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INTERNATIONAL CONFERENCE ON INNOVATIVE RESEARCH IN ENGINEERING, APPLIED SCIENCE & MANAGEMENT (IC-IREASM-2019)

Editors

Prof Dr. Md Sameeruddin Khan,
Dr. M Senthil Kumar,
Dr. Rajeev Shrivatsava,
Dr. Sourabh Jain
&
Dr. Ashok Gupta

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Editors

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I. INTRODUCTION

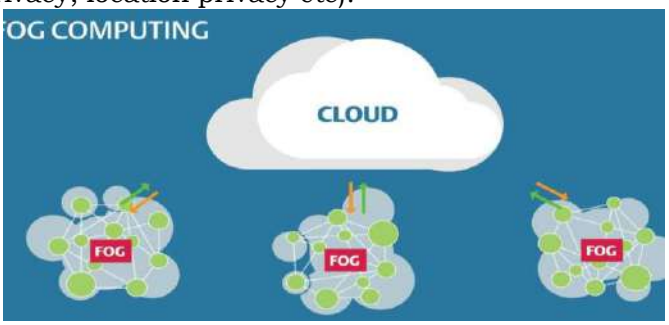
Fog computing complements cloud computing. Fog computing allows for short-term analysis at the edge. In fog computing intelligence and compute power is placed at the LAN. Fog computing is more scalable, and gives a better big picture view of the network as multiple data points feed data in to it. Fog reduces the amount of data sent to the cloud. It conserves network bandwidth and minimizes network and internet latency. It also improves system response time and security by keeping data close to the edge. In this paper I argue that even though the fog computing has power full characteristics to extend the cloud computing paradigm, there are some of the most promising and challenging security and privacy issues of IOT and fog computing: IP address spoofing and man-in-the middle attacks.

1.1 Assumptions & Research methodology:

In recent years, IOT's has emerged as a revolutionary paradigm that enables intelligent and self configuring (smart) IOT devices and sensors. IOT paradigm can stimulate the development of innovative and novel applications to various areas such as smart cities, smart homes, smart grids, smart agriculture, smart transportation, smart health care, etc., to improve all aspects of people's life.

Cloud computing is unable to meet the requirements of low latency, location awareness and mobility support. To solve this problem, FOG computing is introduced as a trusted and dependable solution to put services and resources of the cloud closer to users, which facilitate the leveraging of available serves and resources in edge networks.

By this we are moving from the core (cloud data center) to the edge of network closer to the users. As in every new technology, sum challenges face the vision of the fog computing which are the administrative polices and security concerns (i.e. secure data storage, secure computation, network security, data privacy, usage privacy, location privacy etc).



IOT with fog computing, generate and act on data benefits the business in the following ways:

1. Better security: Fog nodes are protected by using the same policy, controls and procedures used in other parts of IT environment. Using the same physical security & cyber security solution.
2. Deeper insights, with privacy control: Analyze sensitive data locally instead of sending it cloud for analysis.
3. Lower operating expenses: Conserves network bandwidth by processing selected data locally instead of sending it to the cloud for analysis.

Table 1

Requirements	Cloud Computing	Fog Computing
Latency	High	Low
Delay Jitter	High	Very low
Location of Service	Within the Internet	At the edge of the local network
Distance between client and server	Multiple hops	One hope
Security	Undefined	Can be defined
Attack on data enroute	High probability	Very low probability
Location awareness	No	Yes
Geo-distribution	Centralized	Distributed
No. of server nodes	Few	Very large
Support for Mobility	Limited	Supported
Real time interactions	Supported	Supported
Type of last mile connectivity	Leased Line	Wireless

Spoofing of IP is a key attribute of DDOS attack that consumes cloud resources and network bandwidth within a short period of time.

DOS attack: To keep a large scale attack on a machine or group of machine from being detected, Spoofing is often used by the male factors responsible for the event to disguise the source of attacks and make it difficult to shut it off. Spoofing takes on whole new level off severity when multiple hosts are sending constant streams of packet to the DOS target. In that case, all the transmissions are spoofed, making it very difficult to track down the source of the storm.

Man-in-the-middle attack: Imagine two hosts participating in normal transmissions between each other. In man-in-the-middle attack a malicious machine intercepts the packets sent between this machines, alters the packets and then sends them on to the intended destination, with the originating and receiving machines unaware their communications have been tampered with; This where the spoofing element enters the question. Typically, this type of attack is used to get targets to reveal secure information and continue such transmission a period of time, all the while unaware that the machine in the middle of transmission is eaves dropping the whole time.

Examples:

Spoofing, while mostly negative has some more or less legitimate applications. Satellite internet access is one. Packets going to orbit and coming back have a relatively long latency, and there are a lot of protocols in common uses that don't take well to this delay.

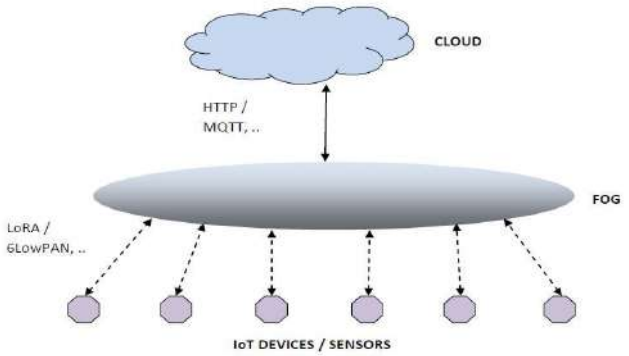
Satellite providers may spoof these protocols, including IP, So that each end of a packet flow receives acknowledgement packets without much delay.

There are five things, which help prevent IPspoofing and its related attacks from affecting network:

1. Use authentication based on key exchange between machines on network, something like IPsec will significantly cut down on the risk of spoofing
2. Use an access control list to deny private IP address on downstream interface
3. Implement filtering off both inbound and outbound traffic
4. Configure routers and switches if they support such configuration, reject packets originating from outside local network that claim to originate from within.
5. Enable encryption sessions on routers, so that trusted host that is outside network can securely communicate with local host.

2 BRIEF SURVEY

Currently there are few works focusing on security (or) privacy issues in fog computing



Security issues:

1. Authentication
2. Access control
3. Intrusion detection

1. Authentication:

As the emergence of biometric authentication, such as finger print authentication, face authentication, touch based or key-stroke-based authentication etc., in mobile computing and cloud computing applying bio metric based authentication in fog computing will be beneficial. The main security issue of fog computing as the authentication at different levels of fog notes while public key infrastructure (PKI)

based technique could solve this problem, trusted execution environment (TEE) technique may have its potential in fog computing.

2. Access control:

Access control has been a relievable tool on smart devices, and cloud, ensuring the security of the system. In fog computing we can also raise questions like how to design access control spanning client-fog-cloud to meet the goals and resource constrains at different levels.

3. Intrusion detection:

ID techniques have been applied to cloud infrastructures two mitigate attacks such as insider attack, flooding attack, port scanning attacks on VM (or) hyperwiser. They can also be deployed at network side to detect malicious activities such as DOS, port scanning etc.,

In fog computing, it provides new opportunities to investigate how fog computing can help with ID on both client side and the centralized cloud side. There are challenges such as implementing ID in geo-distributed, large-scale, high mobility fog computing environment.

3 PRIVACY ISSUES

Users are concerned about the risk of privacy leakage (data, location (or) usage) on the internet privacy- preserving techniques have been proposed in many scenarios including cloud, smart grid, wireless network, and online social network.

In the fog network, privacy-preserving algorithms can be run in between the fog and cloud since computation and storage are sufficient for both sides while those algorithms are usually resource-prohibited at the end devices. Fog node at the edge usually collects data generated by sensors and devices. Techniques such as homomorphic encryption can be utilized to allow privacy-preserving at aggregation at the local gateways without decryption.

#####

ENHANCEMENT OF DISSOLUTION AND BIOAVAILABILITY OF BCS- CLASS II DRUG BY SOLID DISPERSION METHOD

Ch. Madhavi, N.Sowmya, B. Keerthi, S.Sathwika

Abstract - Glibenclamideis a BCS –class II drug it has poor solubility and absorption patterns. The aim of the present study is to improve the solubility and dissolution characteristics of Glibenclamide by preparing solid dispersion using **Melting-Solvent method** technique and to study the effect of particle size and different dissolution media on drug release property. The carrier used was Soluplus as a solubilizer. The solid dispersions were prepared in drug: carrier ratios 1:1.5, 1:2, 1:3, 1:4, 1:6 and 1:8 by solvent evaporation method. The resultant solid dispersions were evaluated for solubility studies at different pH conditions. From the dissolution analysis it was observed that the drug release from 1:3 formulation was released above 50% within 5min than that of physical mixture of Glibenclamide, soluplus and pure drug. Solid dispersions of 1:1.5 and 1:2 were also shown 50% release but after 30 min. Hence 1:3 formulation was optimized. In 1:3 formulation 250-micron particle size of solid dispersion showed higher release than with other solid dispersion. ASolid-state characterization of solid dispersion has been carried out by DSC, FTIR and results revealed that the solid dispersion containing drug: polymer ratio 1:3 has shown amorphous form with improved solubility and dissolution. Solid dispersions were subjected to accelerated stability studies and were characterized by DSC.

Keywords: Glibenclamide, soluplus, DSC, FTIR

1 INTRODUCTION

Solid oraldrug delivery is the simplest and easiest way of administering drugs. It is estimated that 40% of new chemical entities identified in combinatorial screening programs are poorly water soluble[1].The rate and extent of absorption of BCS class II &BCS class IV compounds is highly dependent on the bioavailability which ultimately depends on solubility. Therefore, most of the New Chemical Entities (NCE) under development are intended to be used as a solid dosage forms that originate an effective and reproducible in vivo plasma concentration after oral administration. Hence, these areas of pharmaceutical research that focus on improving the oral bioavailability of active agents include: (i) enhancing solubility and dissolution rate of poorly water-soluble drugs and (ii) enhancing permeability of poorly permeable drugs. Solubility is the important physical property referring to the ability of a given substance, the solute, to dissolve in a solvent.SD refers to the dispersion of one or more drugs in inert and solid water-soluble carriers, either molecularly or as fine particles. Mechanisms to improve the solubility and dissolution properties of SDs include change of the drug crystal structure into an amorphous structure, reduction of aggregation and increased wetting and solubilization of drugs by the carriers. As soluble carriers solubilize in solvent, poorly water-soluble drugs are exposed to dissolution media as very fine particles or dispersions that enhance their dissolution and absorption. (One of most widely used carriers in the preparation of SDs is solid-type polyethylene glycols (PEGs), such as PEG 4000, 6000, and 8000. PEG-based SD are commonly prepared using the fusion (or melting) method, due to its convenience, ease and pulverization over a shorter period, without the use of organic solvents. However, due to the limited solubilizing capability of carriers, various pharmaceutical excipients, such as solubilizers, surfactants, oils and fatty acids, or in the form of mixtures, can be added into the SDs to further improve the bio availability.)

“A dispersion involving the formation of eutectic mixtures of active ingredient with water soluble excipient carriers by melting of their physical mixtures”

The term solid dispersion refers to the dispersion of one or more active ingredient in an inert carrier or matrix at solid state prepared by melting (fusion), solvent, or the melting solvent method. (1) Solid dispersions of active moiety are generally produced by either solvent evaporation or melt methods. (2) Both procedures require

further processing. After production by solvent evaporation, the solvent is removed and the dispersions are hardened then usually pulverized, sieved and mixed. Solid dispersions produced by the melt method are hardenedby freezing before the pulverizing, sieving and mixing stages.

2 PREPARATION OF SOLID DISPERSIONS

1. Preparation of Solid Dispersion by melting solvent Technique:

The carrier used in the study was Soluplus. In the preparation of solid dispersion by melting solvent method, solvent used was N, N-dimethyl formamide which dissolves both drug and carrier. Solid dispersions were prepared in drug/Soluplus ratio of 1:1.5, 1:1, 1:2, 1:3, 1:4, 1:6 and 1:8 for drug: Soluplus. Drug and carrier are initially dissolved in solvent separately and then the carrier solution is added to the drug solution under stirring conditions which is incorporated in to the melt of polyethylene glycol. Then the solvent is subjected to evaporation at $60^0c \pm 5^0c$. After complete evaporation of the solvent, solid dispersion is collected, milled, dried and passed through # 40 mesh screen. The obtained solid dispersions were further characterized for drug content, Solubility studies and in vitro dissolution studies.

2.1 Evaluation methods:

Drug content estimation:

Solid dispersions equivalent to 20 mg of drug was transferred to a separate volumetric flask and dissolved in ethanol, mixed and filtered via filter. Required amount of phosphate buffer was added to the filtrate, suitably diluted with buffer and drug content was analyzed against blank by UV spectrophotometer at 226 nm. The percentage of drug present in the solid dispersion was calculated. Disintegration time observed with disintegration apparatus

2.2 Dissolution test:

Dissolution test protocol: Dissolution study was performed for API and prepared Solid dispersions using USP type-II apparatus (ELECTROLAB). The dissolution test was performed using 900 mL of phosphate buffer (pH 7.5) as the dissolution medium at 50 rpm and at a temperature of 37 0C ± 0.5 0C. Five milliliters of aliquots were periodically withdrawn at 5, 10, 15, 30, 45, 60, 90, 120,150 and 180 mins and the sample volume were replaced with an equal volume of fresh dissolution medium. The samples were diluted and analyzed spectrophotometrically at 226nm.Characterization of Solid dispersions: To elucidate the enhanced dissolution and bioavailability, the physical state of the drug crystals in the soluplus -based SD (1:3) was investigated using instrumental analysis. Studies such as DSC, FTIR are performed for the characterization of solid dispersions

3 RESULTS AND DISCUSSION:

Polymorphic studies were performed by DSC for Glyburide and carrier. The melting ranges of Glyburide was found to be 172.73-177.12 o C and for Soluplus 63.67-114.50 o C. The sharp peak in the thermo gram of Glyburide indicates crystalline nature of drug. Pure drug exhibits a sharp melting endothermic at 174.49oC. Soluplusexhibited a single sharp melting endothermic at87.44o C. Due to formation of solid dispersion melting point of active ingredient and excipient where decreased & it indicates formation of eutectic mixture. Soluplusalong with drug exhibits sharp endotherm at 68.11oC. No endotherm corresponding to the melting point of the pure crystalline API was observed. These results suggest that heating in DSC, the drug progressively dissolves in solu plus and melts completely below the melting point of the drug. The drug in F5 formulation shows characteristic peaks at 1306 cm–1 and 1458 cm–1Soluplus shows characteristic peaks at 3461.37cm–1, 1245.64 cm–1, and 1633.72 cm–1.The absence of any other newpeak in the solid dispersion indicates that drug isnot undergoing any polymorphic change during their preparation. Furthermore, the presence of shifts in the wave numbers of the FTIR peaks ofthe solid dispersions indicates significant interactions between the drug and the soluplus inthe solid dispersions which resulted in improved solubility of Glibenclamid. The study shows that up to the optimum concentration i.e. at 1:3

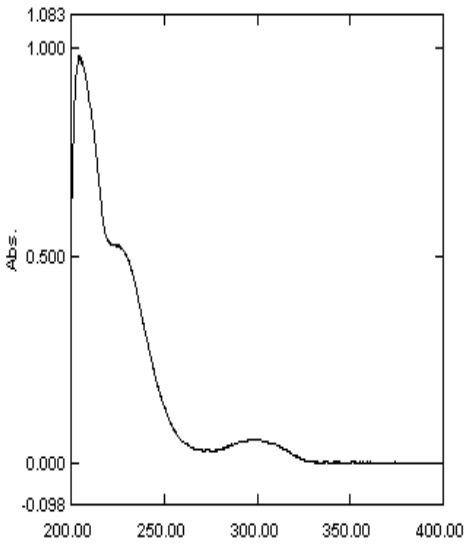
ratio (F5) of drug to soluplus ratio, soluplus will increase the drug release. After that concentration it will retard the drug release. Below the optimum concentration it will not solubilize the drug. Soluplus® dispersion showed a significant dissolution enhancement of drug compared to crystalline drug alone and Physical mixture of drug, Soluplus. The percentage release of F5 formulation was found to be higher in 7.5 buffers. So increase in the pH of the dissolution media increases the solubility of solid dispersion.

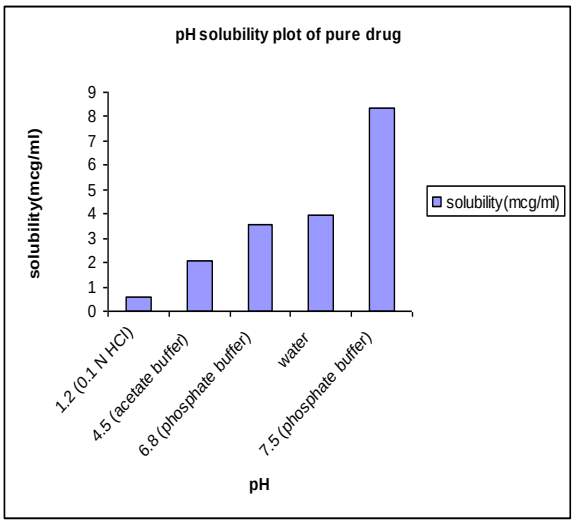
3.1 Solubility studies

Solubility data of pure drug

pH	Solubility (mcg/mL)
1.2 (0.1 N HCl)	0.6
4.5 (acetate buffer)	2.09
6.8 (phosphate buffer)	3.58
Water	3.97
7.5 (phosphate buffer)	8.35

Spectrum of the Glibenclamide was found to be 226 nm





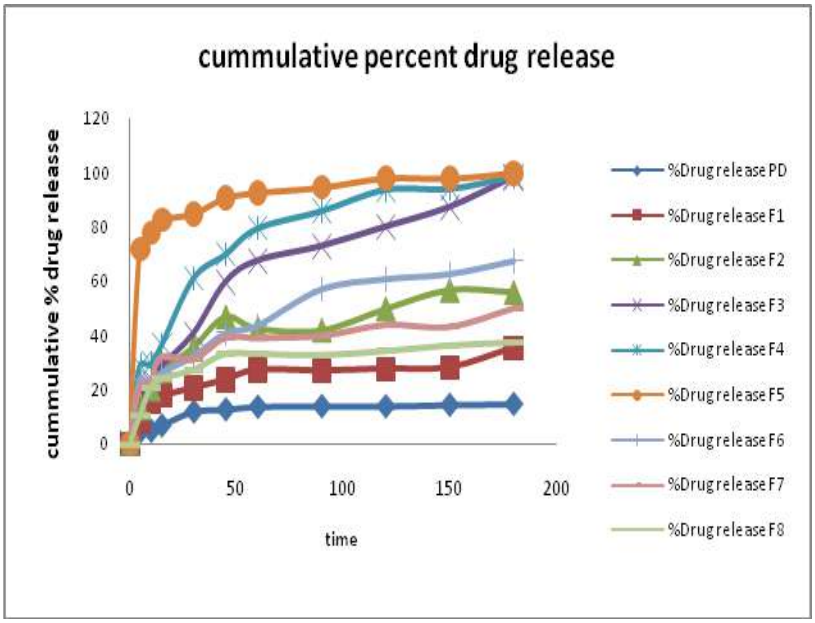


Fig: 1 Graph of % drug release of various solid dispersions

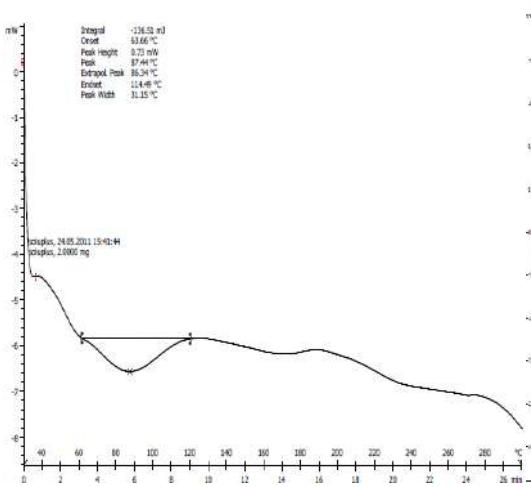


Fig: 2 Thermogram of Glyburide and Soluplus formulation

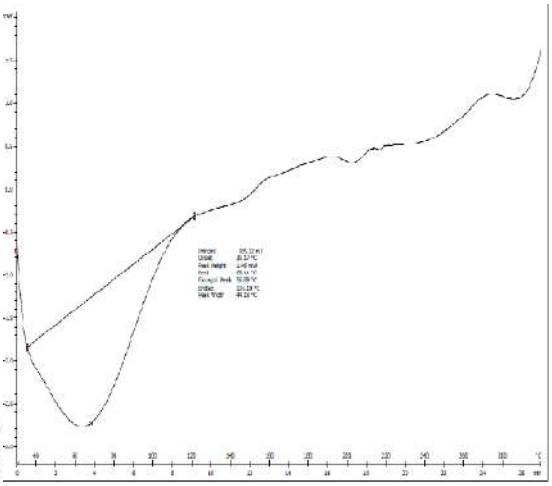


Fig: 3 Thermo gram of F5

Table 1 Composition of Formulations

Formulation Code	Drug (mg)	Soluplus (mg)	Avicel PH 102(mg)	Croscarmellose sodium(mg)	Aerosil 200 pharma (mg)	Magnesium stearate (mg)	Total capsule content(mg)
PD	5	-	95	-	-	-	100
F1	5	5	90	-	-	-	100
F2	5	2.5	85.5	5	1	1	100
F3	5	5	83	5	1	1	100
F4	5	10	78	5	1	1	100
F5	5	15	73	5	1	1	100
F6	5	20	68	5	1	1	100
F7	5	30	58	5	1	1	100
F8	5	40	48	5	1	1	100

Table 2 In vitro drug release profile of different solid dispersions

Time(mins)	Cumulative % drug release								
	PD	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	4.8	8.5	13.21	20.21	29.13	71.87	24.14	21.08	10.62
10	4.9	15.9	20.14	22.68	29.53	77.8	20.62	23.03	20.99
15	6.9	17.9	26.9	28.97	36.45	82.67	26.44	32.29	24.4
30	12.1	20.9	35.73	40.92	61.33	84.8	32.63	31.29	27.47
45	12.9	23.9	46.90	59.8	70.18	90.55	41.27	39.17	33.35
60	13.9	27.5	42.64	67.77	79.81	92.58	44.02	39.2	33.35
90	14.1	27.2	41.96	73.12	86.24	94.49	57.43	39.89	32.9
120	14.1	27.9	49.81	80.21	94.11	97.9	61.23	43.91	34.38
150	14.6	28.4	56.76	87.47	94.45	97.8	63.12	43.22	36.44
180	14.9	35.5	55.96	98.48	98.98	99.82	67.86	49.96	37.47

4 CONCLUSIONS

Solid dispersion technology is a promising approach to enhance the solubility of poorly water soluble drugs. The carrier concentration plays an important role in the

enhancement of solubility and dissolution parameters. Increase in carrier concentration up to the optimum i.e. at 1:3 ratio showed an improved solubility of drug because of hydrophilicity, porosity and wetting properties of carrier and amorphous nature of solid dispersion. The result indicates that the dissolution rate of the poorly soluble Glibenclamide can be increased significantly via the melting solvent method using an amphiphilic carrier solu plus at different drug: carrier ratios. From the dissolution analysis it was observed that the drug release fromF5 formulation was released above 50% within 5min than that of physical mixture of drug, soluplus and then of pure drug.

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SENSOR-CLOUD INFRASTRUCTURE: USER AUTHENTICATION FOR SOCIAL ENHANCEMENT OF HOME NETWORKING

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Abstract - Cloud Computing has powerful data storage and data processing capabilities as well as Wireless sensor network has capability of gathering large amount of data. For this unique feature CC-WSN(Cloud Computing-Wireless Sensor Network) integration received a lot of attention in both industries and academics, but here Authenticated trust and reputation calculation and management of cloud service provider (CSP) and sensor network provider (SNP) are two critical issues. To fill this gap, this paper proposes a novel TCE framework for CC-WSN integration. The proposed system has two functionalities: 1. Calculating and managing trust and reputation for CSP and SNP. 2. Helping Cloud Service User (CSU) to choose desirable CSP and assisting CSP in selecting suitable SNP. Detailed analysis and evaluation are shown.
Keywords: Cloud, sensor networks, integration, authentication, trust, reputation.

I. INTRODUCTION

Computing is being transformed to a model consisting of services that are commoditized and delivered in a manner similar to traditional utilities such as water, electricity, gas, and telephony. In such a model, users access services based on their requirements without regard to where the services are hosted or how they are delivered. Cloud computing (CC) is a model to enable convenient, on-demand network access for a shared pool of configurable computing resources (e.g., servers, networks, storage, applications, and services) that could be rapidly provisioned and released with minimal management effort or service provider interaction. Wireless sensor networks (WSNs) are networks consisting of spatially distributed autonomous sensors, which are capable of sensing the physical or environmental conditions. Objectives: 1) Authenticating CSP and SNP to avoid malicious impersonation attacks. 2) Calculating and managing trust and reputation regarding the service of CSP and SNP. 3) Helping CSU choose desirable CSP and assisting CSP in selecting appropriate SNP.

Computing is being transformed to a model consisting of services that are commoditized and conveyed in a way like traditional utilities, for example, water, electricity, gas, and telephony. In such a model, users access services in light of their prerequisites without respect to where the services are facilitated or how they are delivered. cloud computing (CC) is a model to enable convenient, on-demand network access for a shared pool of configurable processing resources (e.g., servers, networks, storage, applications, and services) that could be quickly provisioned and released with minimal management effort or service supplier interaction. W ireless sensor networks (WSNs) are networked system comprising of spatially appropriated distributed autonomous sensors, which are capable of sensing the physical or environmental conditions.

1) Cloud network: Cloud networking is a new networking paradigm for building and managing secure private networks over the public Internet by utilizing global cloud computing infrastructure. In cloud networking, traditional network functions and services including connectivity, security, management and control, are pushed to the cloud and delivered as a service.

2) Sensors: Sensors are sophisticated devices that are frequently used to detect and respond to electrical or optical signals. A Sensor converts the physical parameter (for example: temperature, blood pressure, humidity, speed, etc.) into a signal which can be measured electrically. Let's explain the example of temperature. The mercury in the glass thermometer expands and contracts the liquid to convert the measured temperature which can be read by a viewer on the calibrated glass tube.

3) Types of sensors: The sensors are classified into the following criteria:

1. Primary Input quantity (Measurand)

2. Transduction principles (Using physical and chemical effects)
3. Material and Technology
4. Property
5. Application

4) Advantages of sensor networks: Sensors networks allow a system to be extended from one with basic functions to one that can receive and act on data about the environment it operates in. Sensors such as PIR detectors are relatively cheap if using wired versions.

2. RELATED WORK

Security and privacy issues have become critically important with the fast expansion of multi-agent systems. Most network applications such as pervasive computing, grid computing and P2P networks can be viewed as multi-agent systems which are open, anonymous and dynamic in nature. Such characteristics of multiagent systems introduce vulnerabilities and threats to providing secured communication. One feasible way to minimize the threats is to evaluate the trust and reputation of the interacting agents. Many trust/reputation models have done so, but they fail to properly evaluate trust when malicious agents start to behave in an unpredictable way. Moreover, these models are ineffective in providing quick response to a malicious agent‟s oscillating behavior. Another aspect of multi-agent systems which is becoming critical for sustaining good service quality, is the even distribution of workload among service providing agents. Most trust/reputation models have not yet addressed this issue. So, to cope with the strategically altering behavior of malicious agents and to distribute workload as evenly as possible among service providers; we present in this paper a dynamic trust computation model called „Secured Trust‟. In this paper we first analyze the different factors related to evaluating the trust of an agent in a and then propose a comprehensive quantitative model for measuring such trust. We also propose a novel load balancing algorithm based on the different factors defined in our model. Simulation results indicate that our model compared to other existing models can effectively cope with strategic behavioral change of malicious agents and at the same time efficiently distribute workload among the service providing agents under stable condition.

Ubiquitous sensing environments such as sensor networks collect large amounts of data. This data volume is destined to grow even further with the vision of the Internet of Things. Cloud computing promises to elastically store and process such sensor data. As an additional benefit, storage and processing in the Cloud enables the efficient aggregation and analysis of information from different data sources. However, sensor data often contains privacy-relevant or otherwise sensitive information. For current Cloud platforms, the data owner looses control over her data once it enters the Cloud. This imposes adoption barriers due to legal or privacy concerns. Hence, a Cloud design is required that the data owner can trust to handle her sensitive data securely. In this paper, we analyze and define properties that a trusted Cloud design has to fulfill. Based on this analysis, we present the security architecture of Sensor Cloud. Our proposed security architecture enforces end-to-end data access control by the data owner reaching from the sensor network to the Cloud storage and processing subsystems as well as strict isolation up to the service-level. We evaluate the validity and feasibility of our Cloud design with an analysis of our early prototype. Our results show that our proposed security architecture is a promising extension of today‟s Cloud offers. Wireless sensor networks (WSNs) which is proposed in the late 1990s have received unprecedented attention, because of their exciting potential applications in military, industrial, and civilian areas (e.g., environmental and habitat monitoring). Although WSNs have become more and more prospective in human life with the development of hardware and communication technologies, there are some natural limitations of WSNs (e.g., network connectivity, network lifetime) due to the static network style in WSNs. Moreover, more and more application scenarios require the sensors in WSNs to be mobile rather than static so as to make traditional applications in WSNs become smarter and enable some new applications. All this induce the mobile wireless

sensor networks (MWSNs) which can greatly promote the development and application of WSNs. However, to the best of our knowledge, there is not a comprehensive survey about the communication and data management issues in MWSNs. In this paper, focusing on researching the communication issues and data management issues in MWSNs, we discuss different research methods regarding communication and data management in MWSNs and propose some further open research areas in MWSNs.

Trust is an important concept in human interactions which facilitates the formation and continued existence of functional human societies. In the first decade of the 21st century, computational trust models have been applied to solve many problems in wireless communication systems. This cross disciplinary research has yielded many innovative solutions. In this paper, we examine the latest methods which have been proposed by researchers to manage trust and reputation in wireless communication systems. Specifically, we survey the state of the art in the application of trust models in the fields of mobile ad hoc networks (MANETs), wireless sensor networks (WSNs), and cognitive radio networks (CRNs). We classify the mainstream methods into natural categories and illustrate how they complement each other in achieving design goals. Major research directions are also outlined.

3 SYSTEM ARCHITECTURE

This paper proposes a novel authenticated trust and reputation calculation and management (ATRCM) system for CC-WSN integration. Considering: 1. The authenticity of CSP and SNP. 2. The attribute requirement of cloud service user (CSU) and CSP. 3. The cost, trust and reputation of the service of CSP.

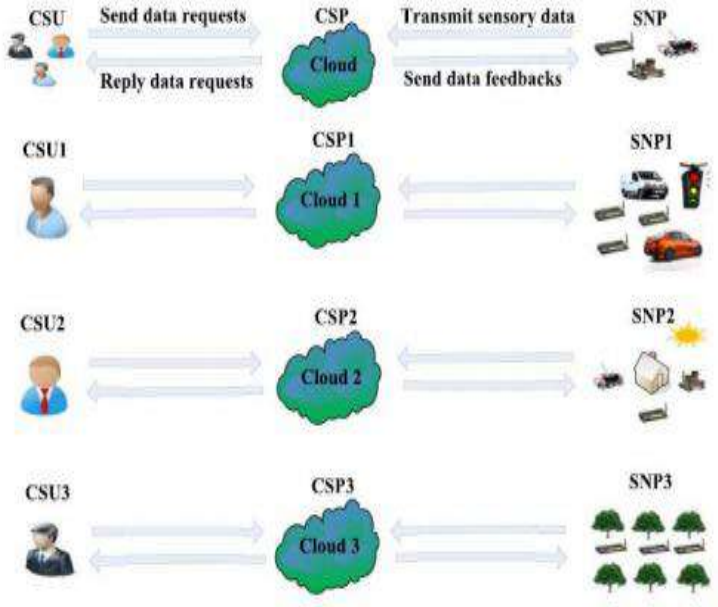

Fig. 1: System Architecture

In the proposed ATRCM system, the SNP achieves the following goals:

1. Authenticating CSP and SNP to avoid malicious impersonation attacks;
2. Calculating and managing trust and reputation regarding the service of CSP and SNP;
3. Helping CSU choose desirable CSP and assisting CSP in selecting appropriate SNP.

Advantageous Of Proposed System:

1. There are different security policies for different domains.
2. The model considers the transaction context, the historical data of entity influences and the measurement of trust value dynamically.

3. The trust model is compatible with the firewall and does not break the firewalls local control policies.

4 SURVEY OF PROPOSED SYSTEM

In this project, we are explored the authentication as well as trust and reputation calculation and management of CSPs and SNPs which are two very critical and barely explored issues with respect to CC and WSNs integration. We proposed a novel ATRCM system for CC-WSN integration.

The proposed ATRCM system achieves the following three functions for CC-WSN integration:

I. Authenticating CSP and SNP to avoid malicious impersonation attacks.
II. Calculating and managing trust and reputation regarding the service of CSP and SNP.
III. Helping CSU choose desirable CSP and assisting CSP in selecting appropriate SNP, In addition, our system security analysis powered by three adversary models showed that our proposed system is secure versus main attacks on a trust and reputation management system, such as good mouthing, bad mouthing, collusion and white-washing attacks, which are the most important attacks.

5 PROPOSED ALGORITHM

A) Authentication flowchart of CSP and SNP:

Step 1: CSPs provide the certificate to CSU and CSU checks whether the signature of the certificate is valid and whether the certificate is revoked. CSU filters the CSPs that are not qualified.

Step 2: SNPs offer the certificate to CSP and CSP checks whether the signature of the certificate is valid and whether the certificate is revoked. CSP filters the SNPs that are not qualified.

B) Trust and reputation calculation and management between CS U and CSPs:

Step 1: CSU checks whether the characteristics of CSPs satisfy the attribute requirement of CSU. Filter the CSPs that are not satisfied.

Step 2: CSU issues requests to TCE and achieves the value of the service from CSP to the CSU. CSU checks whether the value is greater than or equal to the value. Filter the CSPs that are not satisfied.

$$T_{cu} \geq \bar{T}_{scu}$$

Step 3: CSU issues requests to TCE and achieves the value of the service offered by the CSP. CSU checks whether the Rc value is greater than or equal to the value. Filter the CSPs that are not satisfied.

$$R_c \geq \bar{R}_{sc}$$

Step 4: CSU calculates the value between CSC of CSP and DSP of CSU and checks whether the Cc value is within the range. Filter the CSPs that are not satisfied.

Step 5: CSU checks whether ctc is revoked and chooses the service offered by the CSP with the maximum Mc and informs TCE about signed SLA or PLA.

$$M_c = -\alpha_c \cdot \frac{C_c}{|C_{bc}|} + \beta_c \cdot T_{cu} + \gamma_c \cdot R_c$$

Step 6: CSU checks whether ctc is revoked before using the service from the CSP. CSU sends feedbacks about the service of the CSP to TCE (Trusted Center Entity) based on PLA (Privacy Level Agreement) and SLA(Service Level Agreement) after the termination of service. TCE stores and updates the value as well as the value.

6 CONCLUSION

In this paper, we advancing explored the authentication as well as trust and reputation calculation and management of CSPs and SNPs, which are two very critical and barely explored issues with respect to CC and WSNs integration. Further, we proposed a novel ATRCM system for CC-WSN integration. Discussion and analysis about the authentication of CSP and SNP as well as the trust and

reputation with respect to the service provided by CSP and SNP have been presented, followed with detailed design and functionality evaluation about the proposed ATRCM system. All these demonstrated that the proposed ATRCM system achieves the following three functions for CC-WSN integration: 1) calculating and managing trust and reputation regarding the service of CSP and SNP; 2) helping CSU choose desirable CSP and assisting CSP in selecting appropriate SNP, based on (i) the attribute requirement of CSU and CSP; (ii) the cost, trust and reputation of the service of CSP and SNP.

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AN EFFICIENT TIME LINE AND INDEX GENERTATION MECHANISM FOR REAL-TIME SEARCH ON TWEETS

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Abstract - Now days twitter is used worldwide millions of users share and create the tweets. While this is informative, can also be beyond limits even though a tweet is in raw form. Since millions tweets are shared and created it is causing lots of collision. It is very difficult job to handle. Sumblr is a proposed for novel continuous summarization framework called to eliminate the problem. Which is designed to deal with dynamic, quick arriving, and large form tweet streams, on the other hand traditional document summarization methods which focus on static and small form data set? Our proposed framework consists of three major phases. To cluster tweets and maintain distilled enumeration in a data structure known as TCV (tweet cluster vector), we propose an online tweet stream clustering algorithm. We proposed a TCV-Rank summarization technique for creating online summaries and historical summaries of arbitrary time durations.
Keywords: Tweet stream, sumblr, online/historical summary, timeline, evolutionary, TCV.

I. INTRODUCTION

With the Rise of popularity in micro blogging services such as Twitter, MySpace and Facebook in the explosion of the amount of short-text messages. Twitter, for instance, which receives over approx. 400 million tweets over a day has emerged as an overwhelming source of news, blogs, opinions, and lot more. Twitter may yield millions of tweets, spanning weeks, for instance, search for a hot topic. Handling these many tweets for important contents would be an unimaginable, meanwhile it is completely enormous amount of noise and redundancy that user may come across these Situation even though if filtering is allowed but its annoying. The community of users live tweeting about a given event generates enormous contents describing sub-events that occur during an event (e.g., goals, movies, news topics etc.,). All those users share valuable information providing live coverage of events. However, this overwhelming amount of information makes difficult for the user: (i) to follow the full stream while ending out about new sub events that are occurring, and (ii) to retrieve from Twitter the main, summarized information about which are the key things happening at the event.

Growing attractiveness of micro blogging services such as Twitter, Weibo, and Tumblr has resulted in the explosion of the amount of short-text messages. Twitter, for instance, which receives over 400 million tweets per day1 has emerged as an invaluable source of news, blogs, opinions, and more. Tweets, in their raw form, while being informative, can also be overwhelming. For instance, search for a hot topic in Twitter may yield millions of tweets, spanning weeks. Even if filtering is allowed, plowing through so many tweets for important contents would be a nightmare, not to mention the enormous amount of noise and redundancy that one might encounter. To make things worse, new tweets satisfying the filtering criteria may arrive continuously, at an unpredictable rate. One possible solution to information overload problem is summarization. Summarization represents restating of the main ideas of the text in as few words as possible Intuitively, a good summary should cover the main topics (or subtopics) and have diversity among the sentences to reduce redundancy. Summarization is widely used in comfortable arrangement, specially when users surf the internet with their mobile devices which have much lesser screens than PCs. Traditional document summarization approaches, however, are not as effective in the situation of tweets given both the big size of tweets as well as the fast and continuous nature of their arrival. Tweet summarization, therefore, requires functionalities which significantly differ from traditional summarization. In general, tweet summarization has to take into consideration the temporal feature of the arriving tweets.

Consider a user interested in a topic-related tweet stream, for example, tweets about ―Apple‖. A tweet summarization system will continuously monitor ―Apple‖ related tweets producing a real-time timeline of the tweet stream. a user may explore tweets based on a timeline (e.g., ―Apple‖ tweets posted between October to November). Given a timeline range, the document system may generate a series of current time summaries to highlight points where the topic/subtopics evolved in the stream. Such a system will effectively enable the user to learn major news/ discussion related to ―Apple‖ without having to read through the entire tweet stream. Given the big picture about topic evolution about ―Apple‖, a user may decide to zoom in to get a more detailed report for a smaller duration (e.g., from three hour) system may provide a drill-down summary of the duration that enables the user to get additional details for that duration. Such application would not only facilitate easy navigation in topic-relevant tweets, but also support a range of data analysis tasks such as instant reports or historical survey.

Context of tweets given both the large volume of tweets as well as the fast and continuous nature of their arrival, traditional document summarization approaches. Tweet summarization, therefore, requires functionalities which significantly differ from traditional summarization. In general, tweet summarization has to take into consideration the temporal feature of the arriving tweets. Since a big number of tweets are worthless, irrelevant and noisy in nature, due to the social nature of tweeting, implementing stable tweet stream summarization is however not an easy task. Using an illustrative example of a usage of such a system, Let us illustrate the desired properties of a tweet summarization system. for example, tweets about "Apple", consider a user interested in a topic-related tweet stream. A real-time timeline of the tweet stream, a tweet summarization system will constantly monitor "Apple" related tweets producing. A user may explore tweets based on a timeline. To highlight points where the topic/subtopics evolved in the stream, Given a timeline range, the summarization system may produce a sequence of time stamped summaries. To learn major news/discussion related to "Apple" without having to read through the entire tweet stream, such a system will effectively enable the user. a user may decide to zoom in to get a more detailed report for a smaller duration, given the big picture about topic evolution about "Apple". To get additional details for that duration, the system may provide a drill-down summary of the duration that enables the user. To obtain a rollup summary of tweets, a user, perusing a drill-down summary, may alternatively zoom out to a coarser range. The summarization system must support the following two queries: summaries of arbitrary time durations and real-time/range timelines, to be able to support such drill-down and roll-up operations. But also support a range of data analysis tasks such as instant reports or historical survey, such application would not only facilitate easy navigation in topic-relevant tweets. To this end, in this paper, we propose a new summarization method, continuous summarization, for tweet streams.

1.1. Clustering of data stream

The tweet stream clustering module maintains stream, and has capacity to efficiently cluster the tweets and maintain compact cluster information a scalable clustering framework which selectively stores important contents of the data, and compresses or deletes other portions. Cluster Stream is one of the most classic stream clustering methods. It consists of an online micro-clustering component and an offline macro clustering component. number of Web services such as news filtering, text crawling, and topic detecting etc have posed requirements for text stream clustering Stream to generate duration based clustering results for text and categorical data streams. This algorithm relies on an online phase to generate a large number of micro-clusters and an offline phase to recluster everything our tweet stream clustering algorithm is an online procedure without extra offline clustering. We adapted the online clustering phase by incorporating the new structure TCV, and restricting the number of clusters to guarantee efficiency and the quality of TCVs.

2 TIMELINE EVENT SUMMARIZATION

We discard real-time event summarization as the activity which is providing new information about an event every time a relevant sub-event occurs. We remove a two-step process that enables to report information about new sub events in every language. The first step is to identify at all times whether or not a specific sub-event occurred in the last few seconds or not. Next step is to choose a header tweet that describes the sub-event in the language preferred by the user.

2.1 Initialization of tweets

Initially, we collect a tweets clustering algorithm in a small number to create the initial clusters. The corresponding TCVs are initialized according to os. Next, the stream clustering process starts to incrementally update the TCVs whenever anew tweet arrives as entered by the user.

2.2 Increase Clusters

Suppose a tweet t arrives at time (ts), and there are N non passive clusters at that time. The key problem is to decide whether to attract into one of the in progress clusters or advance t as a cluster. We first find the cluster whose centroid is the closest to t. Next we get the centroid of each cluster based on formulations done above, compute its cosine similarity to t, and find the cluster Cp with the largest similar tweet.

2.3 Eliminating unused Clusters

For most events (such as news, football matches, entertainment and new offers) in tweet streams, managing of time is important since it is not permanent for a longtime. Thus it is safe to discard the clusters representing these subtopics when they are commonly unused. To find out such clusters, way is to estimate the average arrival time. whatever storing p percent of tweets for every increase memory costs, especially when clusters grow huge data. We employ an approximate method to get Avg p.

2.4 Merging Clusters

If the number of clusters keeps increasing then, we have an upper limit as Nmax for number of clusters. When the limit is reached its threshold, a merging process starts. The process merges cluster in a greedy algorithm. Basically, it sort all cluster pairs by their centroid similarities in a decrementing order. Starting with the most familiar pair, it merges two clusters. When many clusters are unique clusters which have not been merged with other clusters, they are merged into a new composite cluster defined by the users.

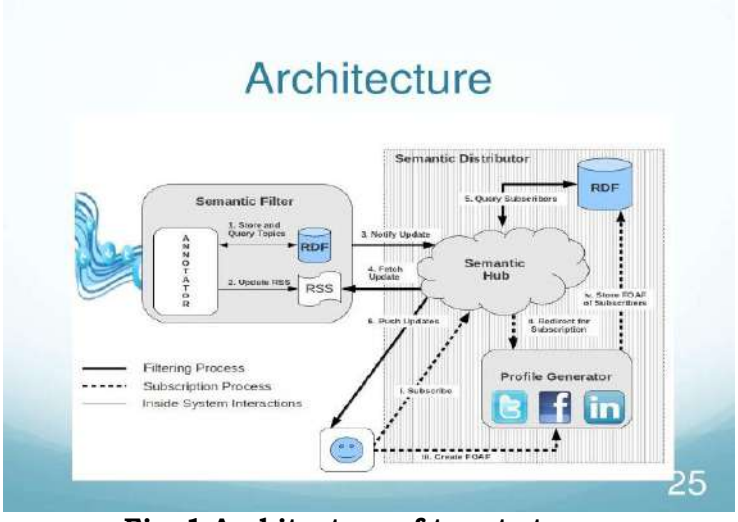

Fig. 1 Architecture of tweet stream

2.5 Summarization at the High-level

This approach is divided into two types of summaries: 1. online and 2 .historical summaries. An online summary describes currently discussed among the users. So, the input for generating online summaries is taken directly from the current clusters handled in memory. Meanwhile, historical summary helps people understand the main happenings during a specific period, means we need to remove the influence of tweet contents from the outside of that period. This helps retrieval of the required data and even more complicated. For example the length of a user accessed time duration is H, and ending timestamp of the duration is tse.

2.6 Timeline Detection

The high need for analyzing huge contents in social medias fuels the improvement in visualization techniques. Timeline is one technique which can make analysis tasks better and quick as in presented a timeline-based hidden channel for conversations around events. This proposed the technique called ETS known as evolutionary timeline summarization to compute evolution timelines similar, which consists of a series of time-stamped summaries.

2.7 Summary-Based Variation

Tweets flow in the stream, online summaries are produced continuously by utilizing online cluster statistics in TCVs. This allows for formation of a real-time timeline. When an obvious variation occurs in the main contents in tweets (summary form), we can get a change of sub-event (i.e., a time node on the timeline. To gross the variation, we use the divergence to measure the distance between two word partitions in two successive summaries Sc and Sp (Sc is the partition of the current summary and Sp is that of the previous one).

2.8 Volume-Based Variation

Though the summary-based variation can reflect sub-topic changes. Many tweets are related to users day to day life, a sub-topic change detected from tweets description may not be significant much. At this point we consider the use of rapid raise (or spikes) in the volume of tweets in timeline, which is a common technique in present online event detection systems. We develop a spike finding method. The input, the binning process in Algorithm needs to count the tweet arrival volume in each time unit.

3 PROPOSED WORK

We propose a regular tweet stream summarization framework, defined as Sumblr, to generate timelines and summaries in the stream of tweets. We design a data structure for stream processing called TCV, and propose an algorithm called TCV-Rank algorithm for 2 types of summarization method such as online and historical summarization. Then we propose an algorithm called TCV (topic evolution detection algorithm) which produces timelines by checking three kinds of variations. Regular testing on real Twitter data sets demonstrates the efficiency and effectiveness of our framework for the requirements of user.

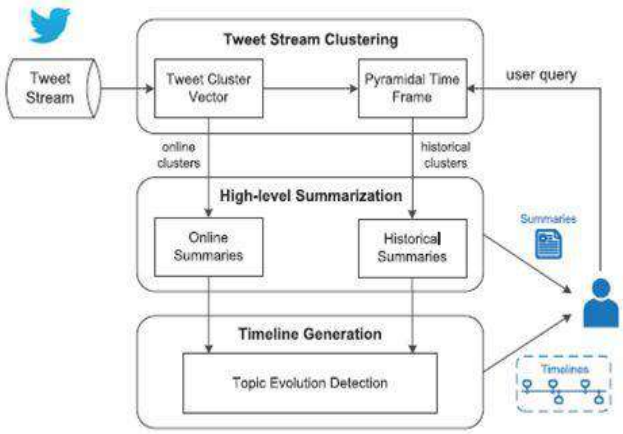

Fig. 2 The Framework of Sumblr

Sumblr is abbreviated as continuouS sUMmarization By stream cLuste Ring. The framework consists of three major division,1. Tweet Stream Clustering module, 2. High-level Summarization module and 3.Timeline Generation module. In tweet stream clustering module, we design an efficient tweet stream clustering algorithm, for allowing the effective clustering of tweets with only one pass over the data we use an online algorithm allowing. This algorithm has two data structures to keep important tweet information in clusters. The initial one is a novel compressed structure known as tweet cluster vector TCV. TCVs are analyzed as potential sub-topic delegates and secures dynamically in memory during stream processing. The another structure is the pyramidal time frame narrated as PTF, which is used to save and organize cluster snapshots at variety of moments, thus allowing historical tweet data to be retrieved by any arbitrary time durations. This module supports generation of two kinds of summaries:1. online and 2. historical summaries. (1)we propose a TCV-Rank summarization algorithm by allude to the current clusters maintained in memory, to generate online summaries. This high-level summarization algorithm begins its computation by centrality scores for tweets kept in TCVs, and selects the top-ranked ones in terms of novelty content and coverage. (2) To compute a historical summary where the user specifies an haphazard time duration, we very first retrieve two historical cluster snapshots from the PTF with respect to the two endpoints one is the beginning and other one is ending points of the duration. Then, the TCV-Rank summarization algorithm is used to generate summaries, based on the difference between the two cluster snapshots. The elemental of the timeline generation module is a topic evolution detection algorithm, which utilize online or historical summaries to produce realtime or range timelines. The algorithm supervises quantified variation during the course of stream processing. In addition of a new node on the timeline a enormous fluctuation at a particular moment implies a sub-topic change. In our design, we consider 3 different factors in the algorithm. First, we mark variation in the main contents discussed in tweets, in the form of summary. To calibrate the précis based variation (PUM), To measure the distance between two word distributions in two serial summaries, we use the Jensen-Shannon divergence (JSD). Second, we monitor the volume-based variation (VOL) which reflects the importance of sub-topic changes, to find high level increasesă (ură —spikes‖)ă ină theă volumeă ofă tweets over time. Third, we state the sum-vol variation (SV) by joining both effects of summary content and significance, and detect topic evolution whenever there is a break in the consolidate variation.

3.1 First Step: Sub-Event Detection

The first part of the event summarization system corresponds to the sub-event detection. The system has to check at all times whether or not a relevant sub-event has occurred, irrespective of how the stream will continue to evolve. Before the start of an event, the system is provided with the time that it begins, as scheduled in

earlier event, so the system knows when to start looking for new sub events. With the target of developing a real-time sub event detection method, users depend on the fact that relevant sub-events trigger a massive tweeting activity of the community. The more important a sub-event is, the more users will tweet instantly about it almost immediately. This is rejected as peaks in the histogram of tweeting rates. In the process of identifying sub-events, we aim to compare 2 different ideas: (i) only sudden increase with respect to the recent tweeting activity, and (ii)By considering also all the activity which is seen previously during a game, so that the system acquires from the modification of the viewers. We compare the following two methods that relay on these 2 ideas:

1. Increase:

This increase approach was introduced by Zhao et al. It considers that an important sub-event will be reacted as a sudden raise in the tweeting rate. For time periods defined at seconds 10, 20, 30 and 60, this method checks previous time frame for any of those history if the rate of tweeting increases by at least 1.7 from the previous time. If the expansion actually occurred, it is considered that a subevent occurred. This method is that not only outstanding tweeting rates would be submitted as sub-events, but also lowers the rates that are foregoing by even lower rates which is major drawback of it.

2. Outliers:

This introduce approach relies on whether the given timeframe stands out from the regular tweeting rate seen so far during the event for a tweeting rate (not only from the previous time frame). We set the time period in seconds 60for this approach. Initial 15 minutes before the game starts, the system begins to learn from the tweeting rates, to and out what is the approximate audience of the event. When the start time approaches, very first the system begins with the detection process of sub-event. The system considers that a sub-event occurred when the tweeting rate represents and activity seen before an outlier is the one compared both of them. If it is (tweeting rate) above 90% of all the earlier visualized tweeting rates, the current time frame will be reported as a sub-event. This threshold has been set a priority without optimization.

3.2 Second Step: Tweet Selection

The last part of the summarization system is the tweet stream. Only when first step reports that new sub-event has occurred then only next step is activated .Once the system has determined that a sub-event occurred, the selector is provided with the tweets corresponding to the time (in minute) of the sub-event. From those tweets, the system has to choose one as a head of the tweet that tells what has happened. This tweet must provide the main information about the sub-event, so the user will get to know what happened and can track the event. Here we compare two tweet selection methods, depending only on information stored within that minute of the sub-event. We use outlier based sub-event detection approach to test them on the output described above, as the approach with best performance for the rest step. we get a ranking of all the tweets, to select a representative tweet. To do so, we earn each tweet with the average of the values of the terms that it contains. The more head clusters are the terms contained in a tweet, the more representative will be the tweet itself. To define the values of the terms, we tally 2 methods: (i) only the sub-parts can consider tweets(to give highest values to terms that are used frequently within the sub-event), and (ii) taking into the user account also the tweets are sent before throughout the game, so that the system can make a fluctuations from what has been the very common vocabulary during the event (to give highest values to terms that are particularly used within the time(min) and not so periodically earlier during the event). We were using these following famous approaches to implement these two ideas:

1. Tweet Frequency (TF): each term is given the value of its frequency as the number of appearance within the minute, nevertheless of its prior use.
2. KLD: know as Kullback-Leibler divergence we use this to measure how frequent of term t within the sub-event (H),During the game until the

previous minute(G) it also considering how frequent it is. Thus, KLD will give a higher weight to terms frequent within the minute that were low repeated frequency during the game analysis. Rather provide higher rates to specific terms within the sub-event. In all along the game this may allow to get rid of the common vocabulary, DKL (HkG) = H(t) logH(t)G(t) called as equation1 With these two approaches, the sum of values for each terms contained in each tweet results in a strength for each tweet. With weights given to all tweets, tweets are sent during the sub-event are considered and creates ranking of it , where the tweet with highest weight ranks list.

4 CONCLUSIONS

We proposed a new technique for continuous tweet stream summarization called Sumblr. This employs a clustering algorithm to reduce tweets into TCVs and maintains them in an online fashion. Then, for to generating online summaries and historical summaries with arbitrary time durations it uses a TCV-Rank summarization algorithm. By allowing sumblr to produce dynamic timeline for streams of tweet, automatic topic evolution can be detected. The experimental results exhibit the capacity and productiveness of our idea. For future work, we aim to develop a multi-topic version of Sumblr in a distributed system, and analyses it on more complete and huge data sets. We design to develop a multi topic version of Sumblr in a spread system, we can also try to do estimation on more complete and large-scale datasets.

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CHARGING ALGORITHMS OF LITHIUM-ION BATTERIES: AN OVERVIEW

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Abstract - This paper presents the overview of charging algorithms for lithium-ion batteries, which include constant current-constant voltage (CC/CV), variants of the CC/CV, multistage constant current, pulse current and pulse voltage. The CC/CV charging algorithm is well developed and widely adopted in charging lithium-ion batteries. It is used as a benchmark to compare with other charging algorithms in terms of the charging time, the charging efficiency, the influences on battery life and other aspects, which can serve as a convenient reference for future work in developing a charger for lithium-ionbattery.
Keywords: Lithium-ion batteries; charging algorithms

I. INTRODUCTION

The rapid development in mobile phones, laptop and tablet devices in recent decades has developed an enormous demand for compact and lightweight batteries. The lithium-ion batteries offer one of the highest energy to weight/volume ratios among current battery systems and display characteristics of long life cycles, no memory and low self-discharge [1], [2]. Those positive characteristics have made lithium-ion batteries a major applicant. More recently, rising environmental and energy sustainability issues, along with the constant decrease in expenses and enhancement of security and reliability in batteries made electric car (EV) industries more sustainable and competitive for standard cars, thereby making EVs more feasible. In about among these applications, a battery system is constructed of the battery as well as battery management system (BMS). Battery charging is actually playing a crucial role within the BMS, in which that the charging algorithms, namely charging profiles as charging currents over time, have a strong influence on the battery efficiency as well as life cycles. As a result, numerous charging algorithms have been designed as well as implemented [3].

The algorithms vary in the charging time, the charging efficiency and the impact on the battery life cycles as well as implementation complexity, sensors required, cost and popularity. They range from the almost obviously simple charging algorithm, such as constant current-constant voltage (CC/CV), to being most creatively complicated one, such as multistage charging algorithm with an ant colony, which is not necessarily the most effective. In fact, so many charging algorithms been developed that it has become very difficult to determine which algorithm is most appropriatefora given application. However, the review of all the algorithms would be very beneficial to researchers and practicing engineers who are working on the areas of battery charging systems. We apologize if one or more important charging algorithms, or significant improvements of, have not beenincluded.

The rest of this paper is arranged as follows. Section II discusses and analyze svarious charging algorithms. Section III provides the summary of the major characteristics of each charging algorithm in terms of their implementation complexity, charging time, charging efficiency, cycle life and sensors required. The conclusion is drawn in SectionVI.

2 CHARGING ALGORITHMS OF LITHIUM-IONBATTERIES

The lithium-ion batteries involve a reversible insertion (extraction) of lithium ions into/from two porous electrodes during the discharging (charging) process, where two electrodes are separated by a foil that prevents electrical contact, and both two electrodes and the separator foil are immersed in a liquid electrolyte containing charged species Li^+ ions [4]. Note that some lithium-ion batteries have a solid

electrolyte, which serves both as ionic conducting medium and an electrically insulating separator. These lithium-ion batteries are sometimes called lithium ion polymer batteries or lithium polymer batteries. However, no matter what electrolyte (liquid or solid) is used in the battery, the charged species that intercalates in the battery are the Li^+ ions, and hence they are generally named as lithium-ion batteries.

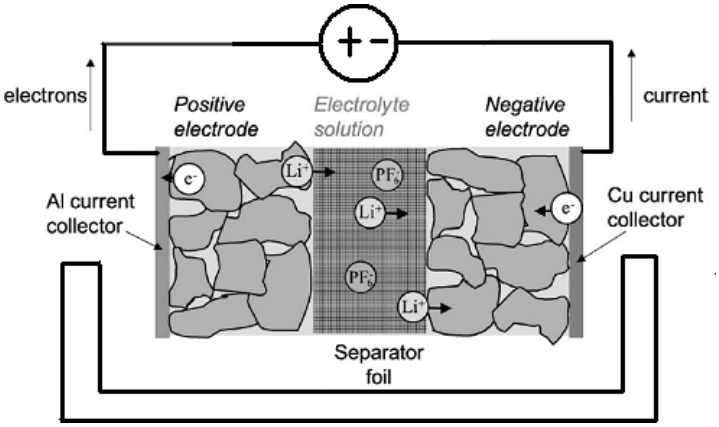


Fig. 1 Charging of lithium-ion batteries

The lithium insertion/extraction process occurring with a flow of ions through the electrolyte is accompanied by a reduction (oxidation) reaction of two electrodes assisted with a flow of electrons through the external circuit. Fig. 1 shows the schematic representation of lithium-ion batteries during charging, where Li^+ ions are extracted from the positive electrode and inserted into the negative electrode. The energy stored in the lithium-ion batteries through the charging process depends on the difference in energy states of the intercalated Li^+ ion in the positive and negative electrodes [5].

A. Constant current-constant voltage

Among all charging algorithms, the constant current- constant voltage (CC/CV) charging algorithm is well developed and widely adopted incharg in lithium-ion batteries because of its simplicity and easy implementation. Under the arrangement of the CC/CV charging algorithm, a constant current is applied to charge the battery until the battery voltage rises to apre set maximum charging voltage($V_{pre\,set}$),then the Charging algorithm is very easy and cheap to implement as it does not necessarily require a microcontroller

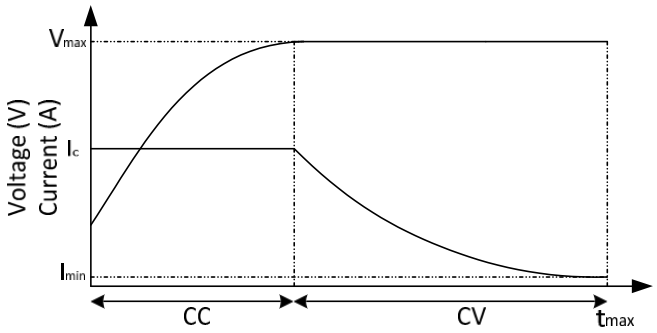
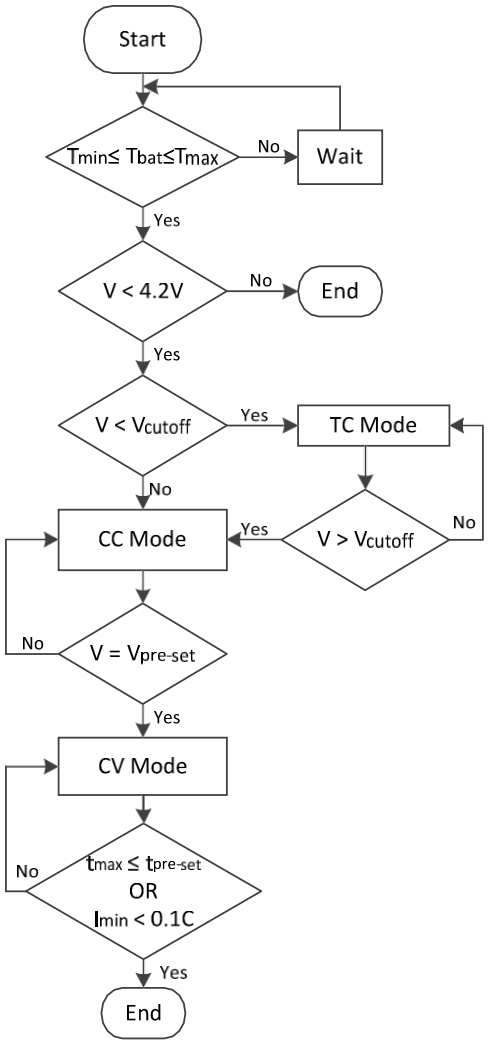


Fig. 2 Charging profile of CC/CV

.Charging voltage is held constant at



V_{preset} and correspondingly the charging current is reduced exponentially. The charging process stops when the charging current reaches a preset small current. Fig. 2 shows the charging profile of the CC/CV [6].

When the CC/CV was used to develop a charger for a lithium-ion battery, a few protection measures have to betaken to protect the battery. Fig. 3 shows the flow chart of the charging process of a charger based on the CC/CV [7] including the safety and protection check. It shows that the charging process of the CC/CV consists of three steps. First, the battery initial conditions, such as temperature and open-circuit voltage (OCV), are checked if they are in the normal range. If the OCV is less than apre set cut off voltage(V_{cutoff}), the battery is charged by trickle charge (TC) mode with small current (e.g. 0.1C) until the battery voltage rises to the cutoff voltage, where 0.1C represents the charging current with the C representing the nominal capacity of the battery. Second, once the battery voltage exceeds V_{cutoff}, the CC mode starts to charge the battery. The charging current is chosen by referring to the specification of the lithium-ion batteries, its range can be varied from 0.5C to 3.2C [8]. Third, when the battery voltage charges to V_{preset}(e.g. 4.2V), the charging process switches to the CV mode, the battery is charged at the constant voltage of 4.2V and the charging current is reduced correspondingly. The charging period is terminated by either the minimum charging current (I_{min} 0.1C) or the maximum charging time (t_{max} t $_{preset}$) is reached.

Based on the charging current in the CC mode, the total charging time is varied

from 1 hour to 2.5 hours. In general, the lower the charging current of the CC mode is, the higher the charging efficiency and longer the charging time and the battery life. Three sensors are usually required to measure the battery voltage, current and surface temperatures. TheCC/CV

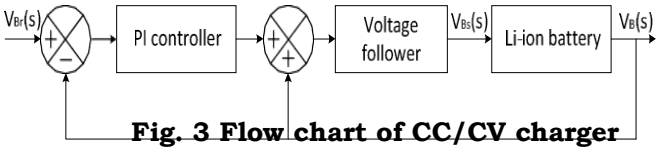


Fig. 3 Flow chart of CC/CV charger

B. Variants of CC/CV charging algorithms

Many variants of the CC/CV charging algorithms were developed. There are two of them by slightly modifying the standard CC/CV charging algorithm. One is the double-loop control charger (DL-CC/CV) [9], as shown in Fig. 4. With positive and negative feedback of the battery voltage (V_B (s)), the DL-CC/CV can obtain the charging profile very similar to the standard CC/CV without sensing the charging current. Asa result, the need for a current sensor is eliminated while still achieving the similar performance of the CC/CV with the simplest and lowest cost in hardware implementation. complexity and the requirement of high computation power, a microcontroller is more suitable for implementing both charging algorithms.

There is one more charging algorithm based on the principle of the phase-locked loop (PLL) control [13]. The PLL process naturally coincides with the requirement to f the charging profile of the CC/CV (PLL-CC/CV). Fig. 7 shows the block diagram of thePLL-CC/CV.

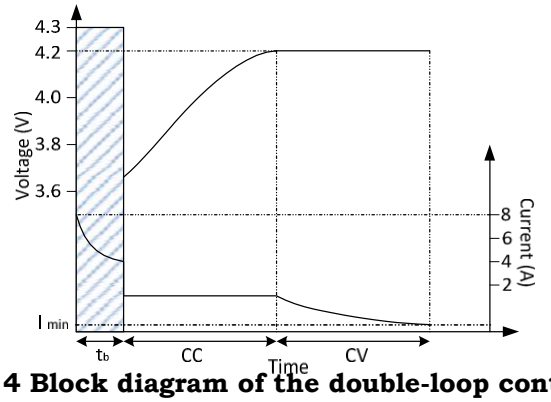


Fig. 4 Block diagram of the double-loop control charger

The other is the boost charger (BC-CC/CV) [10], where the battery is required to be fully discharged before charging. For the BC-CC/CV, the CV mode of the maximum charging voltage V_{max} (e.g. 4.3V which is 0.1V higher than 4.2V) is initially used to charge the battery in the boost charging period t_b(e.g. 5 min.) and the charged capacity can reacha round 30% of its nominal capacity. It shows that a significant amount of charge has been stored in the battery within a relatively short period t_o. If this period is extended to 10 minutes, about 60 % of its nominal capacity can be charged into the battery. After this period, the charging algorithm is the switched to the standard CC/CV. Fig. 5 shows the charging profile of the BC-CC/CV. Due to the initial higher charging voltage, the BC- CC/CV can charge the battery faster than the CC/CV, but it is required to fully discharge the battery before charging which requires the discharge circuit. This will increase the number of components and cost. The necessity of discharge before charging also makes this charging algorithm inefficient. The effect of initial higher charging voltage on the battery life has been investigated. It shows that there is no obvious degradation within 500 testing cycles.

There are other two algorithms which use the advanced control to implement the CC/CV. In these two charging algorithms, the fuzzy-logic control and the grey-predicated control were used to optimize the charging current in the CV mode of the

CC/CV, which are named as the FL-CC/CV [11] and the GP-CC/CV [12], respectively. The essential part of these two charging algorithms is to use the open-circuitvoltage to replace the voltage inchargeas the change over voltage from the CC mode to the CV mode so that the chargeng current of the CV mode is larger at higher current part and smaller at the

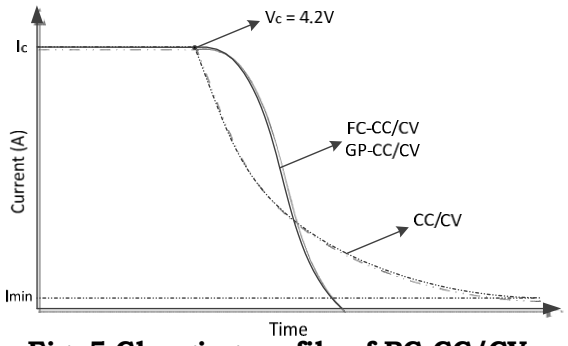


Fig. 5 Charging profile of BC-CC/CV

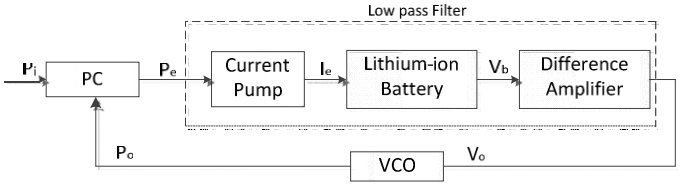


Fig. 6 Charging profile of FL-CC/CV and GP-CC/CV

From Fig. 7, the output of the VCO oscillates a feedback phase P that reflects on the battery voltage V. P is then compare lower current part than the current in the CV mode of the standard CC/CV charging algorithm. As a result, more the input reference phase $P_i$to produce the phase error capacity is able to be charged into the battery within the same P_e. This phase error P_e is sent to the current pump to period of the CV mode.

Fig. 6 shows the schematic representation of the charging profiles for the both algorithms, where a fuzzy-controlled active state of charge controller for the FL-CC/CV and a grey-predicted technique for the GP- CC/CV have been used to dynamically determine the appropriate charging current with the OCV of 4.2V in the CV mode. Thus, the FL-CC/CV and the GP-CC/CV have a shorter charging time and a higher charging efficiency. Due to their produce a suitable current to charge lithium-ion batteries. The battery can be fully charged after many cycles.

Under this PLL-CC/CV arrangement, the auto-tracking process (the frequency-tracking) is corresponding to the bulk charge which is similar to the CC mode of the CC/CV. The auto-locking process (from the phase-tracking to the phase-locked state) is corresponding to the variable current charge and float charge which is similar to the CV mode of the another. This was solved by setting the maximum charging CC/CV. Fig. 8 shows the flow chart for the charging process of voltage Vma (e.g. 4.2V) and whenever the battery voltage is the PLL-CC/CV. Later, an improved PLL-CC/CV [14] was proposed (IPLL-CC/CV). The complete charging process consists of the bulk current charge (CC mode) which remains the same as that of the PLL-CC/CV and the pulsed current charge and the pulsed float charge (CV mode) which were modified from the variable current charge and the float charge, respectively, as shown in Fig. 9. As the internal pressure charged by a pulsed current is smaller than that charged by constant current, the charging efficiency of the improved IPLL-CC/CV is higher than that of the CC/CV. The total charging time is similar to that of the CC/CV. Both the PLL- CC/CV and the IPLL-CC/CV can be easily implemented by using the IC chip with the PLL function.
Charged to, the charging process will switch over to the max next stage.

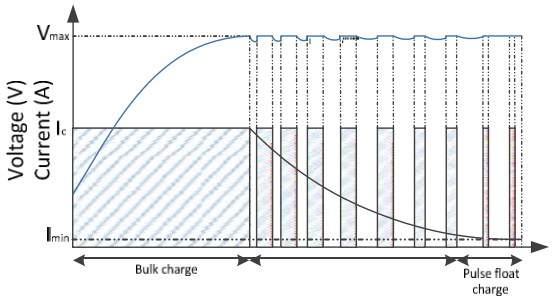


Fig. 7 Flow chart for charging process of PLL-CC/CV

C. Multistage current charging algorithm

Multistage current charging (MSCC) algorithm was developed to charge the battery, where various methods were proposed to determine the optimal charging currents in each charging stage of the battery. Fig. 10 illustrates the charging profiles of the MSCC with 5 charging stages. It is clear that there are two issues in the MSCC. The first issue is that at what time the charging process switches from one stagein to

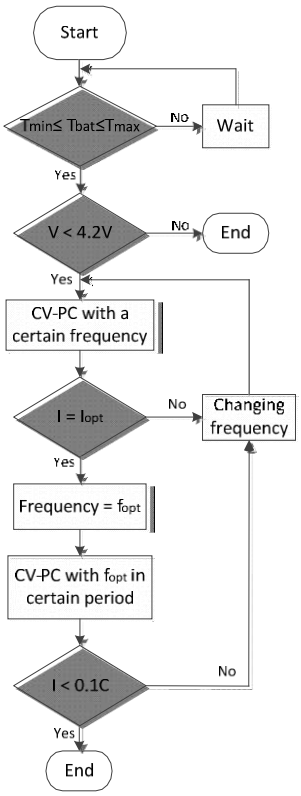


Fig. 8 Charging profile of IPPL-CC/CV

The second issue is that the appropriate charging current in each stage should be must be determined to charge the battery. So far, five approaches were used to determine the optimal charging current for each stage. The first approach used a fuzzy logic controller to determine charging current [15], where the inputs of the fuzzy controller are the temperature and the change of the temperature, and the output of the controller is the charging current. The effectiveness of the approach depends on the knowledge of the user in choosing the right error computation and membership functions and coming up a proper rule basetable.

The second approach adopted the consecutive orthogonal array (or Taguchi method) to search an optimal charging current profile [16], [17]. The third approach applied the ant colony system to optimize a charging current profile [18]. The fourth approach used an integer linear programming to search an optimal charging current

profile [19]. The above-mentioned three approaches were implemented with properly designed experiments with a computer. No matter what approaches are used, the general flow chart to implement each charging algorithm is shown in Fig. 11. In this flow chart, the block highlighted by the shaded area may vary from one to another as various optimization approaches are chosen, the rest ofthem are remaining the same. Generally, the implementation of this charging algorithm has required a microcontroller or a computer. The charging speed is faster and charging efficiency is higher than those of the CC/CV.

D. Pulse charge

The pulse charge has been claimed to be a fast and efficient charging algorithm for lithium-ion batteries. The effects of pulse charge on lithium-ion batteries were evaluated using an electronic network model. Simulation results provide insight into the effect of the pulses on the internal process, such as diffusion, migration, electrochemical reactions and heat generation [20]. Also, the effect of pulse charge on the cycle life of lithium-ion batteries was investigated using the experimental approach[21].

Many pulses charging algorithms were developed. Basically, they can be divided into two groups. The first group is the pulse charge with the constant voltage (CV-PC) in the entire Highest charging current. A prototype of these two charging algorithms was implemented.

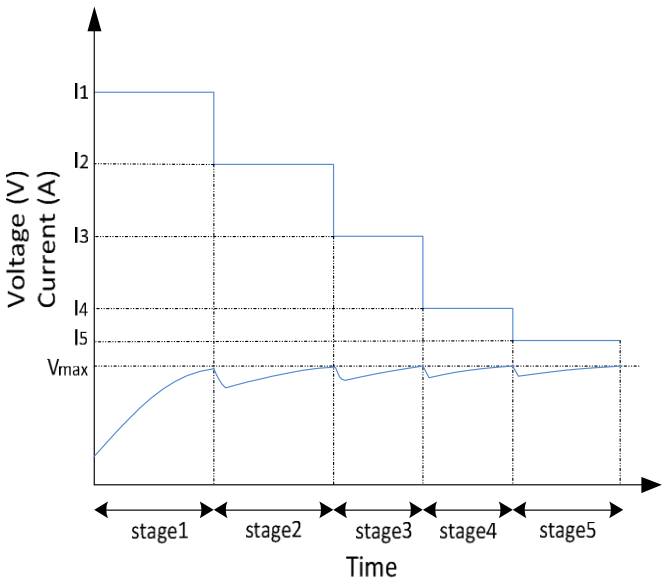


Fig. 9 Charging profile of MSCC

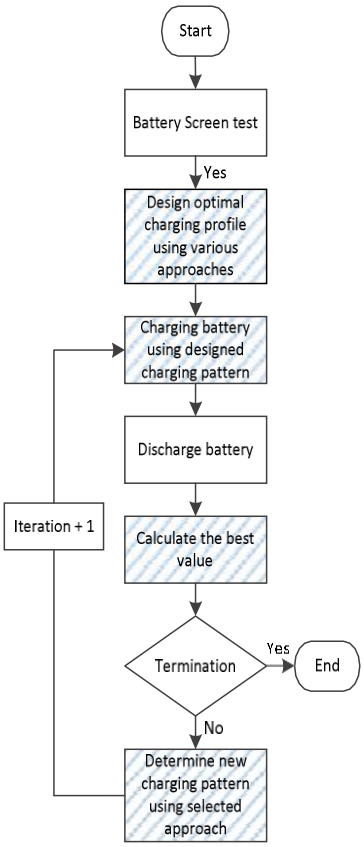


Fig. 10 Flow chart of MSCC

charging process while the frequency of the pulse (FCV-PC) [22] or the duty cycle of the pulse (DCV-PC) is changed [23].

The basic idea of the FCV-PC is to adjust the frequency of the pulse with inaccurate in range and obverse the response of the charging current. The optimal frequency ($_{optimal}$) is obtained when the battery impedance is minimized and the highest Charging currents chieved. Fig.12 shows the flow chart of the FCV-PC. The DCV-PC is very similar to the FCV-PC, the only difference is that, instead of changing the frequency of the pulse, it changes the duty cycle of the pulse to achieve the Flow chart of FCV-PC

It demonstrated that the charging time is shorter than that of the CC/CV [22], [23] and the charging efficiency is higher and the cycle life islonger.

The second group is the pulse charge with the constant current in the entire charging process (CC-PC) while the battery voltage is monitored to make sure that the voltage is always lower than the preset maximum charging voltage. The charging profile can be varied by changing the amplitude and width of the pulse and the relaxation period between the pulses [24], [25]. Fig. 13 shows the charging profile of the CC-PC. With the help of the simulation, the charging time (t_c) is selected when the maximum concentration is reached and the relaxation period (t_r) is determined such that it provides sufficient time to a reset concentration.

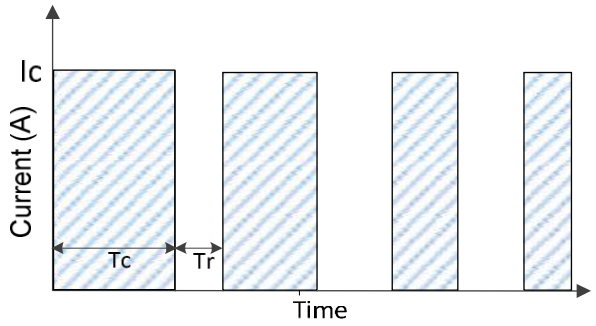


Fig. 11 Charging profile of CC-PC

As a result, electrochemical reactions neither produce heat nor cause the accumulation of pressure inside the battery. Since this charging algorithm is designed to establish the link between the pulse charging current profile and the chemical reaction process, in principle, it can charge the battery faster and more efficient as well as extend battery cycle life. However, no hardware of this charging algorithm for the lithium-ion battery has been implemented so far [15]-[16].

3 DISCUSSIONS

With so many charging algorithms available to charge lithium-ion batteries, it might not be obvious for the users to choose which one better suits their application needs. However, Table I summarizes the major aspects of these charging algorithms which should help in choosing an appropriate charging algorithm.

Table I. Major Characteristics of Charging Algorithms

Charging algorithm	Analog or digital	Ch. time	Ch. Eff.	Imp. Comp.	Cycle Life	Sensed Para.
CC/CV	Both	L	L	M	L	V, I, T
DL-CC/CV	Analog	L	L	L	L	V,T
BC-CC/CV	Both	H	L	M	L	V, I, T
FL-CC/CV	Digital	M	M	H	M	V, I, T
GP-CC/CV	Digital	M	M	H	M	V, I, T
PLL-CC/CV	Analog	L	M	M	L	V, I, T
IPLL-CC/CV	Analog	L	M	M	M	V, I, T
MSCC	Digital	M	M	H	M	V, I, T
FCV-PC	Digital	H	H	H	H	V, I, T
DCV-PC	Digital	H	H	H	H	V, I, T
CC-PC	Digital	H	H	H	H	V, I, T

Notes: H: high, M: medium, L: low, Ch.: charging, Eff.: efficiency, Imp.: implementation, Comp.: complexity, Para.: parameters

4 CONCLUSION

This paper discusses and analyzes the existing charging algorithms for lithium-ion batteries in the literature. Their major characteristics are compared in terms of implementation, charging time, charging efficiency, cycle life and sensed parameters, which serves as a useful guide in choosing the right charging algorithms for particular applications.

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IN VITRO ASSESSMENT OF DIDANOSINE LOADED LONG CIRCULATED LIPOSOMES INTENDED FOR PARENTERAL DELIVERY

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Abstract - In the present study, didanosine loaded stealth liposomes were prepared by ethanol injection method using 3^2 factorial designs and further modified using PVA to improve their properties there by retarding recognition and removal by the reticulo endothelial system. The prepared dispersions were characterized for various parameters such as drug content, size, % EE and in vitro drug release studies. The %EE ranged between 43-91% and size of liposomes found to be in the range of 180nm-268nm. The in vitro drug release of liposomes showed 86% for 12 hr. Depending on size, %EE, and in vitro % drug release, liposomal (L5) batch was optimized. Optimized batch was subjected to PEGylation using sufficient volume of 5% PVA solution. Stealth liposomes were evaluated for surface morphology and FTIR studies. Comparative physicochemical analysis of stealth liposomes and conventional vesicles, stealth liposomes showed better results. The selected conventional and stealth liposomes were sterilized by two step sterilization by filtered through 0.22µ Fluorodien Filter grade filters and followed lyophilization by trial error method. The entire experimental procedure was carried out under laminar air flow chamber and vesicles were in order to obtain a sterile product.
Key words: Stealth liposomes, laminar air flow, PEGylation, sterilization and dialysis.

1 INTRODUCTION

Vesicular systems are novel class of colloidal dispersions. Water embedded lipid based bilayered vesicular systems are called as liposomes. Liposomes have ability to encapsulate the hydrophilic and lipophilic drugs with respective their suitable location. Liposomes have ability to alter the biological properties of drugs by various routes of administration [1]. Generally liposomes are made up by natural/synthetic lipids with or without cholesterol. By parenteral administration, the conventional liposomes (CV) followed dose dependent pharmacokinetics due to opsonization effect. Long circulative liposomes (LCL) are alternative to overcome the opsonization process [2]. Long circulative liposomes are modified form of conventional liposomes by coating of hydrophilic polymers in order to increase the residence time of the drug at the site of action and avoid the elimination process [3]. There are few literature reports on stealth liposomes. Biswajit et al. reported that acyclovir loaded stealth nano liposomes sustain the release of acyclovir by increasing the residence time and reduce its dose-related systemic toxicity [4]. Lakshmi Narashimhan et al., reported saquinavir loaded stealth liposomes showed better anti viral activity compared to conventional liposomes, by using cytotoxicity studies on Jurkat T-cells it was found that % cell death was more to the non-PEGylated formulation compared to the PEGylated [5]. In the present study, vesicles surface can be modified to improve its properties and the most noteworthy modification is the incorporation of the hydrophilic polymers like PVA to prevent interactions with plasma proteins, thus retarding recognition and removal by the reticulo endothelial system (RES). Didanosine, selected as a model drug has a low half life 1-2 hrs and low bioavailability 20-30%, when administered through oral route didanosine showing hepatic metabolism. These problems can be overcome by loading the selected drug into stealth liposomes using hydrophilic polymers like PVA and delivered by parenteral route [6].

2 MATERIAL AND METHODS

Didanosine: Gift sample from Hetero Pvt. Ltd., Hyderabad. Dipalmitoyl phosphatidylcholine (DPPC): Gift sample from Lipoid GmbH, Germany. Cholesterol and stearic acid were purchased from LOBA CHEME Pvt. Ltd., Mumbai. PVA from

MERCK Pvt. Ltd, Sodium hydroxide and potassium dihydrogen phosphate are purchased from Merck Pvt. Ltd., Mumbai, and ethanol used was of analytical grade.

2.1 Preparation of vesicles

In the present study, amount of lipid and cholesterol use to change their concentrations for each batch whereas amount of drug loading dose 80 mg, stearic acid (20 mg) and final volume of liposomal dispersion medium 20 mL kept constant [7-8]. Drug loaded liposomal dispersions were prepared by ethanol injection method for a batch of 10 mL. Accurately weighed amounts of DPPC, cholesterol and stearic acid were taken in a beaker and dissolved in 1mL ethanol and heated to 60˚C. The monophasic mixture of ethanol was injected slowly through a 14-gauge needle at the rate of 0.25 ml/min into a beaker containing weighed quantities of didanosine in 10 mL of pH 7.4 phosphate buffer maintained at a temperature of 60˚C kept under stirring at 500 rpm (Remi magnetic stirrer) using a teflon-coated bead. The system was subjected to evaporation for 45 minutes to remove ethanol. The aqueous phase immediately turned milky because of vesicles formation. Buffer was added to adjust the volume of final vesicular dispersion to 10 mL. The dispersion was filtered through 0.02µm filters (Ultipor GF Plus®, Pall Corporation, Pall India Pvt. Ltd, Mumbai, India) to obtain a uniform size distribution. Furthermore it was refrigerated for 2 hours for effective vesicle sealing. The batches were assigned from L1-L9 and stored under refrigerated conditions (2-8˚C) [7-8].

2.2 Characterization of vesicles [9-10]

Percent drug content

Vesicular dispersion (1mL) was pipetted out from and was lysised with methanol. It was further diluted with pH 7.4 phosphate buffer and drug concentration was determined by UV-Visible spectrophotometer at λ_{max} of 250 nm.

Determination of Particle size, Polydispersity index and Zeta potential (ζ):

Mean vesicle size, Polydispersity and zeta potential liposomes were determined using Zeta sizer (Malvern Nano ZS90, Malvern, UK) based on photon correlation spectroscopy.

Determination of percent entrapment efficiency (%EE):

The %EE of liposomes was carried out by using ultra centrifugation technique. 4 mL of nanosuspension was centrifuged at 20000 rpm for 2 hrs at a controlled temperature of 4°C (Remi cooling centrifuge).The amount of drug unentrapped in the vesicles was determined as follows,

$$EE\ (\%) = [(C_d - C)/C_d]^* 100 \qquad \textbf{Eq. 1}$$

Where Cd is the concentration of total drug and C is concentration of unentrapped drug.

In vitro release studies

In vitro drug release studies are conducted using dialysis process. Dialysis membrane soaked overnight in pH 7.4 phosphate buffer was used. The liposomal dispersion loaded through the open end of the dialysis membrane and placed in the receptor compartment containing pH 7.4 phosphate buffer, the whole experiment was run at 100 rpm and maintained at 37±0.5°C temperature. 5ml of aliquots were withdrawn at predetermined time intervals and analyzed at 250 nm using UV spectrophotometer in reference to the calibration curve of DDI constructed [11-12].

2.3 of stealth liposomes

Based on lower particle size, highest entrapment efficiency and maximum drug release. The optimized conventional liposomes subjected to develop the long circulating liposomes by polymer coating in order increase the circulation time. Polyvinyl alcohol (PVA) was selected as the polymers to impart hydrophilic coating. Based on the earlier works done, 2 mL of 1%w/v concentrations of the PVA were used for the preparation of stealth liposomes. For preparation of polymer coated vesicles, the polymer dissolved in pH 7.4 phosphate buffer and stirred continuously

after attaining the required viscosity the solution was slowly introduced into the vesicular dispersion at constant stirring [13-14].

2.4 Fourier transforms infrared (FTIR) spectroscopy

Drug-polymer interaction plays an important role with respect to the release of drug from the formulation amongst others. There is always a possibility of drug polymer interaction in the formulation due to their intimate contact [15-16].

3 RESULT AND DISCUSSION

The objective of the current research is to develop a formulation that overcomes the didanosine disadvantages associate by oral delivery and decrease the dosing frequency by administering the drug parenterally and also increase its circulation time by developing stealth liposomes using hydrophilic polymer (PVA). The percentage drug content of the liposomal formulations was found in the range of 99.2% to 101.5%. This result indicates uniform distribution of drug in each liposomal formulation. The mean vesicle size was in the range of 180nm to 268nm, and it was strongly affected by the selected variables. The polydispersity index (PDI) is in the range of 0.186-0.411 which indicated a narrow vesicle size distribution. The %EE of liposomes was determined after separating entrapped and unentrapped drug by ultra centrifugation. It varied from 43% to 91% for all the formulations. The highest %EE of 91% was observed for L5 formulation. The %EE was found to be increased with increase in the amount of lipid and cholesterol. More amount of lipid accommodates more drugs in its bilayers. Zeta potential values of prepared liposomal dispersions ranged from -39 to -49 mV. For any liquid dosage form surface charge is essential for its stability. Zeta potential value>±30 mV is essential for effective stability and to inhibit aggregation. Liposomal dispersion exhibited a maximum zeta potential value of -49 mV due to the surface charge imparting nature of stearic acid. The values of zeta potential showed that prepared liposomes have sufficient charge to inhibit aggregation of vesicles due to electric repulsion.

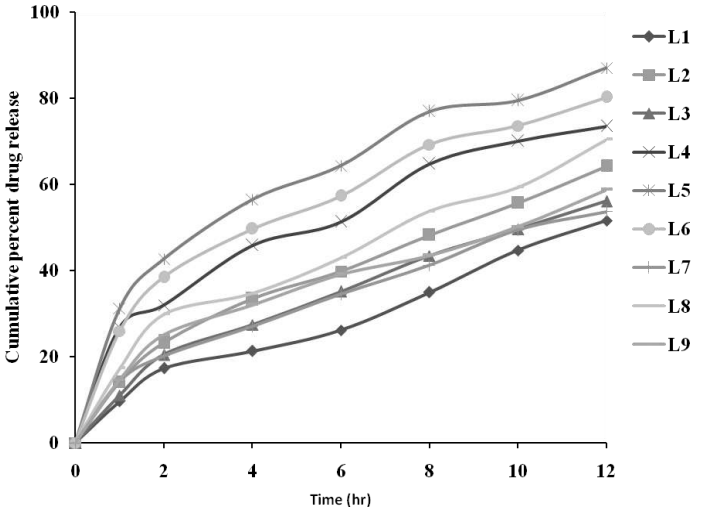

Fig.1: In vitro drug release profiles of liposomal formulations

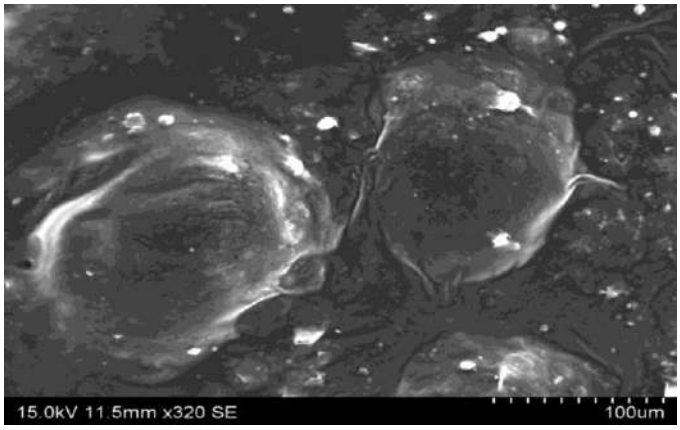

Fig.2: Surface morphology of stealth liposomal vesicles

The in vitro drug release profiles of all 9 batches of liposomal formulations at12 hrs are in the range of 51.54% to 86.96%. The L5 batch formulation showed maximum release i.e. 86.96% after 12hrs, drug release increased with increased concentration of lipid and at a certain level of lipid, the percentage release decreased at higher levels of cholesterol. This is because of at higher levels cholesterol makes the surfactant bilayers more rigid and retards the drug release. All formulations were followed first order release kinetics and Fickian diffusion drug release mechanism was followed. Scanning electron microscopy (SEM) confirmed the formation of stealth vesicles. The scanning of the grids showed the presence of spherical vesicles. SEM micrographs of the sample replica were taken to visualize the vesicles. The PEGylation process enhanced the physicochemical properties of stealth liposomes compared to conventional liposomes. Due to the effect of PVA, the particles size was found 191nm, 96% of the %EE and zetapotential was -52 mV. The drug release time was extended up to 30 hrs. The stealth liposomes followed first order release kinetics and the drug release followed Fickian diffusion.

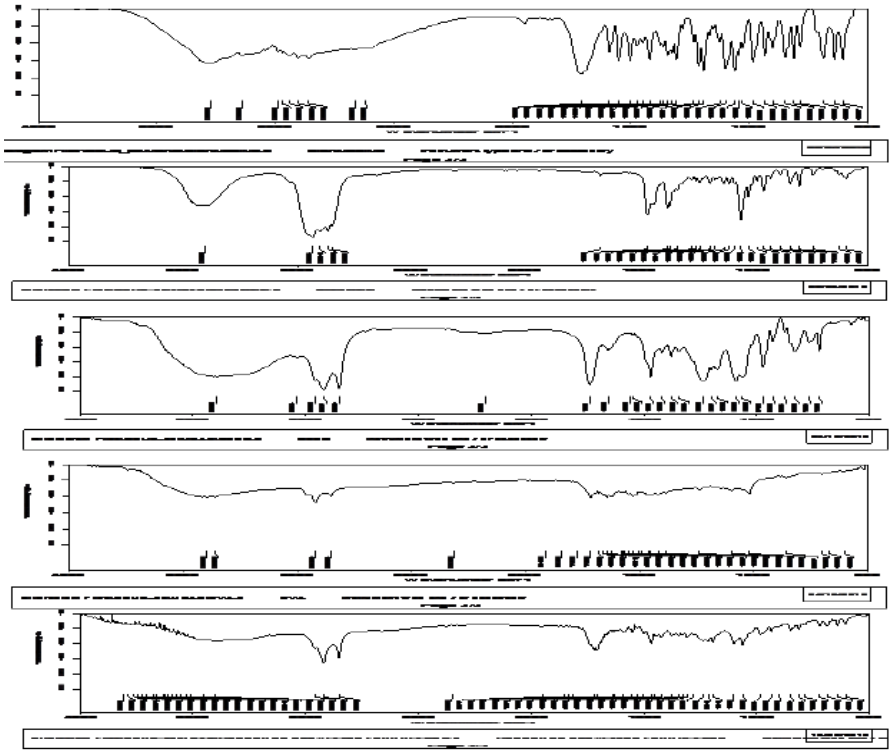

Fig.3: a) Didanosine, b) DPPC c) Cholesterol, d) PVA, f) stealth Liposomes

Drug and other excipients along with the optimized formulations were subjected to FTIR studies and the results obtained were shown in **fig.3**. Didanosine produce peaks at 3273 cm^{-1} due to N–H stretching vibrations, the bands at 2988 and 2859cm^{-1}, the alkyl C-H bands at 26627.3 and 26622.08cm^{-1}. The major peaks for didanosine were 1590.98, 1705.23, 3273.96, 2988, 26627.3, 1235-1213 and 1061-1044 cm^{-1}. The FTIR spectrum of DPPC showed aliphatic-CH stretching at 2956.23, 2918.23, 2850.29 cm^{-1}. The FTIR spectrum of cholesterol showed C-O alcoholic stretching vibration at 1022.59 cm-^{1}, C-H (aliphatic) stretching vibration at 2932 cm^{-1} and C=C stretching vibration at 1465 cm^{-1}. In the liposomal formulation, the drug in combination with excipients did not produce major shift in principal peaks of didanosine, indicating no interaction due to presence of excipients.

4 CONCLUSIONS

Hence the present study confirmed that the stealth liposomes have ability to enhance the mean residence time of the didanosine in rat body using 5% PVA solution as a PEGylating agent. So the stealth liposomes proved as useful tool in antiretroviral therapy to reduce the disadvantages and significantly improve the drug efficiency for AIDS treatment.

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REAL-TIME DATA ACQUISITION EMBEDDED SYSTEM FOR EXPERIMENTAL ADVANCED SUPERCONDUCTING TOKAMAK

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Abstract - Dispensation of environmental data is gaining importance with time. Real time monitoring of environment facilitates us in identification of suitable locations for agriculture, industry and other purposes. The Experimental Advanced Superconducting Tokamak (EAST) is planned to run 1000 s plasma discharges in the near future. In this steady-state operation, the data acquisition system (DAS) will be required to continuously acquire diagnostic signals, transfer diagnostic data from the digitizer front-end to the data servers in order that the data is retrieved by the experimenters in real-time.

A study has been launched to identify the limitation of the present acquisition system with respect to long pulse operation. During the study, a new data acquisition system based on Field programmable gate array (FPGA) and Advanced RISC Machines (ARM) technologies has been developed in order to realize the continuous data acquisition and real-time data transmission during a long-pulse discharge. This device offers a flexible, portable, multi-channels, continuous simultaneous signal acquisition, with programmable gain and isolation amplifiers. This paper will describe the new data acquisition device in detail.

Keywords: Data acquisition protocol , embedded system arrangement, real-time, Tokomak.

1 INTRODUCTION

The Experimental Advanced Superconducting Tokomak (EAST) has been designed and developed by the Institute of Plasma Physics, Chinese Academy of Sciences (ASIPP), it is planned to eventually create plasma lasting 1,000 consecutive seconds. Conventional data acquisition systems in EAST, for instance, the CAMAC digitizers and the New PCI (NPCI) cards [1] are usually adapted for short-pulse discharge, and their sampling rates and total acquiring durations are typically limited due to the restricted capacity of the storage media on board. If they are to be used for a long-time plasma discharge, a much slower sampling rate may be adopted, which decreases the accuracy and omits some detailed physical information of the signals. At the end of the post-processing procedures after each discharge, the data transmission, storage, and visualization are executed sequentially for data produced within the digitizers and cards.

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In long-pulse experiments whose duration are up to 20–30 minutes, however, such a post-processing mechanism will be ineffective because any diagnostic data cannot be seen throughout the duration of the discharge. Therefore, for the long-pulse experiments of EAST, real-time data acquisition and simultaneous visualization will be indispensable.

Currently the hardware of data acquisition systems of EAST includes signal conditioning devices, interconnecting devices and data acquisition devices based on PCI [2]. They are independent devices and interconnected with a variety of cables. Fig. 1 shows the structure of the current DAS. As result of the long cables and the unreliable connectivity between independent systems, before signals are acquired, signals have attenuation and noises are imported.

This paper describes the architecture of a new data acquisition system prototype based on FPGA and ARM technologies [3]. This system provides a continuous acquiring and quasi real-time data transferring capability. The motive of this work is to obtain a high integration level architecture that allows signals to be

conditioned, simultaneously acquired according to the external clock and triggers [4], processed and transferred to data servers in real-time, so that it may be used in steady-state fusion devices. The main characteristics of the system will be described in the following paragraphs.

2 HARDWARE STRUCTURE

The new data acquisition system integrates signal conditioning, a data acquiring, data collecting and processing function into the single board based embedded system. It has twelve simultaneously acquiring channels, 250 kS/s per channel and supplies the standard signal for test of the global system. Fig. 2 shows the hardware architecture of this data acquisition system.

A. Customized Signal Conditioning Module

Precision programmable-gain instrumentation amplifiers (PGIA) are an important part in the module. The PGIA is used to amplify and attenuate original signals from sensors which have different characteristics to meet a given range of input voltage of an analog-to-digital converter. They are configured by the main control module by Serial Peripheral Interface (SPI). Additionally, this module can connect the standard signal to input terminals by changing the relay. The standard signal is a 100 Hz, ±10 V square signal supplied by the Timer/ Counter of the main control module. Fig. 3 shows the diagram of this module. Its specification and technical requirements are as follows:(1) It has 8 gain steps (0.1, 0.5, 1, 2, 5, 10, 20 and 50);The range of input voltage is; ~0.3V

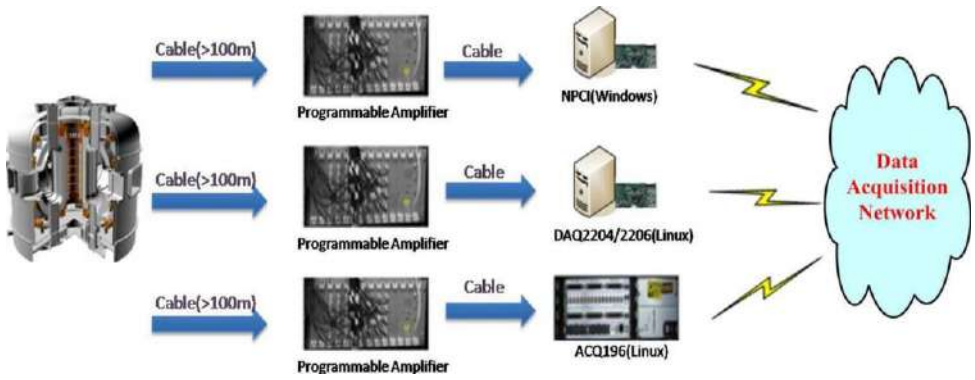

Fig. 1. The structure of the current DAS.

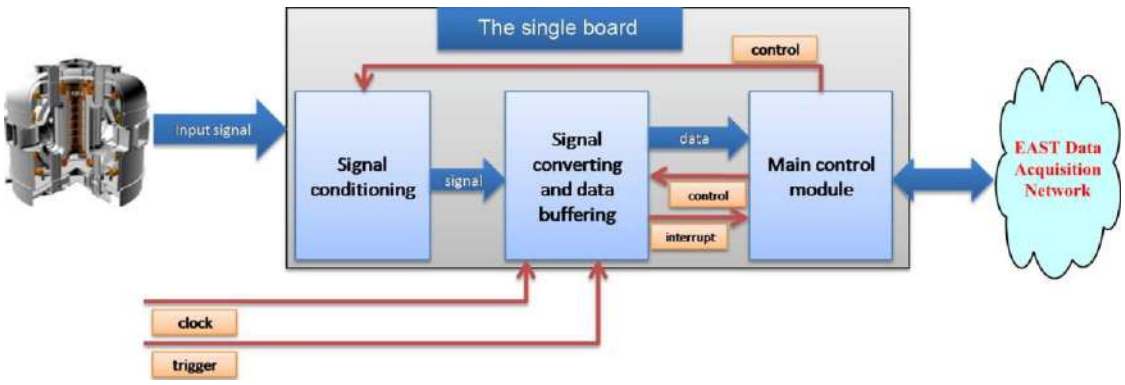

Fig. 2. The Hardware Structure of the embedded data acquisition system.

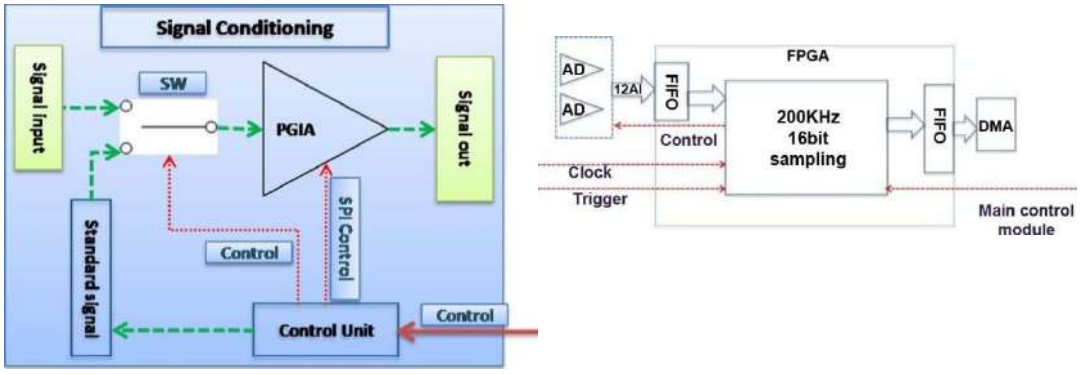

Fig. 3 Signal Conditioning Module.

(2)= 1 With gain, its 3 dB bandwidth is greater than 100 KHz;

B. Signal Converting Module

Fig. 4 shows the internal structure of signal converting module. The module is the core of the embedded data acquisition system. It provides 12 analog input channels implemented by two ADS8364 chips [5] which achieve signal conversion. One chip includes six, 16-bit, 250 kSPS Analog/Digital Converters (ADCs) with 6 fully differential input channels grouped into two pairs for high-speed simultaneous signal acquisition. And it offers a flexible high-speed parallel interface with a direct address mode, a cycle and a First-In First-Out (FIFO) mode. As the central part of this module, the FPGA is in charge Fig. 4. Signal Converting Module of controlling A/D converters which acquire signals synchronized with internal/external clock and trigger. After the end of signal conversion, it reads the data from the FIFO of ADCs.

Altera Cyclone II FPGAs extend the low-cost FPGA density range to 68416 logic elements (LEs) and provide up to 622 us- able I/O pins and up to 1.1 Mbits of embedded memory. As result of the above advantages, here the EP2C8T144C8 [6] is used in the module. It has two PLLs providing clock multiplication and division. There are 165888 bits in this FPGA to implement the FIFO buffer of 8192 16 bits.

C. Main Control Module

The ARM chip SAMSUNG S3C2440A [7] is designed to provide a general application with low-power, and high-performance microcontroller solution in small die size. It comprises a Memory Management Unit (MMU), the Advanced Micro- controller Bus Architecture (AMBA) BUS, the Harvard cache architecture, and integrates various interfaces on the chip such as serial ports, and SD cards. This chip and other peripheral

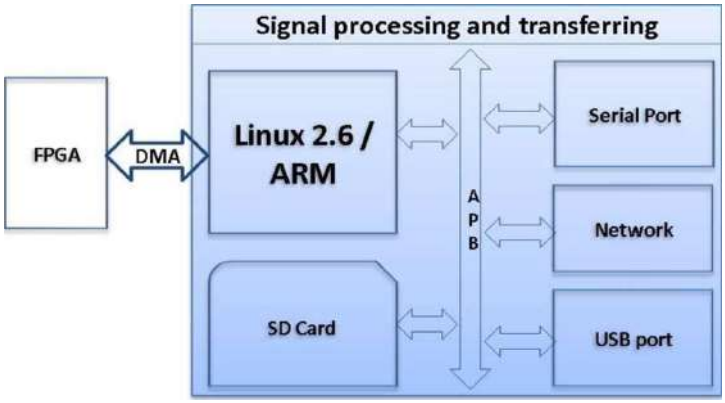

Fig. 5. The structure of Main Control Module

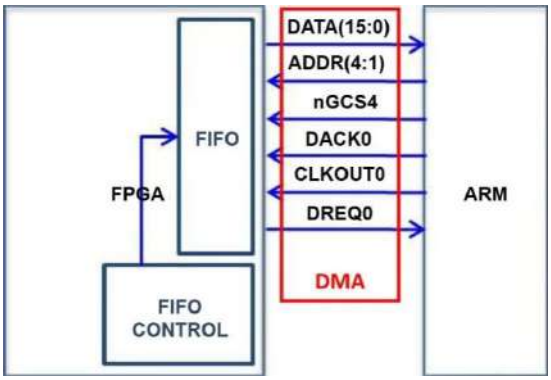

Fig. 6. Interface of FPGA and S3C2440.

equipments are mainly in charge of control of the FPGA and PGIAs and read the data from the FIFO of FPGA by DMA. Fig. 5 shows the structure of main control module. It programs the signal conditioning module to amplify and attenuate the signals and signal converting module to acquire data according to pre- defined parameters. The acquired data is sliced, compressed and transferred to the data servers. In order to avoid that data is lost during the transmission from the data acquisition device to the data server, during a network failure, the acquired data will be saved on the SD card and automatically send to the data servers after the network is back to normal operation. A 4 GB SD card with an average read-write rate of 10 MB/s is used in this module whereby data for about 600 s of a discharge can be stored on it.

D. Interface of ARM and FPGA

By DMA, the main control module receives the acquired data from signal converting module. The S3C2440 supports a four- channel DMA controller located between the system bus and the peripheral bus. Each DMA channel controller can perform data movements between devices in the system bus and /or peripheral bus with no restrictions. The ARM processor and the FPGA are interconnected by an external bus interface (EBI). Fig. 6 shows the mode of connection.

A 16 K FIFO is implemented in the FPGA to decouple the mismatch between the sampling frequency of the AD converters and the reading speed of the S3C2440. When the FIFO memory contains 4 K words, the FPGA sends a request signal to the main control module. When the main control module receives this request, it is acknowledged and starts to read the data of the FIFO.

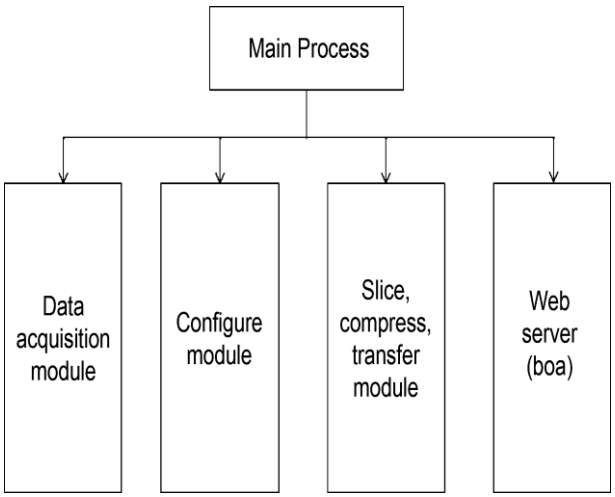

Fig. 7. The structure of software system

Table I
The Performance of Lzo Compression Algorithm

Algorithm	Length	ComLen	%Remn	ComK/s	DecK/s
-	-	-	-	-	-
LZO1-1	224401	117362	53.1	4665.24	13341.98
LZO1-99	224401	101560	46.7	1373.29	13823.40
LZO1A-1	224401	115174	51.7	4937.83	14410.35
LZO1A-99	224401	99958	45.5	1362.72	8115.75
LZO2A-999	224401	87880	40.0	301.21	8115.75

Algorithm: version of LZO algorithm
Length: original data length before compression
ComLen: data length after compression
%Remn: average compression ratio
ComK/s: the speed of compression
DecK/s: the speed of decompression

3 SOFTWARE STRUCTURE

The data acquisition software for the embedded system has been written in the object-oriented programming language. The software is developed and cross-compiled for the ARM architecture on a host system using cross-tools 3.4.1.

Fig. 7 shows the structure of the software system. There are three important technologies introduced into this system. It includes compression technology; time slice [8] technology and a web service for configure the embedded system.

A. Compression

As per the EAST diagnostics requirements DAS is currently acquiring data from about more than 1500 channels at a wide sampling rate range, from KHz to MHz The volume of data generated ranges is about 3–5 GB per shot. This raises many technical issues and if they are not addressed properly it in- creases the network load, reduces the channel handling capacity and demands large storage devices. Hence, the basic condition is to acquire lossless, compress it in real time, push it on the network for user and decompress it on client side for viewing before the next block of data comes. The Lempel-Ziv-Oberhumer(LZO)-based compression [9] and decompression is implemented in client/server architecture-based DAS.

LZO is written in ANSI C and is Open Source Software. Both the source code and the compressed data format are designed to be portable across platforms. LZO implements a number of algorithms with the following features: decompression is simple and very fast, requires no memory for decompression and compression is pretty fast. LZO is a block compression algorithm; it compresses and decompresses a block of data.

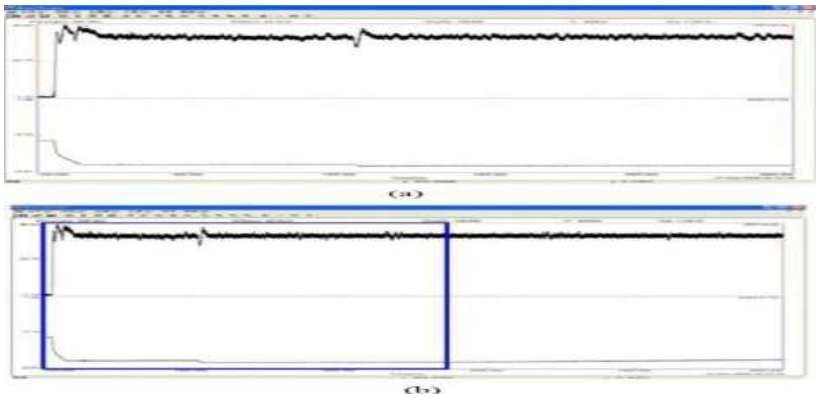

Fig. 8 shows the results when using time slice Technology.

Fig. 8. When using time slice technology, the client retrieves the data of first 5 seconds and the first 10 seconds from the data servers. The blue rectangle shows the data of the first 5 seconds in the first 10 seconds. (a) The data of first 5 seconds (b) The data of first 10 seconds

B. Time Slice

In long-pulse experiments whose duration is up to 1000 seconds, however, any post-processing mechanism will be ineffective because not any diagnostic data can be seen throughout the shot duration. Therefore, time slice technology is introduced into the system. Time slice mechanism is a very simple and flexible method for developing a real-time data acquisition system. During discharge, the data is continuously acquired by digitizer front-end. The real-time data is sliced every 5 seconds and labeled with a sub-shot-number. Then the sliced data is sent to the data servers by a high-speed network. Smaller or larger time slice is possible. But if the time slice is too small, this will boost the network overhead on the data server; if the time slice is too large, a long wait will occur while retrieving data. To reduce the network data flow between the data servers and the clients, the original data is down sampled into multi-stage data by a program and saved in the data servers. These down sampled data is called as thin data. In this way, for 1000 s operation, users can access current acquisition data even if the experiment is still running.

C. Monitoring Module Based on Web

The new data acquisition system is an independent distributed embedded system, it has no keyboard and no mouse, and we can only communicate with it by Ethernet. So in order to monitor its status parameters (for example this device running time, current sampling rate, current shot number and so on) and configure it

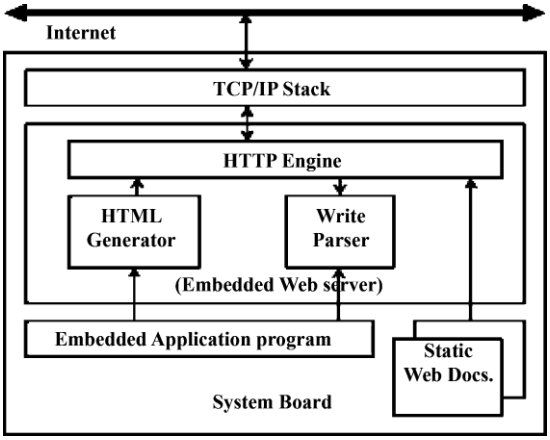

Fig. 9. The Embedded Web Server Interface

remotely, the Boa web service is installed. As a result of the restricted software environment of embedded systems, Boa (basic Object Adapter) [10] is an excellent choice. Boa is a single-tasking HTTP server and is suitable for embedded application. It does not fork a copy of it or spawn a thread to handle each incoming connection, but rather internally multiplexes the connections. Also, the source code is available and can be customized for variable environments. Fig. 9 shows the Embedded Web Server Interface.

4 CONCLUSION

In this paper a new data acquisition device was developed on the basis of an embedded system, different from the structure of a conventional data acquisition system. It integrates signal conditioning, signal converting and data processing and transmission in one board. Some new technologies are introduced into this system such as ARM, FPGA, LZO technologies, and time slice mechanism and embedded web server. To a certain degree, this system avoids the disadvantages about long cables, and enhances the integration level. Additionally, it has many other advantages such as portability, reduction of disturbance, lower cost and easier maintenance. In addition, the most important thing is that the data acquisition system can realize continuous and real-time data acquisition and transmission.

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PALM-PRINT BASED BIOMETRIC VERIFICATION FRAMEWORKS

Srujana T, P. Suresh Kumar

Abstract - This paper presents a completely unique personal authentication system exploitation palm prints. The technology is used in the distinctive data extracted from palm prints (such as wrinkles, principle lines and textures) throughout the authentication method to eliminate frauds that cant be avoided by ancient strategies (using positive identification or cards). The individuality of options and hardiness of rule create the system so much superior to existing biometric systems. This paper presents the system design construction and also the rule style. Being a study and reliable system, it absolutely was tested by over 8000 palm print pictures with terribly low false acceptance rate(0.02%) and a relative high real acceptance rate (98.83%). The total method time for once authentication is a smaller amount than one second. Finally some applications area unit mentioned that might be benefited by exploitation palm print technology.

1. INTRODUCTION

Biometrics primarily based personal identification is obtaining wide acceptance with in the networked society, replacement passwords and keys because of its reliableness, individualism and also the ever increasing demand of security. This paper investigates the employment of palm print for private identification mistreatment wavelets. Palm print not only has the distinctive data out there as on the fingerprint however it has much more quantity of details in terms of principle lines, wrinkles and creases. It will simply combined with hand form biometric thus on kind a extremely correct and reliable biometric based personal identification system.

Palm print primarily based personal verification has become associate in nursing progressively active analysis topic over the years. The palm print is made in data and has been analyzed for discriminating options like wherever rippling remodel has been used for feature extraction has intended us to analyze the effectiveness of mistreatment combination of multiple wavelets for the textural analysis of palm print.

Personal identification is present in our daily lives for instance, we regularly ought to prove our identity for obtaining access to checking account, coming into a protected website, drawing money from associate in nursing ATM, work in to a Laptop and so on. Conventionally we tend to establish ourselves and gain access by physically carrying passports, keys, access cards or basic cognitive process passwords, secret codes and private identification number (PINS).

A biometric could be a distinctive, measurable characteristic or attribute of an individuals being for mechanically recognizing or supportive identity. By employing a identification, the individual verification are often done by doing the applied mathematics analysis of biological characteristic. This measurable characterstic are often physical like eye, face, finger image and hand.

In existing system, this paper can be explained by using wavelet transform and Discrete wavelet transforms.

There are two types of systems available for capturing the palmprint of individuals i.e., scanners and the pegged systems.

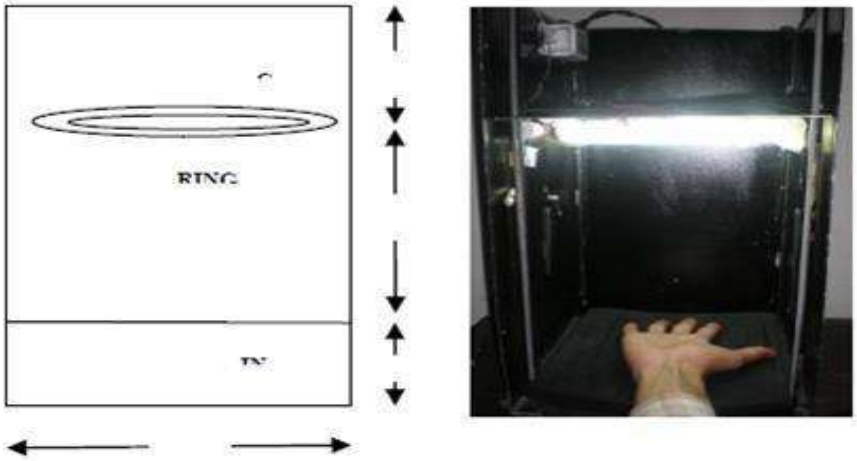


Fig. 1. Front view of image acquisition device

Our image registration approach follow the technique projected and is summarized as follows: The nonheritable color (RGB) parameters of palm print are unit modified to HSI parameters. The hue price of skin is same thus it had been safely neglected beside the less discriminating saturation price. The palm print has been analyzed for its texture using the gray level or intensity values,among the HSIvalues. Gray level pictures retain all the helpful discriminating data needed for private identification, beside sizeable reduction in interval. The colour pictures uses the following equation area unit modified to gray level images:

$$I= (0.2989\ R) + (0.5870\ G) + (\ B) \quad (1)$$

We obtained ten pictures of every individual of that five were used for training and also the remainder of them were used for validation. The obtained registered palm print image has been analyzed for its texture mistreatment completely different symmetrical wavelet families particularly biorthognal 3.9 symmelt 8 and demeyer 5. The palm print region 256x256 has been decomposed into three scales for every wavelet type.

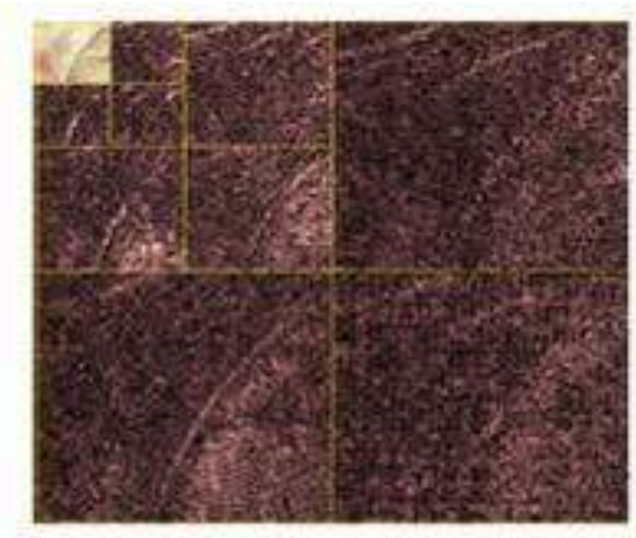


Fig: 2 Three level decomposition of palm

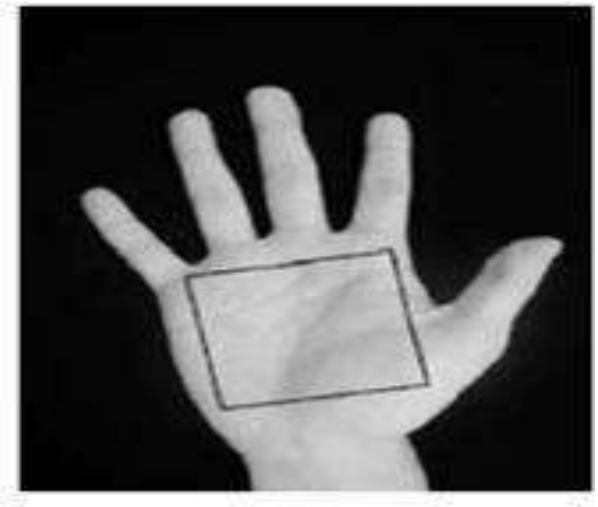


Fig :3 Rotating the axis of region instead palm using wavelet transform

Palm identification, similar to fingerprint identification, is predicated on the combination of data best owed during a friction ridge impression. This data includes the flow of the friction ridges, the presence or absence of options on the individual friction ridge methods and their sequences, and therefore intricate detail of oneridge.

To understand this recognition conception, one should initial perceive the physiology of the ridges and valleys of a fingerprint or palm. Once recorded ,a fingerprint or palm print seems as a series of dark lines and represents the high, peaking portion of the friction ridged skin whereas the natural depression between ridges seems as a white space and is that low, Shallow portion of the friction ridged skin.This is shown in Figure.

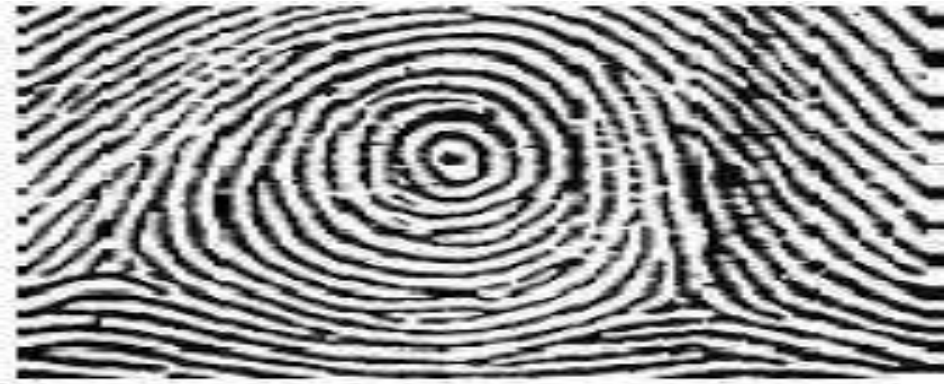


Fig 4 (a) Fingerprint Ridges (Dark Lines) vs. Fingerprint Valleys (White Lines).

The pictures present a pictorial representation of the regions of the palm, two types of minutiae, and examples of other detailed characteristics used during the automatic classification and minutiae extraction processes.

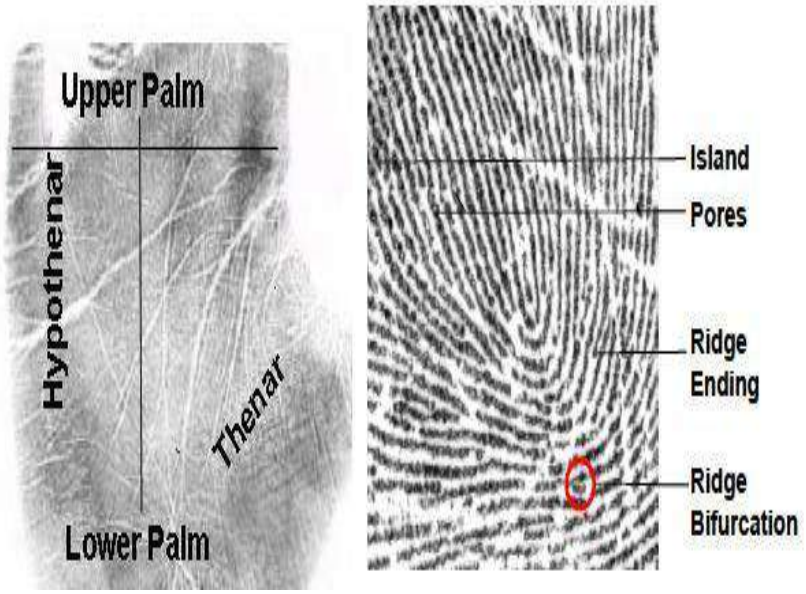


Fig 4(b) Palm showing two types of minuates and characteristics

2 RELATED WORK

In the composition, there are various researchers who have made biometric affirmation modules considering diverse spatial and change space systems. D. Huang, W. Jia, and D. Zhang [1] proposed a novel calculation for the customized portrayal of low-goals palm prints. In the first place the focal lines of the palm are described using their position and thickness. Significant lines are described and depicted by their position and thickness. A game plan of directional line identifiers is imagined for crucial line extraction. By using these discoverers, the potential line initials of the imperative lines are removed and from that point forward, in perspective on the isolated potential line initials, the essential lines are evacuated totally using a recursive technique. The local data about the isolated piece of the significant line is used to pick a return for money invested and after that a proper line marker is evacuated the accompanying piece of the first line in this return for money invested. In the wake of removing the significant lines, a couple of standards are shown for palm print portrayal. A. Kong and D. Zhang [2] have presented a novel element extraction procedure, the Focused Coding Plan for palm print ID. This arrangement isolates the presentation data from the palm lines and stores it in the Aggressive Code. An exact match with a practical execution is made for taking a gander at Aggressive Codes. Hard and fast execution time for check is around 1s, which is adequately brisk for consistent applications. The proposed coding plan has been surveyed using a database with 7,752 palm print pictures from 386 particular palms. For check, the proposed method can work at a high true blue affirmation pace of 98.4% and a low false affirmation pace of 3*10-6. Dai and Zhou [3] presents high goals approach for palm print affirmation with numerous highlights extraction. Highlights like subtleties, thickness, presentation, and fundamental lines are taken for highlight extraction. For presentation estimation the DFT and Radon-Change Based Direction Estimation are used. For subtleties extraction Gabor channel is used for edges redesign as demonstrated by the local edge course and thickness. Thickness guide is learned by using the composite calculation, Gabor channel, Hough change. Additionally, to isolate the essential line highlights Hough change is associated. SVM is used as the blend strategy for the check structure and the proposed heuristic standard for the distinguishing proof system. Jiaa, Huanga and Zhang [4] and [5] have proposed palm print check in perspective on solid line presentation code. Changed restricted Radon change has been used for highlight extraction, which isolates presentation include. For organizing of test picture with a readiness picture the line planning procedure has been used which relies upon pixel-to-run calculation. Zhang, Kong, You and Wong [6] have proposed Online Palm

print Distinguishing proof. The proposed system takes online palm prints, and uses low goals pictures. Low pass channel and limit following calculation is used as a piece of preprocessing stage. Indirect Gabor channel used for highlight extraction and 2-D Gabor stage coding is used for highlight portrayal. An institutionalized hamming division is associated for planning. J. You, W. Kong, D. Zhang, and K. Cheung [7] proposed a unique decision plan by showing overall surface element estimation and the acknowledgment of close by fascinating core interests. Our close to examination of palm print include extraction shows that palm print models can be all around depicted by surfaces, and the surface imperativeness estimation has an immense vacillation between different classes while holding high diminutiveness inside the class. The coarse-level portrayal by overall surface highlights is convincing and key to diminish the amount of tests for further getting ready at fine level. The guided chasing down the best planning in light of intriguing centers improves the structure viability further. W. Li, J. You, and D. Zhang [8], have proposed a fruitful requesting and chasing plan down an image database to energize speedy recuperation when the proportion of a palm print database is huge. There are three key issues to be considered: highlight extraction, requesting, and planning. All things considered, in an image database, the evacuated highlights are frequently identified with the primary pictures as records. A mission for the best planning is coordinated in a layered way, where one element is at first picked to lead the interest by diminishing the course of action of contenders. By then various highlights are used to reduce the candidate set further. Such a method will be repeated until the last yield is settled in light of the given organizing criteria. The selection of highlights expect a basic part for capable interest. A fruitful component assurance plan should dismiss the most incomprehensible candidates, take a gander at successfully, and require minimal size of room for limit. Prasad, Govindan and Sathidevi [9], have proposed Palm print Confirmation Utilizing Combination of Wavelet Based Portrayals. Highlights removed are Surface component and line highlights. In proposed system pre-getting ready consolidates low pass isolating, division, region of invariant centers, and course of action and extraction of return for capital invested. OWE used for highlight extraction. The match scores are produced for surface and line includes only and in joined modes. Weighted total rule and thing lead is used for score level planning. Cappelli, Ferrara, and Maio [9] proposed high goals palm print affirmation structure which relies upon subtleties extraction. Pre-getting ready is confined by division of an image from its experience. To improve the idea of picture, neighborhood frequencies and close by presentations are assessed. Neighborhood presentation is surveyed using exceptional finger impression presentation extraction approach and close by frequencies are assessed by tallying the amount of pixels between two consecutive zeniths of dim level along the course common to close by edge presentation. Specifics highlight is evacuated in highlight extraction organize. To isolate the subtleties highlights significant filtering with Gabor channels procedure is associated. Points of interest barrel code has been used for planning the subtleties highlights. A. Gyaourova and A. Ross [10] have proposed a requesting strategy that can either use the biometric matcher that is starting at now present in the biometric system or use another free matcher. Record codes are produced for each technique using the looking at matcher. In the midst of recuperation, the record code of the test is contemplated against those in the presentation using an equivalence measure to recoup a once-over of cheerful characters for biometric planning.

3 PROPOSED MODEL

Here in this section, we described the proposed palm print authentication model using hybrid process and UDBW transform. Fig shows that the proposed model for palm print authentication, in which we had three modules:

1. Registration process
2. Testing
3. palm matching

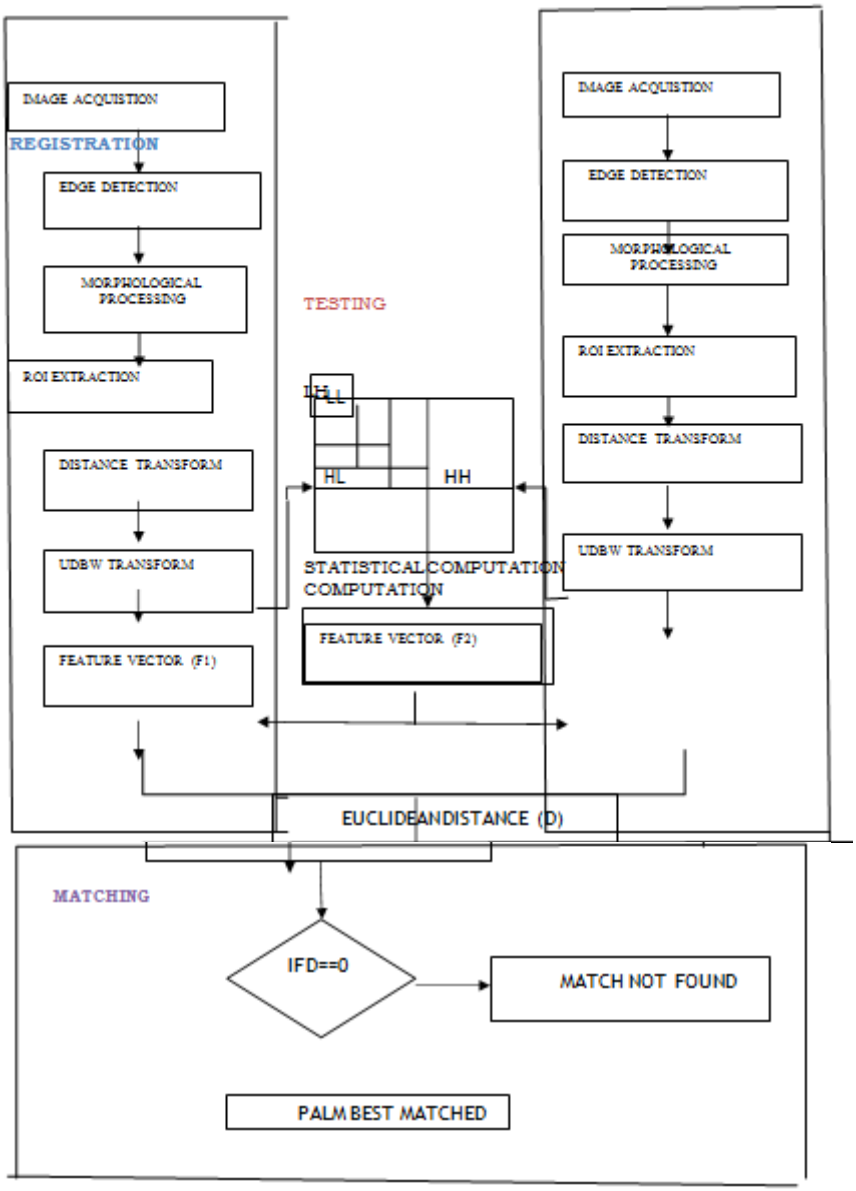


Fig: 5 Flow Chart For Palm Print Authentication

3.1 *Registration*

In this module input palm picture will be selected by applying regions of enthusiasm with morphological activity there by discover the partition change and after that expelling the low level highlights using 3-level UDBW change. In the wake of getting the UDBW coefficients, quantifiable computation will be done by taking the mean and change of the crumbled coefficients. By then all of the estimations will be taken care of in a vector to make a train highlight vector

3.1.1 *Edge Detection*

Edge identification is a picture preparing method for finding the limits of items inside images. works by distinguishing discontinuities in brightness. Edge identification is utilized for picture division and information extraction in territories, for example, picture preparing, PC vision, and machine vision.

3.1.2 *Morphological Operation*

Twofold pictures may contain various defects. Specifically, the double districts created by straightforward thresholding are twisted by clamor and surface. Morphological picture handling seeks after the objectives of evacuating these flaws by representing the structure and structure of the picture.

3.1.3 *ROI extraction*

Region of interest is a chosen tests subset inside a dataset recognized for a specific purpose. This can be utilized in numerous applications, for example, medicinal imaging, the tumor limits might be de- fined on a MR or CT picture for estimating of its size. The endocardial outskirt might be characterized on an image, maybe during various periods of the heart cycle, for instance end-systole and end-diastole, to survey cardiovascular capacity. In topographical data frameworks (GIS), a return on initial capital investment can be taken truly as a polygonal determination from a 2D map. In PC vision and optical character acknowledgment, the return on initial capital investment characterizes the fringes of an article under thought.

3.1.4 *Distance Transform*

The separation change is an administrator which must be applied to paired pictures. It brings about a dark level picture which resembles same as info picture, then again, actually the dim level forces of focuses in-side closer view districts are changed to demonstrate the separation to the nearest limit.

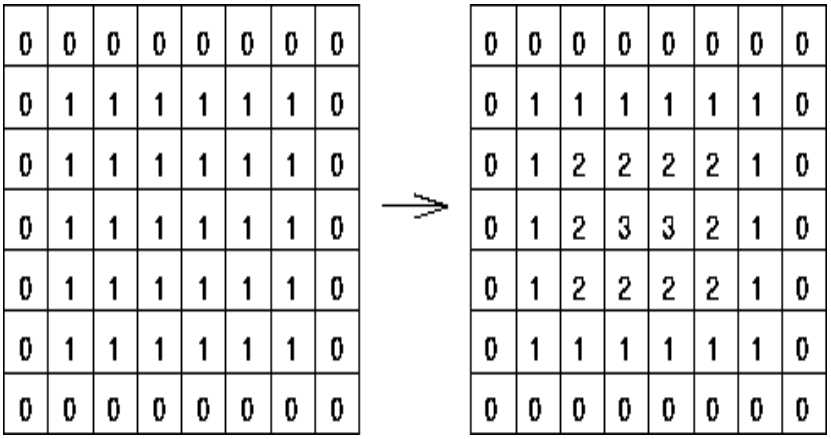


Fig.6 Example of distance transform with chessboard metric

3.1.5 *UDBW Transform*

Un-annihilated biorthogonal change is all around utilized for multi goals investigation because of its multi scaling usefulness i.e., two scaling capacities to create wavelet channel banks for decay and recreation independently. It will give increasingly powerful disintegration coefficients because of its multi scaling property.

In the case of orthogonal, we have one hierarchy of approximation spaces $j-1$ j $j+1$
orthogonal decomposition which leads us to use two filter sequences $h_n$and $g_n$for decomposition and reconstruction. Hence,

Let$fk, \in H.$, $gk = \delta jk$Then we will say that the two sequences are biorthogonal.

Now, our aim is to build two se

$$V \quad \subset V \subset (2 \; -k) \qquad (2)$$

$$\psi j, \quad 2j \quad x-k \qquad (3)$$

$$cdn00 = \sum k \; hg2n-k \; cck11 \qquad (4)$$

$$n \; k \; 2n-k \; k \qquad (5)$$

To do so, we need four filters$g$, h,˜, h i.e., two sequences to be act as decomposition sequences and two sequences as reconstruction sequences. For example, if c is a data set, it will be decomposed as And the reconstruction is given b

$$cl1 = \sum n\ \hbar 2n-lcn0 + \tilde{g}2n-ldn0 \quad (6)$$

We can achieve perfect reconst me conditions given below:

$$g = ((-1)\ n+1\ h-1)h,\ =)m\ \ n+2k\ k0 \quad (7)$$

Now consider that $\phi(x)$and $\tilde{\phi}(x$ function with their own hierarchy of wavelet in a method of analogous to the gonal case. We now define the

$$\phi s(cxa)li=ng\sum fun\sqrt{c}2tio\sum n\ ahs\ f\phi ol(l2oxw-s:\ n) \quad (8)$$

So, finally the bi-orthogonal wavelet functions can be defined as follows:

$$(x) =2\ \ (2x - n) \quad (9)$$

$$(x) = \sqrt{2}\ \sum 2\ \ (2x - n) \quad (10)$$

3.2 Testing

The second module in the proposed structure is attempting strategy which joins that the database palm picture will be picked for testing with the enrolled palm picture by applying morphological taking care of; return for money invested extraction, separation change and UDBW change there by figuring the estimations to get the test highlight vector

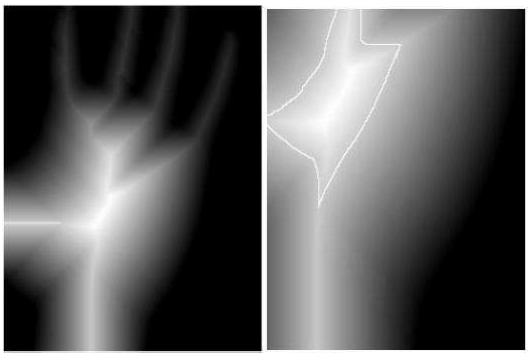
.

3.3 Matching Process

Database to establish that whether approved per-child's distinguishing proof is accessible or not. On the off chance that the separation is zero, at that point the individual will be recognized else it shows that the match not found.

4 SIMULATION RESULTS

(a) **(b)**



)c) (d)

Fig. 7 (a) original palm image for registration (b) morphed image (c) distance transformed image and (d) registered palm image

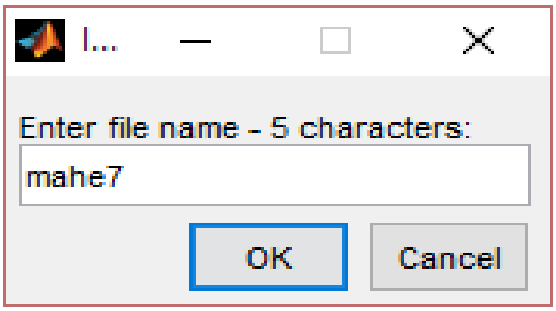


Fig. 8 Message box for saving the registered palm filename with mahe7

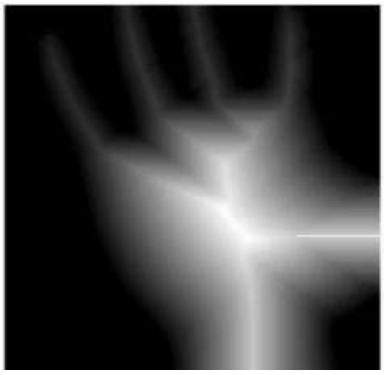


Fig. 9 distance transform of a test image

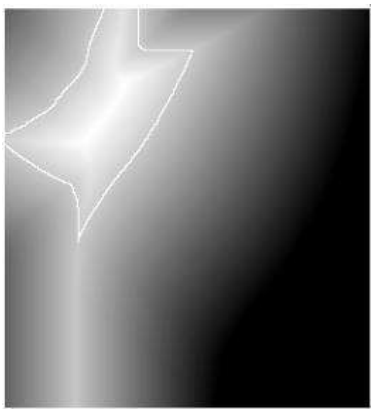


Fig. 10 Registered palm print of a test image

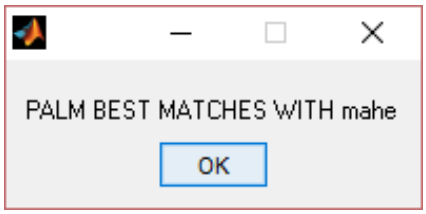


Fig. 11 Message box displayed after completion of test and matching process

(a) **(b)**

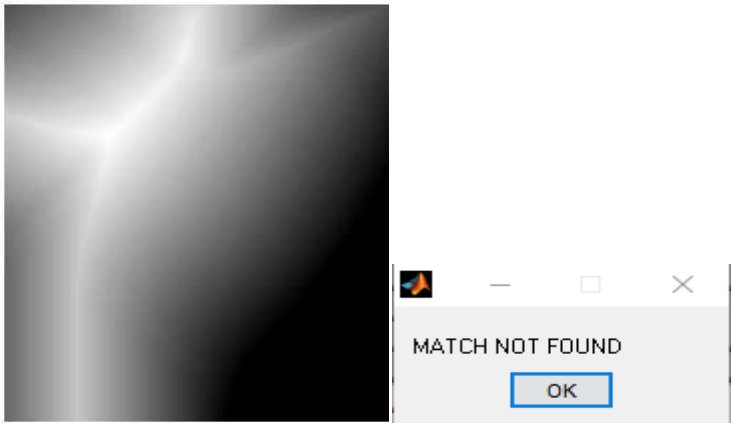
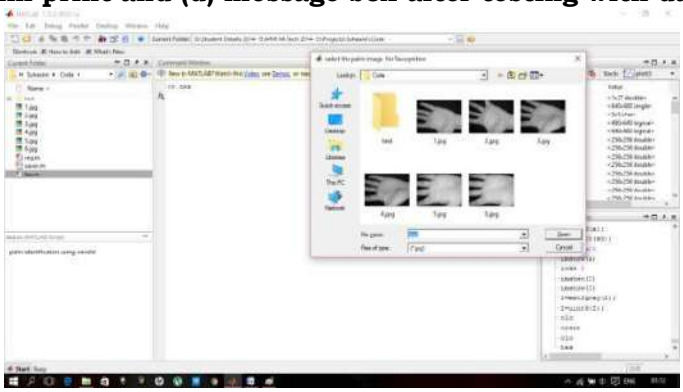


Fig. 12 Unsaved file from data base (a) binary image (b) distance transform (c) registered palm print and (d) message box after testing with data base files



(a)

(b)

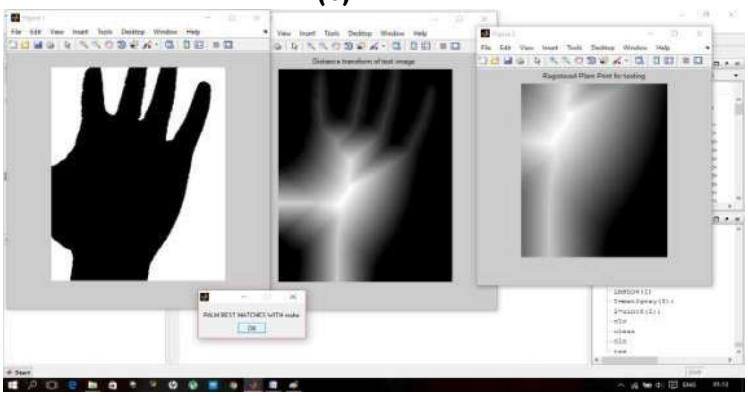


Fig. 13 screen shots of test image 4.jpg which has been saved with a specific file name in database

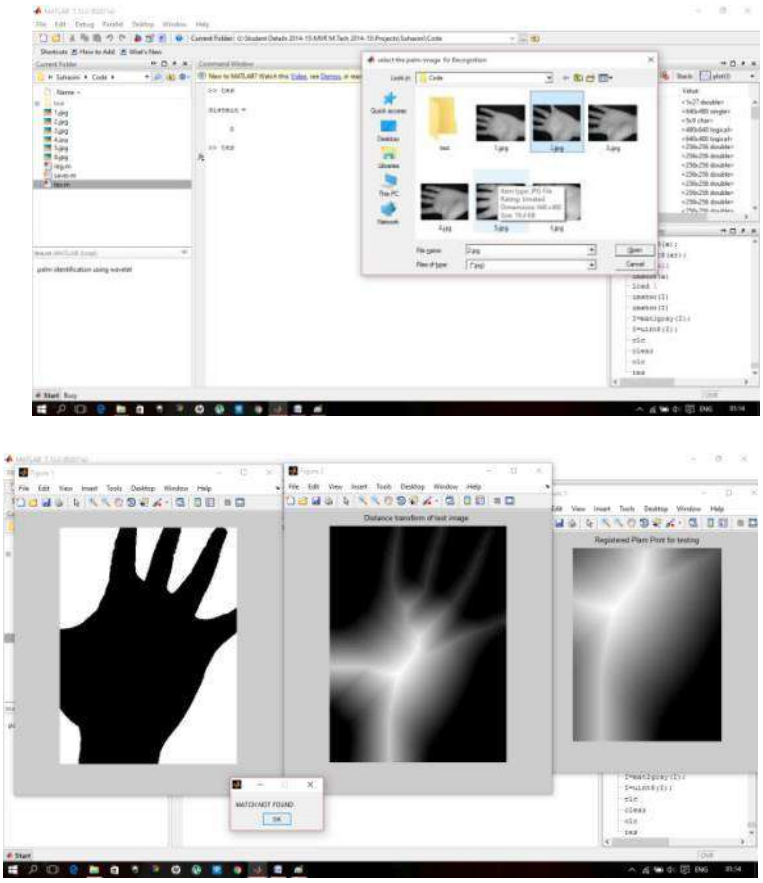


Fig. 14 screen shots of test image 2.jpg which has not saved with a specific file name

5. CONCLUSION

Here, we presented a novel and profoundly verified biometric confirmation model with palm print recognizable proof framework utilizing morphological return for capital invested extraction with separation change and un-destroyed biorthogonal wavelet change. Because of its multi scaling usefulness, two diverse wavelet channel banks will be utilized to extricate the highlights of separation changed picture to acquire the best component factor for contrasting and a test include vector. The proposed model has demonstrated that it has accomplished 100% precision with a few test pictures from the database.

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PEAK-TO-AVERAGE POWER RATIO IN WEIGHTED OFDM

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Abstract - Orthogonal Frequency Division Multiplexing (OFDM) has a disadvantage of high peaks non constant envelope which produce signal excursions into non-linear region of operation of the Power Amplifier (PA) at the transmitter, thereby leading to non-linear distortions and spectral spreading. It is very important to deal with PAPR reduction in OFDM systems to avoid signal degradation. This paper introduces the analysis of various techniques to reduce the PAPR in OFDM system. Simulations are also used to analyze the efficiency of the various techniques used which signifies Weighted OFDM to be providing much better PAPR reduction and a better Bit Error Rate (BER).
Keywords: Power amplifier, M-array Quadrature Amplitude Modulation, Bit error rate, Orthogonal frequency division multiplexing etc.

I. INTRODUCTION

With increased demand for high quality communication services in 4G mobile communication system, Wi-Fi, and some military communication systems, it's been a great challenge to increase the Quality of Service (QoS), high data rate in addition to both power efficiency and lower bit error rate. This demand of high data rate can be fulfilled by the single carrier modulation with compromising the trade off between the power efficiency and bit error rate.

Again in the presence of frequency selective fading environment, it is very difficult to achieve high data rate for this single carrier modulation with a lower bit error rate performance. With considering an advance step towards the multi carrier modulation scheme it is possible to get high data rate in this multipath fading channel without degrading the bit error rate performance. To achieve better performance using multi carrier modulation we should make the subcarriers to be orthogonal to each other i.e. known as the Orthogonal Frequency Division Multiplexing (OFDM) technique. It maintains high data rate, great bandwidth efficiency, low complexity, reduces the delay time, and reducing multipath fading. So usually suffers high peak-to-average power ratio (PAPR) [1].

As we are using the linear power amplifier at the transmitter side, so it's operating point will go to the saturation region due to the high PAPR which leads to in-band distortion and out-band radiation. Because of the nonlinearity of power amplifier (PA), it will lead to signal distortion and restrict implementation of the OFDM system [8, 9]. This can be avoided with increasing the dynamic range of power amplifier which leads to high cost and high consumption of power at the base station. High PAPR decreases the efficiency of PA in order to amplify the signal linearly. In order to preserve the linearity without reducing PA efficiency, many PAPR reduction techniques are used in the literature proposed in recent few years.

2 PEAK TO AVERAGE POWER RATIO

The PAPR is the relation between the maximum powers of a sample in a given OFDM transmit symbol divided by the average power of that OFDM symbol. It is defined as the ratio between the maximum power and the average power for the envelope of a baseband complex signal ˜s(t) i.e.

$$PAPR\{\tilde{s}(t)\} = \max |\tilde{s}(t)|\ 2/E\ |\tilde{s}(t)|\ 2\text{------}2.1$$

Also we can write this PAPR equation for the complex pass band signal s(t) as

$$PAPR\{s(t)\} = \max |s(t)|\ 2\ /E\ |s(t)|\ 2\text{-------}2.2$$

It is expressed in the units of dB. PAPR occurs when in a multicarrier system the different sub-carriers are out of phase with each other. At each instant they are different with respect to each other at different phase values. When all the points achieve the maximum value simultaneously; this will cause the output envelope to suddenly shoot up which causes a 'peak' in the output envelope. Due to presence of

large number of independently modulated subcarriers in an OFDM system, the peak value of the system can be very high as compared to the average of the whole system [2]. This ratio of the peak to average power value is termed as Peak-to-Average Power Ratio. In LTE system, OFDM signal PAPR is approx. 12dB.

OFDM is basically a multi-carrier modulation technique. The multi-carrier signal is the summation of large number of independent orthogonal sub-carriers. Hence, the envelope of the multi-carrier signal varies considerably. The variation in the envelope of the signal can be measured in the form ratio of peak value to the average value of the signal, and it is called as peak-to-average power ratio (PAPR) of the signal [3]. PAPR is the one of the major limitation of the signal.

3 EFFECT OF HIGH PAPR

The high PAPR in an OFDM system primarily arises because of the summation of large number of sub-carriers. Here data symbols across sub-carriers are adding up to produce a high peak value signal. In OFDM when the deviation of peak value from its average value is very high, the signal level moves outside the linear range of the power amplifier. When the signal moves to outside the linear range of the power amplifier, it leads to saturation of power amplifier, which causes high power requirement. When the amplifier goes into saturation, it causes

A. Inter-carrier interference
B. Out-of-band radiation

These two effects can degrade the performance of the system by increasing the Bit Error Rate (BER) at the receiver. The linear dynamic range of power amplifier can be increased to reduce the problem of PAPR but power amplifiers with large dynamic range increases the cost of the system and also the range of the signal to be transmitted is decreased [4].

To decrease the PAPR it need to increase the average power of the signal but it crosses the power limitation imposed by telecom regulatory authority and also it requires more power [4]. To avoid this high PAPR problem it needs to reduce the PAPR of the signal before the signal is transmitted. There number of techniques to reduce PAPR of the signal to an acceptable level but they add some extra computational complexity to the system.

4 ANALYSIS OF PAPR

The performance analysis of PAPR reduction techniques can be done by using complementary cumulative distribution function (CCDF) [5]. CCDF denotes the probability that PAPR of OFDM symbol exceeds the given threshold.[6] The cumulative distribution function of amplitude sampled signal is given by

$F(z) = 1 - \exp(\gamma 0)$

Now the CCDF of OFDM signal is given by :

$pr(PAPR > \gamma 0) = 1 - pr(PAPR \leq \gamma 0)$

$= 1 - F(\gamma 0)\ N$

$= 1 - (1 - e\ \gamma 0\ )\ N$

The example of CCDF curve is shown below Figure 4.1

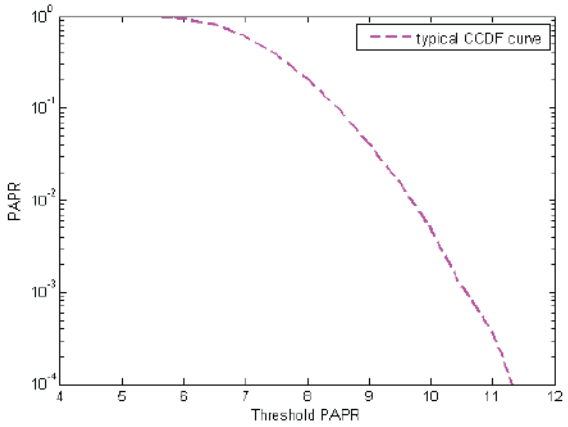

Figure 4.1 OFDM receiver using FFT

5 PAPR REDUCTION TECHNIQUES

There have been many new approaches developed during the last few years. Several PAPR reduction techniques have been proposed in the literature. These techniques are divided into two groups. These are signal scrambling techniques, signal distortion techniques and coding and pre-coding techniques. The signal scrambling techniques are:

a. Block coding
b. Selective Level Mapping (SLM)
c. Partial Transmit Sequences (PTS)

Signal scrambling techniques work with side information which minimized the effective throughput since they commence redundancy[7].

Accordingly, signal distortion techniques reduce the PAPR by distorting the transmitted OFDM signal before it passes through the PA. Although signal distortion techniques slightly increase BER, they have lower computational complexity and do not result in data rate loss. Thus, in order to achieve high data rate in OFDM systems, we adopt signal distortion techniques for PAPR reduction. The signal distortion techniques are:

A. Clipping
B. Peak windowing
C. Peak cancellation
D. Peak power suppression
E. Weighted multicarrier transmission

In signal distortion techniques, clipping and filtering is the most popular way to reduce PAPR because of its low complexity and moderate signal distortion. It clips the OFDM signal to a predefined threshold and uses a filter to restrain the out-of-band radiation [8].

On the other hand, coding and pre-coding techniques transform or code the data using different algorithms to minimize the PAPR. These algorithms may increase the computational complexity, side information or work only with small number of subcarriers which is undesirable for high speed communication. These disadvantages of coding techniques can be overcome by using pre-coding techniques [9].

6 PROPOSED WORK

In a traditional OFDM system, it usually takes the M-array Phase Shift Keying (MPSK) or the M-array Quadrature Amplitude Modulation (MQAM) bit-to-symbol mapping operations. Oversampled Signal Reconstruction Though few problems such as peak re growth, in band distortion and out of band radiation oversampled signal reconstruction is an effective way for reduction of the crest factor . Having used over sampling sequences SNR could be degraded in the clipping threshold point. Also by lowering the clipping threshold value the BER could be improved and PAPR could be reduced as well.

7 SIMULATION

Analysis We can use MATLAB as simulation software, for the random number generator, serial-parallel switching and IFFT transform can be completed by the function of complex matrix operation in the simulation system. In addition, MATLAB has powerful graphics generation capabilities, and data processing capabilities for simulation results of the system. The experiments prove that the proposed algorithm can reduce PAPR of the OFDM signal effectively. Now description of details involved in the simulation are as follows: In this paper, the study is to reduce peak average power ratio of the OFDM signal, and mainly on. The simulation parameters are as in table 1.

S.No.	Simulation Parameter	Value
1	Number of subcarriers (N) or transmitted symbols	64

2	Number of data subcarriers	16
3	Oversampling factor (L)	1.25
4	PA model	Linearized PA: Soft limiter (SL)
5	Modulation schemes	4 QAM
6	Input Back-Off (IBO)	2 dB

Table 1. Simulation parameters

According to above parameters the simulation diagrams are as follows:-

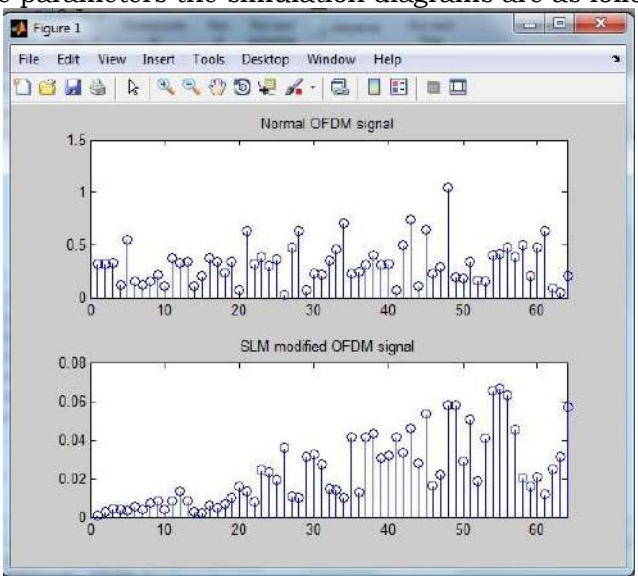

Fig: 7.1 Normalized OFDM and SLM modified OFDM Signal

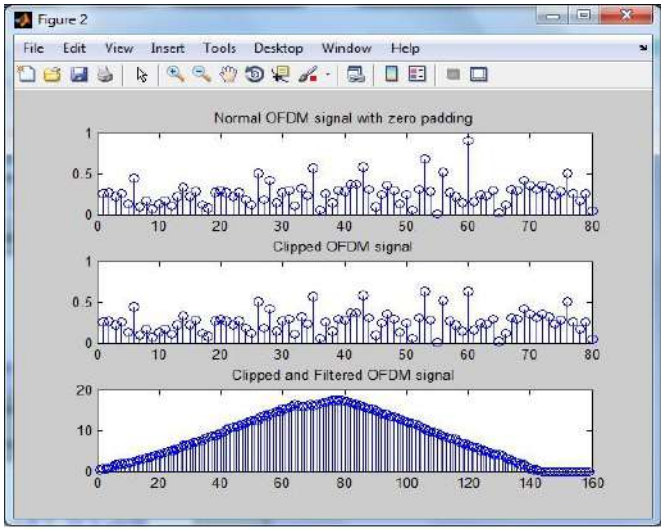

Fig 7.2 PAPR Reduction using SLM Techniques, clipping and filtering Techniques.

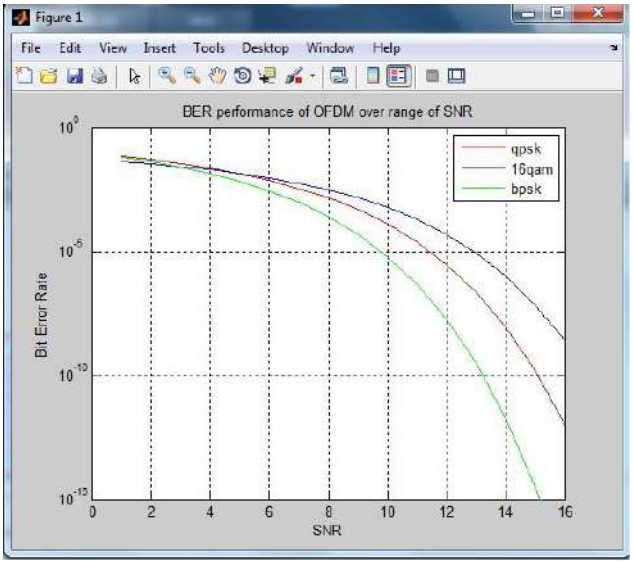

Fig 7.3 BER performance of OFDM

8 CONCLUSION AND FUTURE WORK

In this paper, the problem of high peak-to-average-power ratio (PAPR) in orthogonal frequency division multiplexing (OFDM) systems has been reviewed. This paper has focused only on some modified SLM schemes. However, there are many different kinds of PAPR reduction techniques, which have different advantages and disadvantages. In a future study, more different PAPR reduction techniques such as clipping, coding can be combined. The current research on the SLM scheme has been mainly about how to reduce complexity of the SLM scheme. However, the SLM scheme requires the side information for each OFDM symbol in order to recover the original data information with no error at the receiver terminal. It must be noted that transmitting side information decreases throughput. In addition, false side information detection degrades the BER performance of the system drastically. Therefore, in most practical system, it is very desirable to have SLM or PTS schemes that do not require any side information. It has been found that the frequency domain PAPR reduction technique is better than time domain because of its ability to reduce the PAPR without distorting the transmitted signals and thus not producing any in band distortion and out of band radiation. Among many available techniques of frequency domain, PTS is the best frequency domain methods to reduce PAPR as compare to others. PTS method is distortion less method because it divides frequency vector into some sub-blocks before applying the phase transformation. The main issue of this scheme is increment in complexity due to increased number of sub-blocks, number of selection of phase factors and amount of side information to be sent for recovery of original signal

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IMPROVING THE POWER DELAY PERFORMANCE ON FPGA USING TREE BASED ADDERS

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Abstract - This paper investigates three types of carry-tree adders (the Kogge-Stone, sparse Kogge-Stone, and spanning tree adder) and compares them to the simple Ripple Carry Adder (RCA) and Carry Skip Adder (CSA). These designs of varied bit-widths were implemented on a Xilinx Spartan 3E FPGA and delay measurements were made with a high-performance logic analyzer. Due to the presence of a fast carry-chain, the RCA designs exhibit better delay performance up to 128 bits. The carry-tree adders are expected to have a speed advantage over the RCA as bit widths approach 128. However, because of the structure of the configurable logic and routing resources in FPGAs, parallel-prefix adders will have a different performance than VLSI implementations. In particular, most modern FPGAs employ a fast-carry chain which optimizes the carry path for the simple Ripple Carry Adder (RCA). In this paper, the practical issues involved in designing and implementing tree-based adders on FPGAs are described. An efficient testing strategy for evaluating the performance of these adders is discussed. Several tree-based adder structures are implemented and characterized on a FPGA and compared with the Ripple Carry Adder (RCA) and the Carry Skip Adder (CSA). Finally, some conclusions and suggestions for improving FPGA designs to enable better tree-based adder performance are given.

1. INTRODUCTION

The binary adder is the critical element in most digital circuit designs including digital signal processors (DSP) and microprocessor data path units. As such, extensive research continues to be focused on improving the power delay performance of the adder. In VLSI implementations, parallel-prefix adders are known to have the best performance. Reconfigurable logic such as Field Programmable Gate Arrays (FPGAs) has been gaining in popularity in recent years because it offers improved performance in terms of speed and power over DSP-based and microprocessor-based solutions for many practical designs involving mobile DSP and telecommunications applications and a significant reduction in development time and cost over Application Specific Integrated Circuit (ASIC) designs. The power advantage is especially important with the growing popularity of mobile and portable electronics, which make extensive use of DSP functions. In this thesis, the practical issues involved in designing and implementing tree-based adders on FPGAs are described. An efficient testing strategy for evaluating the performance of these adders is discussed. Several tree-based adder structures are implemented and characterized on a FPGA and compared with the Ripple Carry Adder (RCA) and the Carry Skip Adder (CSA).

1.1. Block Diagram

The Kogge-Stone adder is classified as a parallel prefix adder since the generate and the propagate signals are pre-computed. In a tree-based adder, carries are generated in tree and fast computation is obtained at the expense of increased area and power. The main advantage of this design is that the carry tree reduces the logic depth of the adder by essentially generating the carries in parallel.

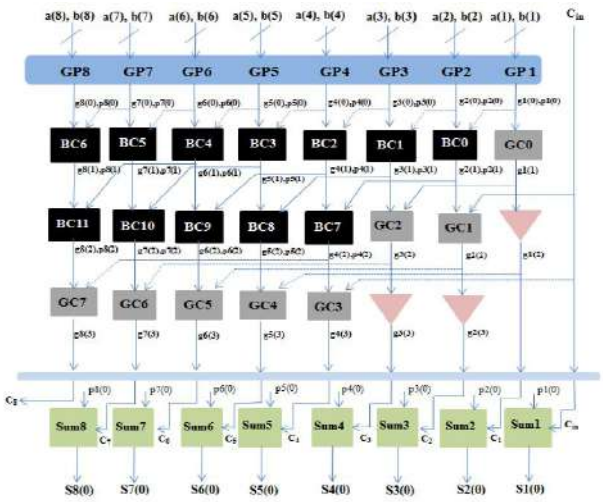

Fig.1.1. 8-bit Kogge-Stone adder

Fig.1.1 The parallel-prefix adder becomes more favorable in terms of speed due to the O(log2n) delay through the carry path compared to O(n) for the RCA. The Kogge-Stone adder is widely used in high-performance 32-bit, 64-bit, and 128-bit adders as it reduces the critical path to a great extent compared to the ripple carry adder. The operation of the tree-based adder can be understood using the concept of the fundamental carry operation (fco). This operator works on the generate and propagate pairs as defined by,

$$(g_L, p_L)\ o\ (g_R, p_R) = (g_L + p_L \cdot g_R, p_L \cdot p_R)$$

where gL, pL are the left input generate and propagate pairs and gR, pR are the right input generate and propagate pairs to the cell. For example, in a 4-bit carry lookahead adder, the carry combination equation can be expressed as,

$$c_4 = (g_4, p_4)\ o\ [\ (g_3, p_3)\ o\ [(g_2, p_2)\ o\ (g_1, p_1)]\ ]$$

$$= (g_4, p_4)\ o\ [\ (g_3, p_3)\ o\ [(g_2 + p_2 \cdot g_1, p_2 \cdot p_1)]\ ]$$

:

:

$$= g_4 + p_4 \cdot g_3 + p_4 \cdot p_3 \cdot g_2 + p_4 \cdot p_3 \cdot p_2 \cdot g_1$$

$$c_4 = (g_4, p_4)\ o\ [\ (g_3, p_3)\ o\ [(g_2, p_2)\ o\ (g_1, p_1)]\ ]$$

$$= (g_4, p_4)\ o\ [\ (g_3, p_3)\ o\ [(g_2 + p_2 \cdot g_1, p_2 \cdot p_1)]\ ]$$

:

:

$$= g_4 + p_4 \cdot g_3 + p_4 \cdot p_3 \cdot g_2 + p_4 \cdot p_3 \cdot p_2 \cdot g_1$$

Since the fco obeys the associatively property, the expression can be reordered to yield parallel computations in a tree based structure,

$$c_4 = [(g_4, p_4)\ o\ (g_3, p_3)]\ o\ [(g_2, p_2\ )\ o\ (g_1, p_1)]$$

2. HIGHER ORDER KOGGE-STONE ADDERS

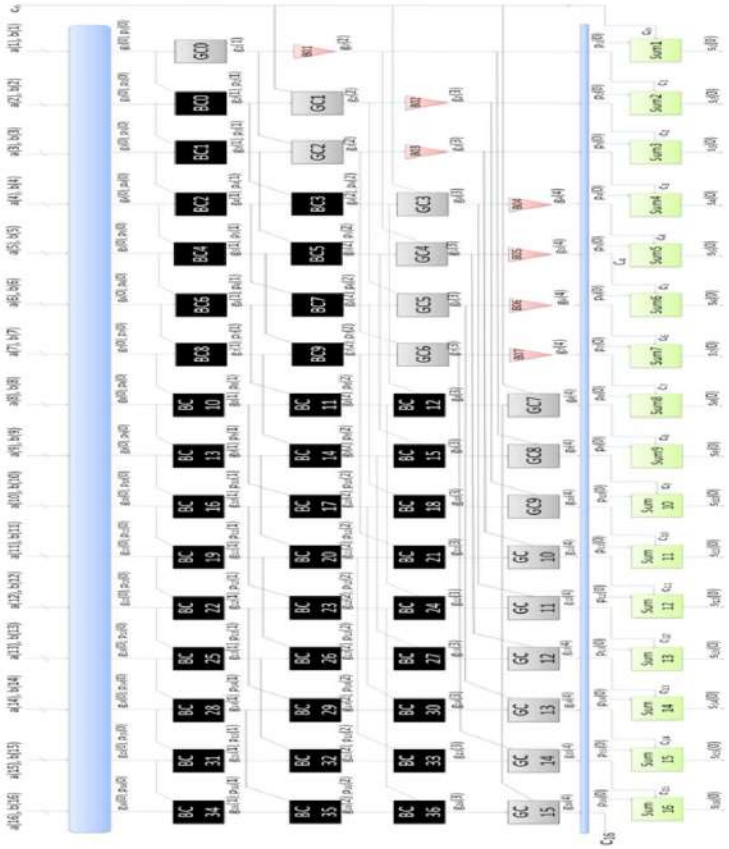

Fig.2.1. 16-bit Kogge-Stone adder

Bit Width of Kogge-Stone Adder	No. of GP Blocks	No. of Black Cells	No. of Gray Cells	No. of Sum blocks
16-bit	16	37	16	16
64-bit	64	257	64	64
128-bit	128	641	128	128

Table 2.1. Kogge-Stone adders of different bit widths

The sparse Kogge-Stone adder consists of several smaller ripple carry adders (RCAs) on its lower half and a carry tree on its upper half. Thus, the sparse Kogge-Stone adder terminates with RCAs. The number of carries generated is less in a sparse Kogge-Stone adder compared to the regular Kogge-Stone adder. The functionality of the GP block, black cell and the gray cell remains exactly the same as in the regular Kogge-Stone adder.

3. SIMPLIFIED IOB DIAGRAM

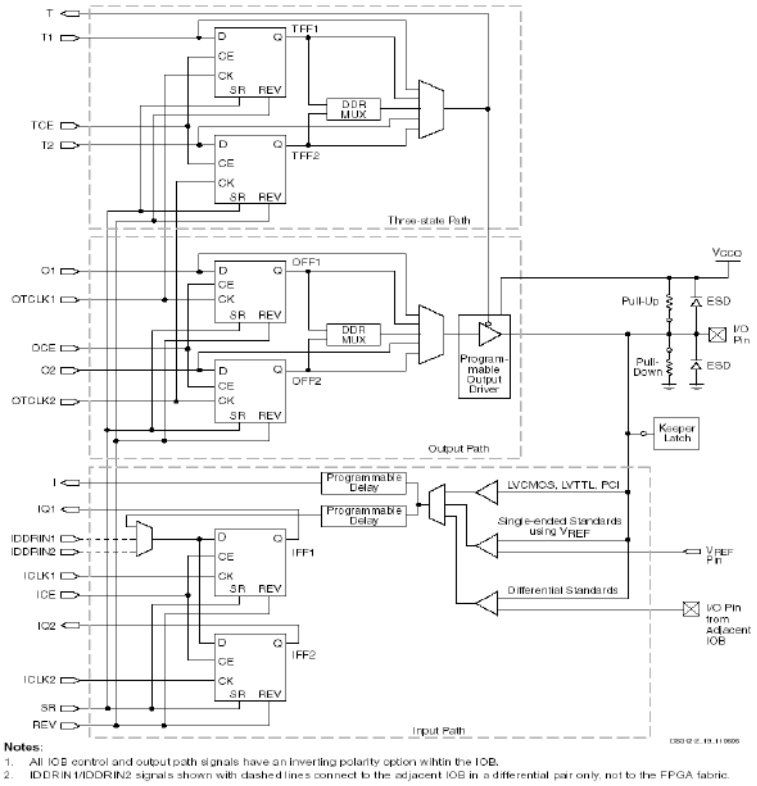

Fig 3.1 Simplified IOB Diagram

Fig 3.1 The Configurable Logic Blocks (CLBs) constitute the main logic resource for implementing synchronous as well as combinatorial circuits. Each CLB contains four slices, and each slice contains two Look-Up Tables (LUTs) to implement logic and two dedicated storage elements that can be used as flip-flops or latches. The LUTs can be used as a 16x1 memory (RAM16) or as a 16-bit shift register (SRL16), and additional multiplexers and carry logic simplify wide logic and arithmetic functions. Most general-purpose logic in a design is automatically mapped to the slice resources in the CLBs. Each CLB is identical, and the Spartan-3E family CLB structure is identical to that for the Spartan-3 family.

3.1 Spartan 3e CLB

Block Diagram

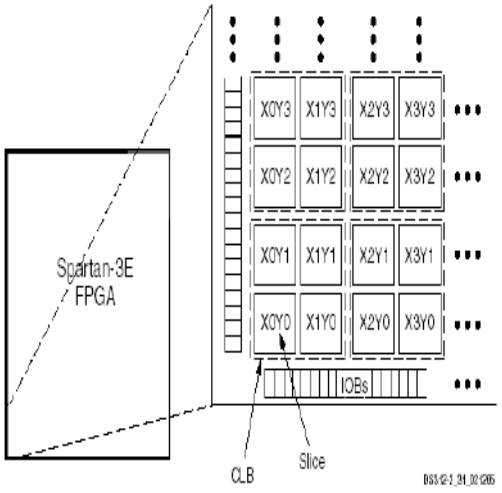

Fig 3.1.1: spartan3e CLB

Each CLB comprises four interconnected slices, as shown in Figure 16. These slices are grouped in pairs. Each pair is organized as a column with an

independent carry chain. The left pair supports both logic and memory functions and its slices are called SLICEM. The right pair supports logic only and its slices are called SLICEL. Therefore half the LUTs support both logic and memory (including both RAM16 and SRL16 shift registers) while half support logic only, and the two types alternate throughout the array columns. The SLICEL reduces the size of the CLB and lowers the cost of the device, and can also provide a performance advantage over the SLICEM.

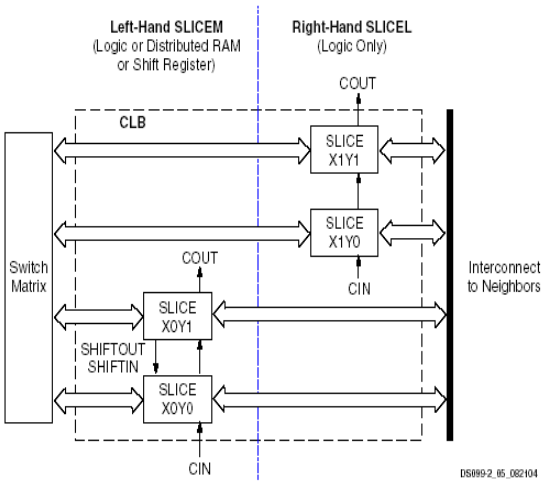

Fig 3.1.2 Arrangement of Slices within the CLB

The Xilinx development software designates the location of a slice according to its X and Y coordinates, starting in the bottom left corner, as shown in Figure 14. The letter 'X' followed by a number identifies columns of slices, incrementing from the left side of the die to the right. The letter 'Y' followed by a number identifies the position of each slice in a pair as well as indicating the CLB row, incrementing from he bottom of the die. Figure 16 shows the CLB located in he lower left-hand corner of the die. The SLICEM always as an even 'X' number and the LICEL always has an odd X' number.

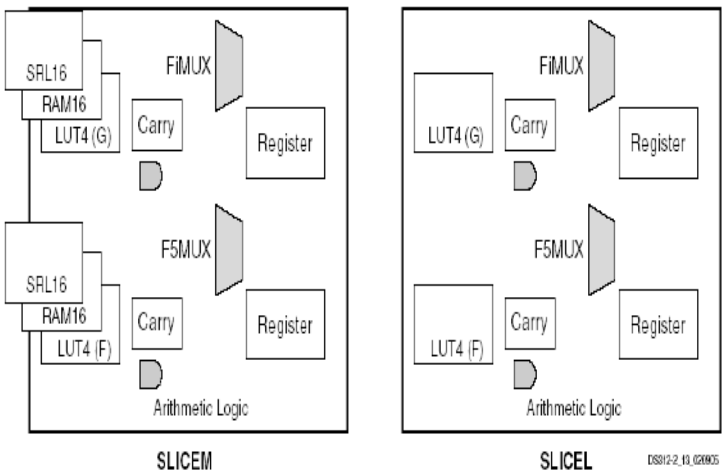

Fig 3.1.3Resources in a Slice

A slice includes two LUT function generators and two storage elements, along with additional logic, as shown in Figure 4.4 .Both SLICEM and SLICEL have the following elements in common to provide logic, arithmetic, and ROM functions:

- Two 4-input LUT function generators, F and G
- Two storage elements
- Two wide-function multiplexers, F5MUX and FiMUX
- Carry and arithmetic logic

Fig 3.2.1: Spurious transition cases in multimedia/ DSP processing

4. SIMULATION RESULTS

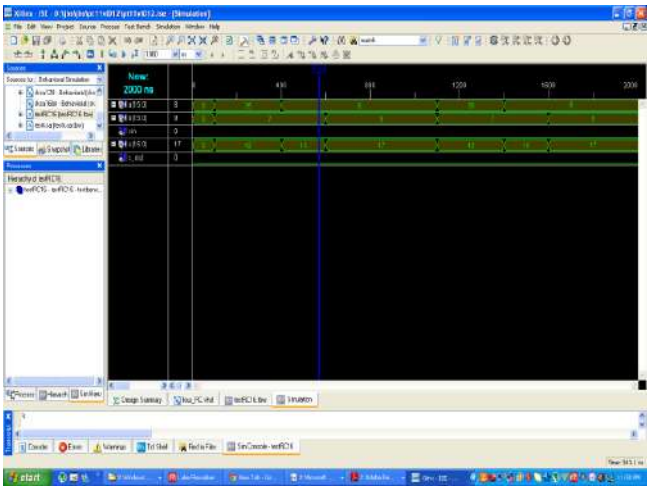

Fig 4.1: Simulation Result of 16bit RC

SYNTHESIS RESULT OF KSA-16 BIT

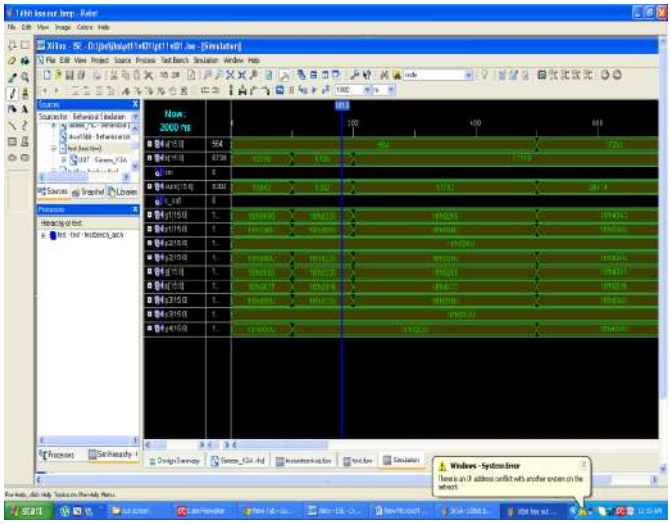

Fig 4.2: Simulation Results of KSA -16 bit

SYNTHESIS RESULTS OF RC-128 bit

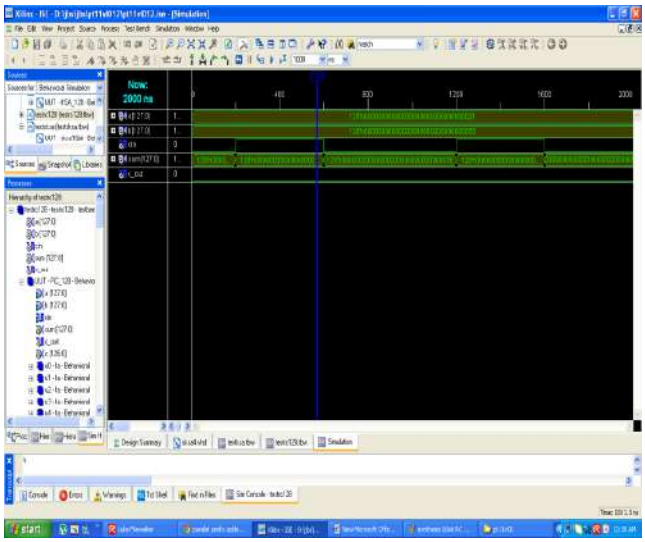

Fig 4.3: Simulation result of RC-128bit

SYNTHESIS RESULT OF KSA- 128 bit

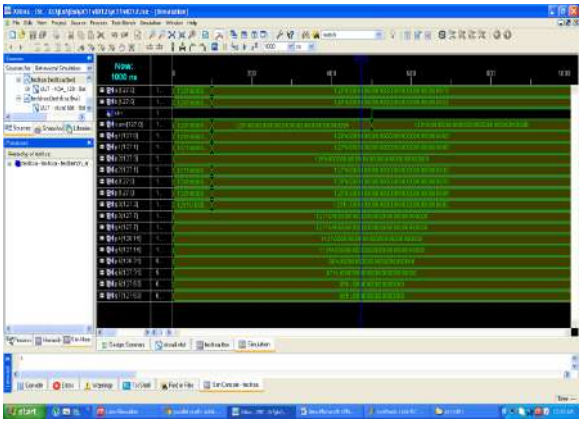

Fig 4.1: Simulation Results of 128bit KSA

5. CONCLUSION

The Above Experimental Results proved that parallel prefix adders are very high speed than normal Ripple carry Adders when it will increase the width of the adders. All adders will successfully synthesized using Xilinx9.1 synthesis tool and simulation will done using ISE simulator. We are generating a synthesis reports for Spartan 3E FPGA.

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ENERGY EFFICIENT HETEROGENEOUS CLUSTERING &MAXIMIZATION ROUTING INWIRELESS SENSOR

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Abstract - Wireless Sensor Network (WSN) is one of the quickly rising area for research and development. WSN can be seen in various fields like environmental monitoring, battle field surveillance, border security surveillance, motion tracking etc. A main issue of research in WSN is to arrange the sensors with different capabilities like power, sensing range, communication range in wireless network and route the sensed data from the sensors to a sink with dynamism. Clustering is a key technique used to lengthen the network lifetime by decreasing the energy utilization. In clustered WSN, Routing the sensory data to the sink without obstacle is impossible. So eliminating the obstacle in the routing area is essential. In this paper, grouping the sensors into clusters by energy efficient heterogeneous clustering, that often selects the cluster head from the cluster. Cluster head is selected with respect to the nodes residual energy and other parameters like transmission range and number of transmissions. In this work the connectivity is concentrated by Route identification technique with the help of shortest path algorithm to reach the sink among obstacles. Connectivity in wireless network is considered as a measure of Quality of Service. We show that the proposed system reduces the energy utilization, average hop count and packet delay of heterogeneous WSN.

Keywords: Clustering, Connectivity, Routing, Wireless Sensor network, Energy, Network Lifetime.

1 INTRODUCTION

Wireless Sensor Networks consist of many small sensor nodes that are capable of sensing wireless communication. Sensor nodes are distributed and autonomous used for different applications like human motion tracking, medical science and military environmental monitoring etc. The region is distributed with autonomous sensors. Each sensor is capable of sensing and transmitting. Sensor node senses the environment as well as transfers the data to the sink node. Coverage depends on the sensing range as well as Connectivity of the node to reach sink depends on the communication range. Connectivity can be defined as an ability of the sensor node to sense the environment and transfer all the information through the network to reach the data sink (FIGURE 1).

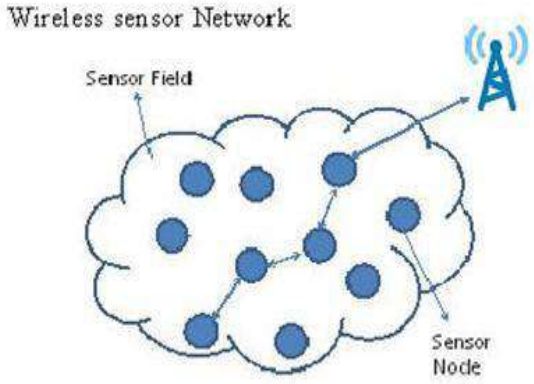

Figure 1.Wireless Sensor Network (WSN)

Heterogeneous wireless sensor network consists of different types of sensor nodes with different, communication range energy and sensing range. Each sensor nodes are battery powered (energy). Energy being the most important one because the battery present in the sensor node cannot be replaced often. The node has a non-rechargeable battery which is impossible to replace batteries in most sensor fields. To lengthen the lifetime of the WSN, clustering is the key technique. Clustering will dynamically re-assign the member nodes in the cluster. Therefore, the network disconnection due to energy drain out nodes can be avoided. Energy consumption of the sensor node is reduced to increase the lifetime of the network. Only some work are focused on lifetime maximization in heterogeneous WSN. The paper is organized as follows: In chapter I, addressed about the introduction and issues in WSN. Related work, methodology and issues. discussed about the proposed system. Deals with the methodologies used to maximize network lifetime Results and Discussion. Conclusion of the paper. At the end is the list of references.

2 RELATED WORKS

Clustering used to extend the lifetime of a sensor network by reducing energy consumption. Connectivity is the very essential attribute for data transmission. Clustering also increases network scalability. Researchers in all fields of wireless sensor network believe that nodes are homogeneous, but some nodes may be of different energy to prolong the entire lifetime of a WSN and its reliability. A distributed approach to determine if a sensor in WSN is a cluster head to meet the preferred connectivity requirements [1]. Cluster based routing in WSN is used to reach network scalability and maximize lifetime [2]. The existing methods for prolonging the lifetime of WSNs focuses on the issues of device placements [3], data processing [4], routing [5] and topological management [6]. In[7]Energy aware algorithm for the selection of sensor and to identify the relay node. Shortest path algorithm is used for choosing the path. In [8] ABC Based Sensor Deployment. Schedule the sensor nodes to achieve network lifetime. Target coverage is provided. Maximized coverage not provided for heterogeneous type of network.On observing the existing work, the techniques are applied only in the homogeneous type of WSN and not in the heterogeneous network.

3 PROPOSED WORK

In the proposed work, to reduce the energy consumption and to maximize the network lifetime an Energy efficient Heterogeneous Clustering (EHC) technique and a Route identification technique in clustered WSN among obstacles are used. Sensor network are often deployed in remote areas. As the energy capability of the nodes is restricted and battery powered, some method are introduced to preserve energy to avoid node failure. Clustering is one of the key and old concepts for energy consumption and to increase the lifetime of a sensor node in a network. After deployment of the sensor nodes randomly in the region of interest, each sensor nodes in the field try to form as a cluster. Each node only interacts with a small set of sensor nodes within the transmission range. At the beginning all the nodes are not clustered. Each node in the clustering process use different types of messages like Broadcast message, State message and Join message.

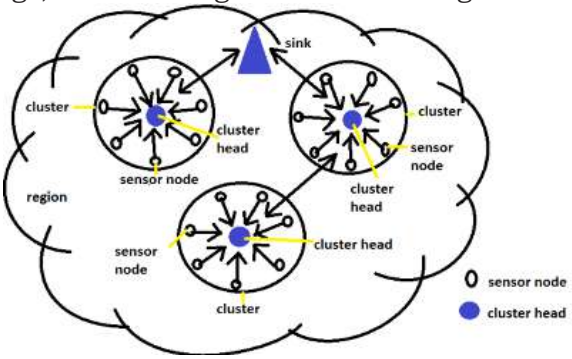

Figure 2.Clustered Networks

Each node broadcasts a message to all its neighbors. According to the number of received messages and with respect to the residual energy and delay the node will decide by itself to be a cluster head. The node with high residual energy will have less delay. Once the delay expires the node will give a state message to its neighbors as a cluster head. All other nodes will give a join message and form as a cluster (FIGURE 2). Each cluster head can form a connected network. Cluster head will communicate with sink node and transfers data. Energy efficient heterogeneous clustering is the proposed technique which works with the heterogeneous type of sensor nodes. Here heterogeneity means the nodes with different energy level, transmission range, sensing range etc. are grouped as a cluster. EHC form a clustered WSN. It performs the cluster formation and the cluster head identification in a distributed manner. Route identification technique with shortest path algorithm which avoids obstacles is used to identify the shortest route to reach the sink node for communication (FIGURE 3). After routing path has been established by cluster heads it will form a connected network. The cluster head identification should be changed time to time dynamically to increase the network lifetime. This dynamic cluster formation will reduce the energy consumption and increase the network lifetime.

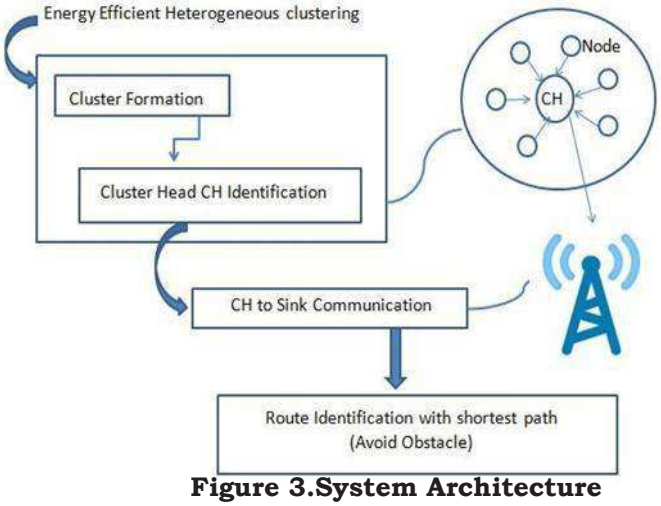

Figure 3.System Architecture

In this paper, the lifetime of the network is the time from the start of the network operation till the death of the first sensor node in the network. The lifetime of the WSN is divided into trips to balance the energy usage among sensor nodes. At the start of the trip, each and every sensor involves in the cluster formation and cluster head election using EHC. Each sensor sense the data and forwards it to the cluster heads, which in turn routes the data to the sink node using route identification technique.

4 METHODOLOGIES

4.1 Energy efficient Heterogeneous Clustering

The sensor nodes are distributed randomly on the sensing field. Energy efficient Heterogeneous Clustering (EHC) will form the cluster and cluster head identification in a distributed approach.

4.2 Cluster Formation:

After deploying the sensor node n in theregion of interest. The node in the region will makes decision independently. Clustering is a key technique toform cluster and is completely distributed. The nodes in the field are formed as a small region called cluster. And each cluster will elect a node as a cluster head. Steps to form a cluster and cluster head identification is discussed in the cluster head identification phase.

4.3 Cluster Head CH identification:

In this work, n nodes arerandomly deployed in the network. Each nodehas initial energy E(i), transmission power P(Tx) and other required parameters by the time they are deployed. The main purpose of the cluster head CH selection is to determine the normal nodes and the cluster head in the network. Every cluster head should be connected with the sink node directly or through some another CH. Now the competition is set among each node that is qualified to be a CH. Node can be identified as a CH only when it has a high residual energy E(r) and with less delay D.Initially each node is given with E(i) and P(Tx) as input. Process each node separately in each trip.

Step 1:
For current node C(n), in the current trip C(r) calculatethe number of transmissions n(Tx) while sending the broadcast message to all the neighbor nodes. This broadcast message is given to say the neighbor about the survival of the node. The n(Tx) can be calculated as the number of node count each node receives.

Step 2:
For the current node C(n) calculate the residual energyE(r) with E(i), P(Tx) and n(Tx) as input with the following formula.

$$(\ ) = (\ ) - [\ (\ ) * (\ )]$$

Step 3:
Calculate the Energy Consumption Rate ECR for C(n)with E(i), E(r) and the Current Trip CR as input.

$$= (\ ) - (\ ) - 1$$

Step 4:
Calculate the Delay D for C(n) with E(i), E(r), random number x which can be 0 or 1 and the Round Trip Delay RTD.

$$= ((\ (\ ) - (\ )) +) * (\ )$$

Step 5:
Repeat the steps for all the nodes. By doing this the node with high residual energy and with less delay will be identified easily.

Identify the cluster head CH (broadcast message)

Input initial energy E(i), transmission power P (Tx)
Begin
for each node (Current node C(n))
{
  For each round (Current trip C(r))
   {
    Calculate number of transmissions n(Tx);
    Calculate the residual energy e(r) with E(i), p(Tx), n(Tx);
    Calculate Energy Consumption Rate for C(n);
    Calculate delay D for C(n);
    }
}
Pick Random Number x in (0,1);
Assume P(D), Q(D) as delay of First node, Second node;
Process all the nodes;
For each node
   {
     Compare p and q and capture the less d node;
     If (P(D)<Q(D) && high E(r));

```
      {
P(D) with less D;
       Node announces itself as CH to nearest nodes;
       }
      Else
       {
P(D) with high D;
        With act as normal node;
        }
    }
End;
```

Figure 4.Identification of the Cluster head

Consider two nodes for assumption P, Q. Let P(D) and Q(D) be the delay of first node and the second node. If P(D) is less than Q(D) then P will announce itself as CH to Q. Else the delay is higher and P will act as a normal node in the cluster (FIGURE 4). The node with higher E(r) will have less delay. So the higher E(r) nodes delay will expires soon and it will give the state message as CH to the neighboring nodes. Now the other nodes will give a join message to the CH and acts as a normal node. Thus the cluster is formed and the CH is identified. After sometime, CH will be re-elected with respect to a threshold value THv. This is done dynamically time to time.So that the nodes will not drain its energy so soon and go under death. This will increase the network lifetime and reduce the energy utilization.

4.4 Route Identification Technique

Cluster head is identified and it is allowed to communicate with the Sink S to form a connected network.

Network Connectivity: Connectivity is considered as ameasure of quality of service. In order to avoid disconnection with the nearest nodes. The connectivity depends on the communication range and should identify the shortest path to during data transfer, the node has to maintain its connection Reach the sink.

Route Recognition: For identifying the shortest route toreach the sink, initially input the clustered WSN. Consider n is a node, for each n with the help of the graph method send data to the CH. If n is a cluster head send data to the sink S. If the CH does not has the nearest node as the sink node then send the data to the nearest CH to reach S. If n is an obstacle, avoid the obstacle and apply the shortest pathalgorithm (Dijkstra) to reach the sink node with shortest path. Consider the clustered network as a Graph G and take a node as Source src. Assume the node as the vertex v. For each vertex in G, assign the distance as infinity, distance to src as zero and the current cost to be infinity. Starting nodes distance is permanent and for all other nodes it's temporary. U is the node with smallest distance. Q is the set of all nodes in the graph G. If a calculated distance of a node is smaller as the current one, update the distance and set the current node as previous node. Set the node with minimum temporary distance as active. Set its distance as permanent. Repeat the process to identify the shortest route to the sink node from each CH (FIGURE 5)

Route identification technique

```
Input clustered wsn
For each node
 {
  If ( n is a node )
    {
      Send data to cluster head CH;
    }
Else if ( n is a CH )
    {
      Send data to nearest CH or sink S;
     }
    If ( n is an obstacle )
      {
```

```
        Apply SPA on vertex ;
        Function Dijkstra( graphG; source arc )
        For each v in G
Distance(v) = 8;
Previous(v) = undefined;
Distance(src) = 0;
          Q = all nodes in G;
          While ( Q is not empty )
             {
             U = node in q with smallest distance(u);
            Remove u from Q;
            For each nearest node v of u
                {
                  a = distance(u) +  distance between(u,v);
if (a < distance (v))
                   {
Distance(v) = a;
Previous(v) = u;
                     Return previous();
                     }
                }
Else
 {
  Send data to nearest CH or sink S;
 }
 Else
 {
Identify n;
  }
```

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RELIABLE AUTOMATIC TELLER MACHINE EVEN THE LOW PERFORMANCE SERVER

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Abstract - In the current scenario the currency plays a major role for performing many tasks. Without currency the human life will not be imagined. Due to this reason, Banking sectors were introduces many automatic Teller Machine (ATM) to overcome the difficulties of bank customers by increasing the availability of currency in all the days through ATM Centre installation. But some scenarios the server which is handling the customer details may leads to slow, this leads the customer not able to collect amount from the ATM. This Research paper illustrates the technique with algorithm to overcome the difficulties of the low performance server. This is achieved by introducing a small caches server, which maintains the mined information about the client and maintain the updated account details. This proposed technique will help to improve the scenario of disputed in ATM and provide reliable currency to the customers. The Concurrency technique incorporate with this research work to carry out the updated information to the Bank servers.

1. INTRODUCTION

An cash machine or ATM permits a bank client to conduct their banking transactions from virtually each different ATM machine within the world. As is usually the case with inventions, several inventors contribute to the history of associate invention, as is that the case with the ATM. Keep reading to be told regarding the various inventors behind the automated teller machine or ATM.
In1939, Luther Simjian proprietary an early And not-so-successful paradigm of an ATM.However, some specialists have the opinion that James Good fellow of European country holds the earliest patent date of 1966 for a contemporary ATM, and John D White (also of Docutel) within the US is usually attributable with inventing the primary free-standing ATM style. In 1967, John Shepherd-Barron made-up and put in an ATM during a Barclays Bank in London. Don Wetzel made-up an yank created ATM in1968.However, it wasn't till the middle to late Nineteen Eighties that ATMs became a part of thought banking. Luther Simjian came up with the thought of making a "hole-in-the-wall machine" that will permit customers to create money transactions. In 1939, Luther Simjian applied for twenty patents associated with his ATM invention and field tested his ATM machine in what's currently Citicorp.

Once six months, the bank reportable that there was very little demand for the new invention and out of print its use. Luther Simjian was born in Turkey on January twenty eight, 1905. Whereas he studied drugs at college, he had a life-long passion for hotography. In 1934, the discoverer rapt to the big apple. Luther Simjian is best famed for his invention of the Bankmatic ATM machine ,however, Luther Simjian's 1st huge industrial invention was a self-posing and self-focusing photographic camera. the topic was ready to look a mirror and see what the camera was seeing before the image was taken. Luther Simjian conjointly fancied a flight meter for airplanes, associate automatic postage metering machine, a coloured X-ray machine and autocue Combining his data of drugs and photography, Luther Simjian fancied some way to project pictures from microscopes and strategies of photo graphing cimens underneath water. Luther Simjian started his own company referred to as Reflect one to additional develop his inventions. According to BBC News, the world's 1st ATM was put in in a very branch of Barclays in Enfield, North London. John Shepherd Barron, United Nations agency worked for the printing firm Delaware La Rue was the chief discoverer.

In a Barclays handout, the bank explicit that comedy actor Reg Varney, star of TV program "On the Buses", became the primary person within the country to use a automatic teller machine at Barclays Enfield on Gregorian calendar month twenty seven, 1967. The ATMs were at that point known as DACS for Delaware La Rue Automatic money System. John Shepherd Barron was the decision maker of Delaware La Rue Instruments, the corporate that created the primary ATMs. At that point plastic ATM cards didn't exist. John Shepherd Barron's ATM machine took checks that were fertilized with atomic number 6, a rather hot substance.

2. LITERATURE REVIEW

Inventors [1] Jeremy Phillips, Hannah Volfson, Zhe Liu, Edward Abbott .A device might get a primary image portrayal contents enclosed in an exceedingly secure storage instrumentality at a primary purpose in time and first user account knowledge related to the secure storage instrumentality. The device might store the primary image in an exceedingly organization related to the primary user account knowledge. Additionally, the device might receive knowledge indicating that a private related to a used account accessed the secure storage instrumentality, and receive a second image portrayal contents enclosed within the secure storage instrumentality at a second purpose in time. The second image is also hold on within the organisation. The device might more receive, from a user device related to the primary user account knowledge, asking to access the information structure, and also the device might offer, to the user device, knowledge that causes show of the second image.

Inventor Aarti Sharma [2]A knowledge signal improvement device for adding supplemental location data to an information signal to reinforce location determination is delineated . in addition, a way and a computer-readable medium for adding supplemental location knowledge to an information signal to reinforce location determination is delineated .

Inventors Carrie Anne Hanson, Sharon Scanlon, Davindar Gill, David M. Grigg [3]Systems, methods, apparatuses, and computer-readable media organized to see a location of a user, determine the user and supply extra services supported the determined location and/or identity area unit provided. In some examples, the identity of a client could also be determined supported detection of a symbol by a private computing machine of the client. One or a lot of associate users related to that client could also be known and a location of the associate user could also be transmitted to the client user. In different examples, a class of Associate in Nursing known client could also be determined Associate in Nursing an associate user equipped to figure the reupondetermined class of client could also be known.

Inventor Abdolreza Behjat [4] Among different things, a mobile wireless device are often used for communication of knowledge via associate optical illustration. The info might represent associate instrument of payment and be provided employing a show. The optical illustration is scan by associate optical receiver of a second device, and might be translated back to the info. Consequently, a tool like a transportable is also accustomed create or receive payments victimization optical representations of knowledge.

Inventors Farrukh Zaidi, Husam Abu-Zaydeh, Brian E. Doyle, Jason A. Alizzi, Sunil R. Bangad, Sridhar M. Seetharaman, Benjamin N. Wu, Robert Bosi, Morgan S. Allen [5]In one embodiment, a system for troubleshooting dealings during a exceedingly network setting includes an interface which will receive a dealing report from every of variety of network devices accustomed method a transaction. Every dealing report might embrace a standing code field indicating a standing of the dealing at every of the plurality of network devices. The system might also embrace a processor communicatively coupled to the interface. The processor might generate a dealing flow report that links every of the received dealing reports related to the dealing. The processor might confirm that the standing code field related to a primary one in all the plurality of network devices indicates a failing standing. The processor might then communicate a standing alert message to a network administrator related to a primary one in all the plurality of network devices.

3. PROPOSED ATM STRUCTURE

The overall architecture of the proposed Automatic Teller Machine only concentrates the operation while performing the server is low. The customer can go to the nearest ATM were the Customer accessing the ATM frequently. The ATM machine verifies the details of the customer with the local cache server .If the server have the updated information about customer bank details then the customer able the transaction. Otherwise the client may not perform the needed operation. When the performance of the server becomes low parallel the customer uses the ATM Centre that case the ATM machine access the local cache server to provide transaction. The concurrency control mechanism is implemented to overcome the problem of multiple accesses.

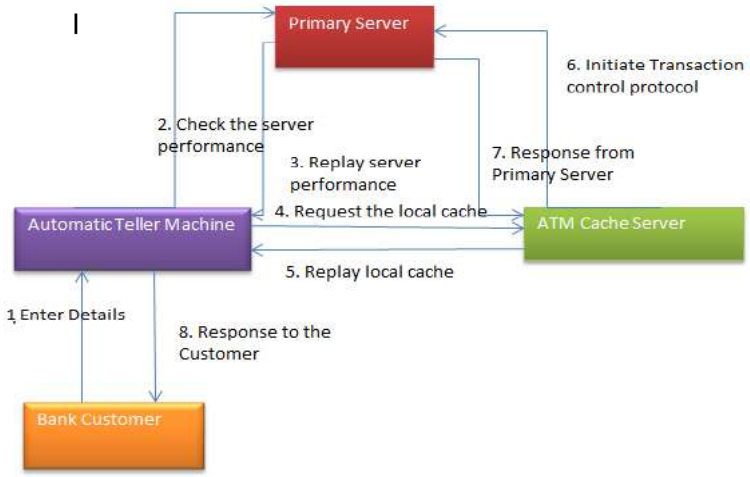

Figure 3.1 Proposed ATM Structure

3.1 Machine Learning Mining Algorithm to Maintain Cache Server

The main role of this research article to collecting the customer information and create the local cache in the ATM. This is achieved by developing the Machine learning Mining algorithm for maintain the information in the local ATM cache server. The steps and flow chart of the Machine learning Mining algorithm is depicted below.

Steps for Machine learning mining the customer details for local ATM cache server

1. Customer enter the ATM card for accessing the account
2. Server check the details of the client with the server (checking PIN)
3. If Every time the customer access the ATM , then the variable called counter is incremented by one (initially the counter value for all the customer Is zero)
4. When the client reached the counter value more than three then the customer is a nearby living customer .so the machine learning mining algorithm maintain the details of the customer in to its own local cache server.
5. Whenever the server performance is low, the customer reach the frequent accessing ATM means the machine learning mining algorithm gets the details from the local cache server and update the transaction details to the server
6. Transaction commit protocol is implemented to avoid the multi withdrawal currency.

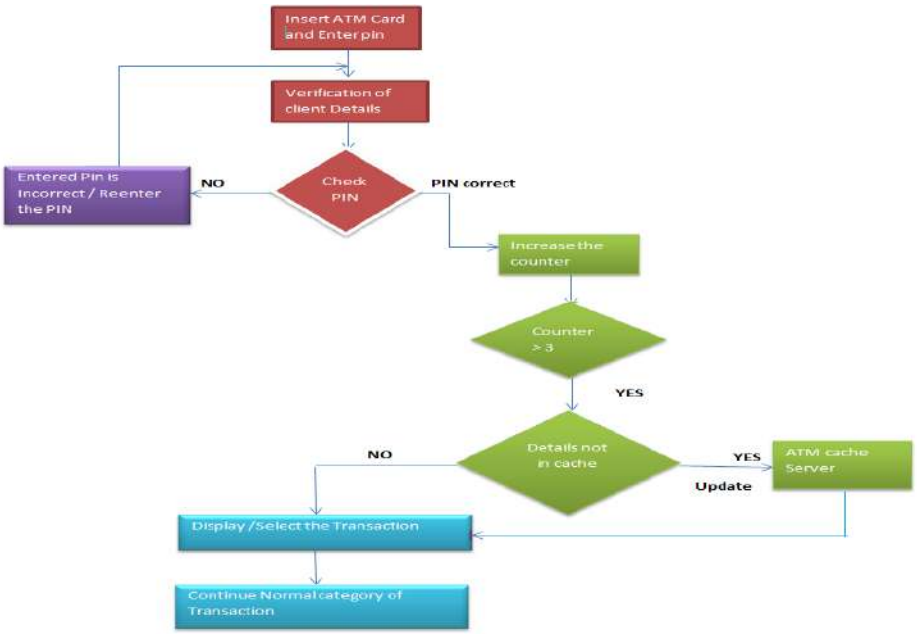

Figure 3.2 Flow Diagram of ATM Structure

4. CONCLUSION

In this Research article proposes a novel innovation for maintaining the frequent customer details. When the server performance is becoming low the customer need not to worry about the transaction failure. Customer can get reliable transaction from local cache in the ATM. The Machine mining algorithm is used to mine the customer and maintain the frequent accessing of respective customer. Finally the updated details will be modified on the server through the concurrency control mechanism. This research article further can be enhances to provide this feature even the new cline is requesting currency.

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2. Patent number: 10108952, Type: Grant,Filed: July 10, 2014,Date of Patent: October 23, 2018 Assignee: Bank of America Corporation ,Inventors: Carrie Anne Hanson, Sharon Scanlon, Davindar Gill, David M. Grigg "Customer identification "
3. Patent number: 10007906 , Type: Grant , Filed: March 9, 2012 , Date of Patent: June 26, 2018 , Inventor: AbdolrezaBehjat "Using a mobile device in a commercial transaction "
4. Patent number: 9965758 Type: Grant Filed: July 6, 2015 Date of Patent: May 8, 2018 Assignee: Bank of America Corporation Inventors: FarrukhZaidi, Husam Abu-Zaydeh, Brian E. Doyle, Jason A. Alizzi, Sunil R. Bangad, Sridhar M. Seetharaman, Benjamin N. Wu, Robert Bosi, Morgan S. Allen "Troubleshooting transactions in a network environment".
5. Patent number: 9934497 Type: Grant Filed: January 20, 2016 Date of Patent: April 3, 2018 Assignee: Bank of America Corporation Inventors: Kristy M. Crist, Terrelle Carswell, Eric McConnell, Rahul Puri, Devin D. Rhodes, James D. Goodwin "Automated teller machine ("ATM") currency stamper".

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. **THERMAL AND WATER ABSORPTION CHARACTERISTICS OF BIO-MASS AND E-WASTE COMPOSITE**

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Abstract - The useful life of consumer electronic devices is relatively short, and decreasing as a result of rapid changes in equipment features and capabilities. This creates a large waste stream of obsolete electronic equipment, electronic waste (e-waste).

The main objective of this project is to investigate effect of the matrix material on thermal properties such as Thermal conductivity, Specific heat capacity, Thermal diffusivity and water absorption behavior of natural fiber reinforced polypropylene (E-waste) composites are studied.

In this study, the thermal conductivity of E waste with rice husk composite at maximum fiber content is measured at temperature of 55°C using Unitherm model 2022 apparatus. The result shows that the thermal conductivity of E waste with rice husk composite is 0.205 W/mk is higher than the Pure E waste material of having thermal conductivity of 0.189 W/mk. When increased fiber content thermal conductivity increased.

The Specific heat of E waste with rice husk composite is measured by Differential Scanning Calorimeter (DSC). The Specific heat of E waste with rice husk composite has higher value than Pure e waste material. Thermal diffusivity of E waste with rice husk composite has higher value than Pure e waste material. Water absorption and moisture diffusion coefficient properties are found.
Keywords: Rice husk, Electronic waste.

1. INTRODUCTION

The growing quantity of e-waste necessitates the development of systems which can handle the waste in such a way that minimizes negative social and ecological impacts while maximizing the positive impacts. By comparing different systems, potential areas of development can be identified and positive aspects of other systems can be adapted to improve the existing system [3]. Environmentally beneficial composites can be made by replacing glass fibres with several types of cellulose fibres. Fibres from pine or eucalyptus wood and also one-year crops such as coir, sisal, etc. are all good candidates. The poor resistance near water absorption is one of the disadvantages of natural fibres/polypropylene composites. The process of absorption of water was found to follow the kinetics and mechanisms defined by Fick's theory. [1]

Wood can be used as filler to increase the strength, stiffness and decrease the raw material cost in thermo plastics and thermoses. Virgin thermoplastics such as High Density Polyethylene (HDPE) and polypropylene (PP) are widely used for wood polymer composites and many literature available based on these thermoplastic wood composites DSC results showed that there is no difference in Tm of composites and RPP and the values of TC marginally changed [9] The evaluation of the thermal properties shows that the poly- propylene based NA particles composites were less thermally stable than the polypropylene matrix alone. Also, the decomposition temperature decreases from 256 °C to 230 °C with the increase of particle loading from 10 to 25 wt.%, respectively [11].

The use of natural fibres as reinforcements for thermoplastics has received much attention from the international research community over the past decade. The main benefits of natural fibres over glass fibres are their low cost, low density, high strength to weight ratio, resistance to breakage during processing, CO2 neutral life cycle and recyclability. Composites were produced with 40 wt% fibre and 4 wt% maleated polypropylene (MAPP) coupling agent using extrusion followed by injection moulding. [2]. And, in fact, the mechanical property of natural fiber was much more inferior to that of glass fiber. Therefore, essential functional strength for structural materials or progress of strength and toughness of green composites and securement of reliability are not enough. Because it is necessary that the

mechanical property of natural fiber approach that of glass fiber, and natural fiber have the optional functions [4].

Thermal conductivity of samples of PLA as a function of sample's fiber content. The thermal conductivity decreases with increasing fiber content. It is because hollow portion of reinforced fiber contains the air. Figure 3 shows a cross-sectional view of PLA-based composites sample. Thermal conductivity of the air is 0.026 [W/(mK)] at 25 degrees C. It has an excellent heat lagging effect. Therefore, thermal conductivity decreases with increasing fiber content. The thermal conductivity of the composites with fiber content of 76wt.% is 0.190 [W/(mK)]. Natural fiber-reinforced composites have excellent thermal insulation properties[5]

The importance of waste electrical and electronic equipment recycling has become more evident over the last ten years. It is expected that quantities of WEEE will increase rapidly in the near future. Actually, WEEE constitutes 4% of municipal waste in EU. But the treatment of electronic scrap especially material with high contaminations or amount of plastic needs always a combination of different steps, i.e. mechanical, thermal and hydrometallurgical, whereas the environmental regulations have to be considered [6]. The inspected samples were obtained during the industrial injection moulding. There were determined the sample mechanical properties (by a tensile test), melt flow rate, temperatures of phase transitions (by differential scanning calorimetry, DSC), temperatures of thermal degradation (by thermo gravimetric analysis, TGA), as well as storage modulus and damping coefficient (both by dynamic mechanical analysis, DMA). The glass transition temperatures (from DSC) of butadiene and acrylonitrile styrene fractions don't vary with the number of injection mouldings and are ca. 61 and +104°C, respectively. The induced temperature of the onset of thermal degradation, thermal degradation temperature, and temperatures corresponding to the 5, 50 and 95% mass loses of the samples do not considerably vary after the subsequent processing procedures [7].

The inspected samples were obtained during the industrial injection moulding. There were determined the sample mechanical properties (by a tensile test), melt flow rate, temperatures of phase transitions (by differential scanning calorimetry, DSC), temperatures of thermal degradation (by thermo gravimetric analysis, TGA) [10]. The composites embedded by twill woven hemp fabrics showed better mechanical, thermal and viscoelastic behaviour than those reinforced by plain woven hemp fabrics due to the structural features of the twill fabrics, such as fewer interlacing and closer packing. The CTE of the hemp/PLA composites decreased considerably with increasing the volume fraction of fiber [19]

2. EXPERIMENTAL PROCEDURE

2.1. Fabrication of composite specimens

The rice husk was ground and screen to 200 mesh size, corresponded to the filler lengths of 3mm. It should be noted that the amount of the filler of 0%-30% by weight was maintained. This composite was mixed properly in a rectangular tray. The mixture of the ground rice husk and E waste were compounded by a co-rotating and intermeshing twin-screw extruder with a screw speed of 25 rpm using the temperature range of 190°C-210°C. After that, theextrude was ground and injection-moulding hoper and operated through plunger of the machine. The material comes out after heating in the machine through its nozzle as shape of cylindrical. In the heater material melted in temperature 190°C-210°C the out coming material from the machine was taken girt ties. Girt ties are crushed in three blade grinding machine and taken out put as small size crystals.

The above crystals restored in hoper of injection moulding machine. Molding dies are arranged after the of the machine. Now plunger operated due to hydraulic process for taken samples in injection moulding machine.

Fig 2.1.1 Injection moulding machine

After operation of plunger the material compressed with high pressure and it was heated through 190°C-210°C and out put send to moulding dies. Required shape of samples taken from the dies. The standard test method for thermal conductivity of E waste and rice husk composites is ASTM-E 1530 which is used to prepare specimens as per the dimensions. Thermal conductivity sample in shape of circular disk.

Fig 2.1.2 Thermal conductivity specimens

Fig 2.1.3 Specific heat testing powder

Fig 2.1.4 Water absorption specimens

2.2. Testing &Thermal properties of Specimens

Thermal conductivity and diffusivity are most important thermo physical material parameters for the description of the heat transport properties of a material or component. The Unitherm™ Model 2022 is used to measure thermal conductivity of a variety of materials. These include polymers, ceramics, composites, glasses, rubbers, some metals, and other materials of low to medium thermal conductivity. Only a relatively small test sample is required. Non-solids, such as pastes or liquids, can be tested using special containers. Thin films can also be tested accurately using a multi-layer technique. The tests are made in accordance with the ASTM E 1530 Standard.

Differential Scanning Calorimeter (DSC) is one of the most frequently used techniques in the field of thermal characterization of solids and liquids. In the technique a sample is placed inside a crucible which is then placed inside the measurement cell(furnace) of the DSC system along with a reference pan which is normally empty. The DSC combines the advantages of modern technology , high sensitivity and a robust, easy to operate work horse. Tests can be carried out in the maximum temperature range between -170°C and 600° C.

The heating wires of the furnace surround the entire sensor plate. For the improved cooling times and sub ambient temperature tests, various cooling options such as forced air, intercooler or liquid nitrogen cooling system are available. Of course, a versatile gas switching and flow control system are also available. For routine application we offer an Automatic Sample Changer (ASC) for up to 20 samples and references, which accommodates different crucible types.

Fig.2.2.1. Unitherm and Differential scanning calorimeter

The physical significance of thermal diffusivity is associated with propagation of heat into the medium during changes of temperature with time. The smaller the thermal diffusivity, more the time required for heat to penetrate in to the solid.

Thermal diffusivity (α) is a function of the thermal conductivity ( ), specific heat capacity (Cp), and density (ρ). Thermal diffusivity (α), was calculated from the relationship

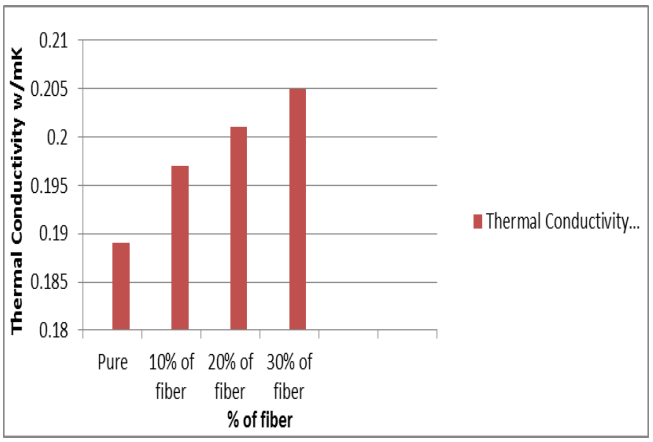
2. RESULTS

In this work, conducted testing the thermal properties by using the equipment of Unitherm model 2022 for thermal conductivity and Differential Scanning Calorimetry for Specific heat capacity testing the thermal properties various composition fiber.

3.1. Thermal properties

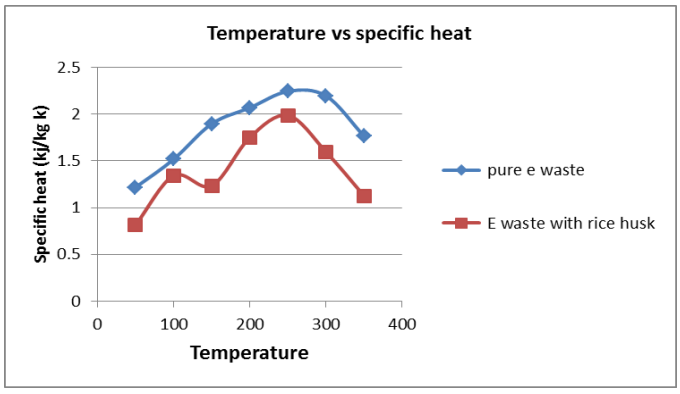
3.1.1. Thermal conductivity

It was observed that as the % of fiber increases the thermal conductivity of composite increases. The composite with 30% of fiber exhibits highest thermal conductivity than remaining %of composites.



3.1.2. Specific heat capacity :

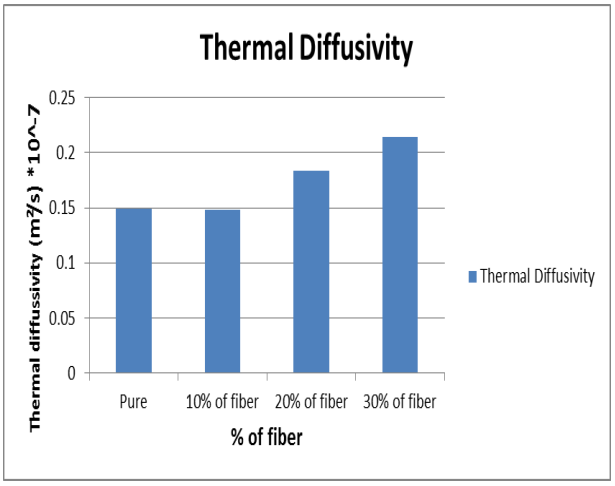
Specific heat capacity is one of the most important thermodynamic properties of the engineering materials. The specific heat capacity was independent of the mass and shape of the material shows the variation in specific heat values of samples with respect to temperature. It is observed that specific heat values of all the measured samples increased gradually up to a temperature of 2800 C for pure E waste. Pure E waste having higher specific heat than rice husk composite at all temperatures. It is observed that specific heat values of all the measured samples increased gradually in the temperature range of 50°C to 90°C. this shows that specific heat of a composite increases E waste with rice husk composite. Specific heat is decrease beyond 90 0C specific heat decreased.



3.1.3. Thermal diffusivity:

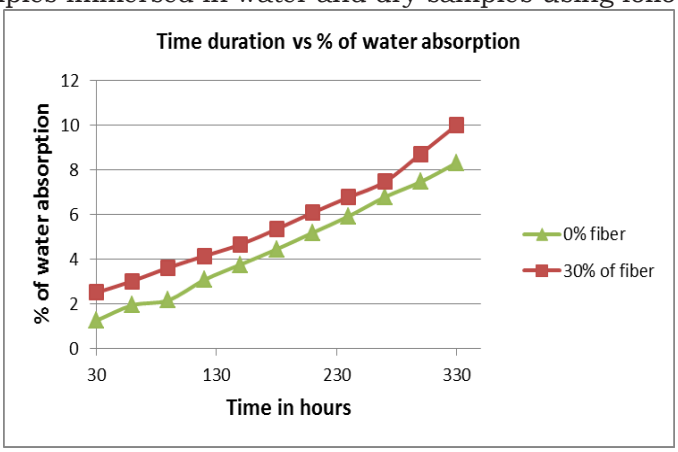
Thermal diffusivity of all specimens are tabulated and graphical represented below.It shows that thermal diffusivity of pure is lower than the composites.30% of rice husk composite has higher thermal diffusivity than remaining specimens. When

compared to pure E waste and E waste with rice husk composites thermal diffusivity of composite is slightly higher. Thermal diffusivity of composite increased with addition of rice husk



3.1.4. Water absorption properties:

It was observed that water absorption of pure E waste and E waste with rice husk composite is higher. E waste with rice husk composite moisture content is high. The percentage of water absorption in composite was calculated by weight difference between the samples immersed in water and dry samples using following equation



$$\text{Moisture content } Mc = \frac{Ma - Md}{Md} \times 100 \quad \ldots\ldots\ldots (1)$$

$$\text{Diffusion Coefficient (D)} = \left(\frac{h}{4Mm}\right)^2 \times \left(\frac{(M2-M1)^2}{(\sqrt{t2}-\sqrt{t1})^2}\right) \quad \ldots\ldots\ldots(2)$$

Water absorption studies were performed following the ASTM standard. The specimen were submerged in water at room temperature. The specimen were removed from water every 30 hours of time and weighed in a high precision balance and then submerged again in water. This process continued until the mass specimen reached constant. The specimen weighed regularly at up to 330 hours. The weight of the samples was measured at different time intervals up to exposure until water content reached saturation. The percentage of fiber content thermal diffusivity value is slightly high.

4. CONCLUSIONS

1. The thermal and water absorption properties such as thermal conductivity ,specific heat, thermal diffusivity, E waste with rice husk composites are determined experimentally.

2. Varying of weight percentage of the fiber (0% to 30%) prepare composite with this properties are slightly changed.
3. Thermal conductivity of the composite which is prepared by E waste and E waste with rice husk composite is increases from 0.189 w/mk to 0.205 w/ mk.
4. E waste with rice husk composite Thermal conductivity is higher than pure E waste.
5. As per increased fiber content the thermal conductivity is also increased.
6. Specific heat of composite is which is prepared by E waste with rice husk composite increased room temperature to 120°C.At this temperature composite holds high temperature.
7. Specific heat of Pure E waste is gradually increases room temperature to 280°C.
8. Thermal diffusivity of composite which is prepared by E waste and it composite is increases from 0.14 to 0.21.
9. Percentage fiber content increases water absorption properties increased.
10. Thermal conductivity percentage of E waste with rice husk composite is greater than pure E waste material. As per percentage 7.8% increased.
11. Specific heat capacity percentage of E waste with rice husk composite is greater than pure E waste material. As per percentage 30% increases at 55°C temperature.

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INFORMATION EXTRACTION AND INFORMATION MANAGEMENT USING TEXT MINING TECHNIQUES

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Abstract - This article deals with the definitions of text mining and also the want for it. The components of text mining area unit explained as data retrieval, data processing and data integration. The powerful technique that helps to identify the relevant S&T literature is enumerated with 5 primary conditions for information extraction. The 3 stages of data Discovery in knowledge and Data Mining (KDD) method is given with the applications of text mining. Applications of text mining vary from data retrieval, bio-informatics, patent analysis, sorting organic phenomenon, mining hospital records and polyglot approach to cross-lingual text retrieval , analysis of e-mails, etc. Also explained the present standing like new ways for text analysis in biology and medicine, the package viz. TextAnalyst meant for linguistics analysis, navigation and search of unstructured texts with the 'Linking data for Novel Discovery and Insight' (LINDI) project at Berkeley for serving to the researchers. The internationally leading syndicate for text mining viz. National Centre for Text Mining at UMIST with four United Kingdom of Great Britain and Northern Ireland partner establishments has been given. the constraints and edges of text mining area unit given and all over that library and datascience professionals ought to implement an equivalent for providing the relevant information from the immense quantity.
Keyword: Information Retrieval, Information Extraction and Indexing Techniques.

I. INTRODUCTION

Text mining is a minor departure from a field called data mining that tries to discover fascinating examples from vast databases. Text databases are quickly becoming because of the expanding measure of information accessible in electronic frame, for example, electronic productions, and different sorts of electronic records, email, and the World Wide Web. These days the greater part of the information in government, industry, business, and different organizations are put away electronically, as text databases. Data put away in most text databases are semi organized data in that they are neither totally unstructured nor totally organized. For instance, a record may contain a couple of organized fields, for example, title, creators, production date, and class, and so on, yet additionally contain some to a great extent unstructured text segments, for example, dynamic and substance. There has been a lot of Studies on the displaying and execution of semi organized data in late database explore. Additionally, information retrieval techniques, for example, text indexing strategies, have been produced to handle unstructured archives. Customary information retrieval techniques wind up plainly deficient for the inexorably tremendous measures of text data. Commonly, just a little portion of the numerous accessible Documents will be important to a given individual client. Without recognizing what could be in the reports, it is hard to detail compelling inquiries for examining and extricating valuable information from the data. Clients require instruments to think about various reports, rank the significance and importance of the archives, or discover examples and patterns over different records. In this manner, text mining has turned into an inexorably well known and basic topic in data mining.

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electronically, as text databases. Data put away in most text databases are semi organized data in that they are neither totally unstructured nor totally organized. For instance, a record may contain a couple of organized fields, for example, title, creators, production date, and class, and so on, yet in addition contain some generally unstructured text segments, for example, theoretical and substance. There have been a lot of concentrates on the displaying and execution of semi organized data in late database inquires about. In addition, information retrieval techniques, for example, text indexing strategies, have been created to handle unstructured reports. Customary information retrieval techniques end up noticeably insufficient for the undeniably tremendous measures of text data. Ordinarily, just a little division of the numerous accessible records will be applicable to a given individual client. Without recognizing what could be in the records, it Is hard to figure powerful questions for dissecting and extricating helpful information from the data. Clients require devices to look at changed records, rank the significance and pertinence of the archives, or discover examples and patterns over different reports. In this manner, text mining has turned into an undeniably mainstream and fundamental topic in data mining.

2 INFORMATION RETRIEVAL

Information retrieval is a field that has been creating in parallel with database frameworks for a long time. Dissimilar to the field of database frameworks, which has concentrated on inquiry and exchange handling of organized data, information retrieval is worried about the association and retrieval of information from an expansive number of text-based reports. Since information retrieval and database frameworks each handle various types of data, some database framework issues are generally not present in information retrieval frameworks, for example, simultaneousness control, recuperation, exchange administration, and refresh. Likewise, some regular information retrieval issues are generally not experienced in conventional database frameworks, for example, unstructured records, surmised seek in light of watchwords, and the idea of significance. Because of the plenitude of text information, information retrieval has discovered numerous applications. There exist numerous information retrieval frameworks, for example, on-line library index frameworks, on-line archive administration frameworks, and the all the more as of late created web crawlers. A run of the mill information retrieval issue is to find important archives in a report accumulation in view of a client's question, which is regularly a few watchwords portraying an information require, in spite of the fact that it could likewise be an illustration applicable record. In such a hunt issue, a client steps up with regards to "pull" the applicable information out from the gathering; this is most fitting when a client has some specially appointed information require, for example, discovering information to purchase an utilized auto. At the point when a client has a long haul information require , a retrieval framework may likewise step up with regards to "drive" any recently arrived information thing to a client if the thing is judged as being pertinent to the client's information require. Such an information get to process is called information sifting, and the relating frameworks are frequently called separating frameworks or recommender frameworks. From a specialized perspective, in any case, seek and sifting share numerous normal techniques. Beneath we quickly talk about the significant techniques in information retrieval with an emphasis on seek techniques.

2.1 Measures for Information Retrieval

The arrangement of archives significant to a query be indicated as {Relevant}, and the arrangement of records recovered be meant as {Retrieved}. The arrangement of archives that are both pertinent and recovered is indicated as {Relevant} ∩ {Retrieved}, as appeared in the Venn outline of Figure 1. There are two essential measures for surveying the nature of text retrieval. Exactness: This is the level of recovered records that are in certainty pertinent to the query. It is formally characterized as

$$\text{Precision} = |\{\text{Relevant}\} \cap \{\text{Retrieved}\}| / |\{\text{Retrieved}\}|$$

Recall: This is the level of records that are important to the query and were, truth be told, recovered. It is formally characterized as

$$\text{Recall} = |\{\text{Relevant}\} \cap \{\text{Retrieved}\}| / |\{\text{Relevant}\}|$$

An information retrieval framework regularly needs to exchange off recall for exactness or the other way around. One usually utilized tradeoff is the F-score, which is characterized as the consonant mean of recall and exactness

$$\text{F-score} = \text{recall} \times \text{precision} / (\text{recall} + \text{precision}) / 2$$

The consonant mean debilitates a framework that penances one measure for another too radically

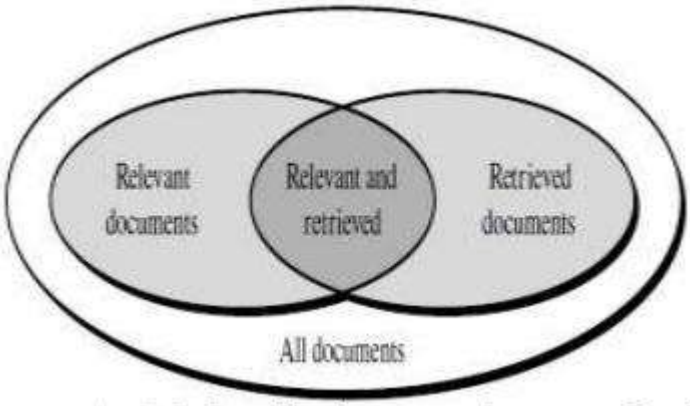

Figure 1: Relationship between the set of relevant documents and the set of retrieved documents

Precision, recall, and F-score are the fundamental measures of a retrieved set of archives. These three measures are not specifically valuable for looking at two positioned arrangements of records since they are not touchy to the inward positioning of the archives in a retrieved set. To gauge the nature of a positioned rundown of archives, it is regular to figure a normal of precisions at all the positions where another applicable record is returned. It is additionally regular to plot a diagram of precisions at a wide range of levels of recall; a higher bend speaks to a superior quality information retrieval framework. For more insights about these measures, perusers may counsel an information retrieval textbook.

3 TEXT INDEXING TECHNIQUES

There are a few famous text retrieval indexing techniques, including transformed records and mark documents. A modified file is a file structure that keeps up two hash ordered or B+-tree filed tables: archive table and term table, where report table comprises of an arrangement of report records, each containing two fields: doc id and posting list, where posting list is a rundown of terms (or pointers to terms) that happen in the report, arranged by some significance measure. term table comprises of an arrangement of term records, each containing two fields: term id and posting list, where posting list determines a rundown of archive identifiers in which the term shows up. With such association, it is anything but difficult to answer inquiries like "Discover the majority of the archives related with a given arrangement of terms," or "Discover the greater part of the terms related with a given arrangement of reports."

For instance, to discover the greater part of the archives related with an arrangement of terms, we would first be able to discover a rundown of report identifiers in term table for each term, and then converge them to acquire the arrangement of pertinent records. Reversed lists are generally utilized as a part of

industry. They are anything but difficult to execute. The posting records could be fairly long, making the capacity necessity very substantial.

They are anything but difficult to actualize, yet are not palatable at handling synonymy (where two altogether different words can have a similar importance) and polysemy (where an individual word may have numerous implications). A mark document is a document that stores a mark record for each report in the database. Every signature has a settled size of b bits speaking to terms. A basic encoding plan goes as takes after. Each piece of an archive mark is introduced to 0. A bit is set to 1 if the term it speaks to shows up in the record. A mark S1 matches another mark S2 if each piece that is set in signature S2 is additionally set in S1. Since there are generally a larger number of terms than accessible bits, various terms might be mapped into a similar piece. Such various to one mappings make the pursuit costly on the grounds that an archive that matches the mark of a query does not really contain the arrangement of catchphrases of the query. The archive must be retrieved, parsed, stemmed, and checked. Upgrades can be made by first performing recurrence examination, stemming, and by separating stop words, and then utilizing a hashing strategy and superimposed coding system to encode the rundown of terms into bit portrayal. All things considered, the issue of various to- one mappings still exists, which is the significant disservice of this approach. Perusers can allude to [2] for more point by point discourse of indexing techniques, including how to pack a index.

4 QUERY PROCESSING TECHNIQUES

Once a transformed index is made for a record accumulation, a retrieval framework can answer a catchphrase query rapidly by looking into which reports contain the query watchwords. In particular, we will keep up a score gatherer for each report and refresh these aggregators as we experience each query term. For each query term, we will bring the greater part of the archives that match the term and increment their scores. More advanced query processing techniques are examined in [2].When cases of pertinent records are accessible; the framework can gain from such cases to enhance retrieval execution. This is called pertinence criticism and has ended up being viable in enhancing retrieval execution. When we don't have such pertinent cases, a framework can expect the main few retrieved records in some underlying retrieval results to be applicable and extricate more related catchphrases to expand a query. Such criticism is called pseudo-input or visually impaired input and is basically a procedure of mining helpful watchwords from the best retrieved archives. Pseudo-input likewise frequently prompts enhanced retrieval execution. One noteworthy confinement of numerous current retrieval strategies is that they depend on correct watchword coordinating. Be that as it may, because of the intricacy of normal dialects, watchword based retrieval can experience two noteworthy challenges. The first is the synonymy issue: two words with indistinguishable or comparable implications may have altogether different surface structures. For instance, a client's query may utilize "car," however a significant archive may utilize "vehicle" rather than "car." The second is the polysemy issue: a similar catchphrase, for example, mining, or Java, may mean distinctive things in various contexts.

4.1 Information Extraction

The broadly useful of Knowledge Discovery is to "extricate certain, beforehand obscure, and possibly helpful information from data". Information Extraction IE basically manages distinguishing words or highlight terms from inside a textual document. Highlight terms can be characterized as those which are straightforwardly identified with the area.

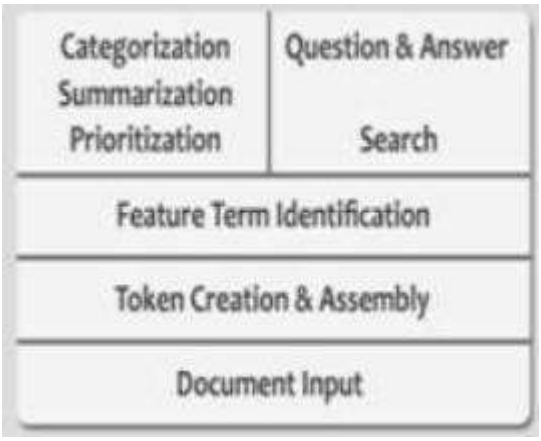

Figure 2: A layered model of the Text Mining Application

These are the terms which can be perceived by the apparatus. With a specific end goal to play out this capacity ideally, we needed to investigate couple of more viewpoints which are as per the following:

4.2 Stemming

Stemming alludes to distinguishing the base of a specific word. There are essentially two sorts of stemming techniques, one is inflectional and other is derivational. Derivational stemming can make another word from a current word, now and again by essentially changing linguistic class (for instance, changing a thing to a verb). The sort of stemming we could execute is called Inflectional Stemming. An ordinarily utilized calculations is the 'Watchman's Algorithm' for stemming. At the point when the standardization is restricted to regularizing syntactic variations, for example, solitary/plural or past/display, it is alluded to inflectional stemming [10].To limit the impacts of articulation and morphological varieties of Words (stemming), our approach has pre-handled each word utilizing a gave form of the Porter stemming calculation with a couple of changes towards the end in which we have precluded a few cases.

e.g. apply – applied – applies print – printing – prints – printed

In both the cases, all expressions of the primary illustration will be dealt with as 'apply' and all expressions of the second case will be dealt with as 'print'.

4.3 Domain dictionary

Keeping in mind the end goal to create apparatuses of this sort, it is basic to give them an information base. An aggregate arrangement of all the 'element terms' is the Domain dictionary. The structure of the Domain dictionary which we actualized comprised of three levels in the chain of command. To be specific, Parent Category, Sub-classification and word, Parent classes characterize the principle classification under which any sub- classification or word falls. A parent class will be extraordinary on its level in the chain of command. Sub-classifications will have a place with a specific parent classification and each subcategory will comprise of the considerable number of words related with it. For instance, think about the accompanying

Table 1: Structure of the Domain Dictionary

Parent Category	Sub-Category	Words
Hardware	Data Storage	*Grabber*
	Input devices	*Light pen*
	Modems	*Joystick*
	Motherboards	*Contact image sensor*
	Networking	*Digital camera*

Table 1 is an illustration that shows how we recognize words which have a place with the Parent Category 'Hardware' and Subcategory 'Input Devices'.

4.4 Exclusion List

A great deal of words in a text record can be dealt with as undesirable clamor. To take out these, we contrived a different record which incorporates every such word. These incorporate words, for example, the, an, an, if, off, on and so on**.**

5 RESEARCH DIRECTIONS

With copious writing distributed in look into visit design mining, one may ponder whether we have tackled a large portion of the basic issues identified with visit design mining so the arrangements gave are adequate to a large portion of the data mining undertakings. Be that as it may, in view of our view, there are as yet a few basic research issues that should be understood before visit design mining can turn into a foundation approach in data mining applications. To begin with, the most engaged and widely considered point in visit design mining is maybe adaptable mining techniques. The arrangement of incessant examples determined by the vast majority of the present example mining strategies is excessively immense for compelling utilization. There are recommendations on diminishment of such a tremendous set, including shut examples, maximal examples, estimated designs, consolidated example bases, agent designs, bunched designs, and discriminative continuous examples, as presented in the past segments.

Be that as it may, it is as yet not clear what sort of examples will give us palatable example sets in both minimization and agent quality for a specific application, and whether we can mine such examples specifically and effectively. Much research is as yet expected to generously diminish the span of determined example sets and improve the nature of held examples. Visit design mining: current status and future headings. Second, in spite of the fact that we have proficient techniques for mining exact and finish set of regular examples, rough continuous examples could be the best decision in numerous applications. For instance, in the examination of DNA or protein successions, one might want to discover long arrangement designs that roughly coordinate the groupings in natural elements, like BLAST. Much research is as yet expected to make such mining more powerful than the as of now accessible devices in bioinformatics. Third, to make visit design mining a basic undertaking in data mining, much research is expected to additionally create design based mining strategies.

For instance, grouping is a fundamental undertaking in data mining. Fourth, we require instruments for profound understanding and translation of examples, e.g., semantic explanation for visit designs, and contextual investigation of incessant examples. The primary research take a shot at design examination has been centered on design structure (e.g., the arrangement of things in thing set examples) and recurrence. The semantic of a regular example incorporates further information: what is the importance of the example; what are the equivalent word designs; and what are the run of the mill exchanges that this example lives? Much of the time, visit designs are mined from specific data sets which additionally contain basic

information. At long last, applications frequently raise new research issues and expedite profound knowledge the quality and shortcoming of a current arrangement. This is likewise valid for visit design mining. On one side, it is vital to go deeply part of example mining calculations, and break down the hypothetical properties of various arrangements. On the opposite side, in spite of the fact that we just cover a little subset of applications in this article, visit design mining has asserted a wide range of applications and exhibited its quality at taking care of a few issues. Much work is expected to investigate new applications of continuous example mining. For instance, bioinformatics has raised a considerable measure of testing issues, and we accept visit design mining may contribute a decent arrangement to it with additionally examine endeavors.

6 CONCLUSION

With the sensational increment in online information as of late, text mining at the convergence of data mining, regular dialect processing, machine knowledge, and information retrieval, is beginning to increase expanding premium. The majority of knowledge covered up in electronic media of an association is epitomized in records. Gaining this knowledge infers successful querying of the reports and in addition the blend of information pieces from various textual sources. The vast majority of knowledge covered up in electronic media of an association is epitomized in reports. Obtaining this knowledge infers successful querying of the reports and also the mix of information pieces from various textual sources. Finding such shrouded know edge is a fundamental prerequisite for some enterprises, because of its wide range of applications. In this short overview, the ideas of text mining have been presented and a few techniques accessible have been introduced. Because of its curiosity, there are numerous potential research territories in the field of Text Mining, which incorporates discovering better halfway structures for speaking to the yields of information extraction, a XML record might be a decent decision. Mining texts in various dialects is a noteworthy issue, since text mining devices ought to have the capacity to work with numerous dialects and multilingual records. Coordinating a domain knowledge base with a text mining engine would support its proficiency, particularly in the information retrieval and information extraction stages.

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ENHACING QUALITY OF DATA WITH DYNAMIC FORMS AT REDUCED COST

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Abstract - Quality of is a major problem in present databases. Data entry forms shows the first and arguably best opportunity for finding and mitigate interruption-related errors, but there has been little research into automatic methods for enhancing quality of data at data entry time. In this paper, we propose GUIDE an end-to-end system for form design, entry, and data quality assurance. By submitting the previous form, GUIDE learns a probabilistic model over the questions of the form. GUIDE then applies this model at each step of the data-entry process to enhance data quality. Before entry, it gives a form layout that takes the most important data values of a form instance as quickly as possible and reduces the complexity of error-prone questions. During entry, it dynamically adapts the form to the values being entered by providing real-time interface feedback, reasking questions with dubious responses, and simplifying questions by reformulating them. After entry, it revisits question responses that it deems likely to have been entered incorrectly by reasking the question or a reformulation thereof. We evaluate these components of enhancing data quality using two real-world data sets. Our results demonstrate that GUIDE can improve data quality considerably at a reduced cost when compared to current practice.
Keywords: Data entry, reasking, end-to-end system

1 INTRODUCTION

It has become an important decision for the Organizations and individuals based on inaccurate data stored in outwardly trustworthy databases. In some domains Data errors, such as aadhar card, voter id in Telagana, have particular severe cases. These errors leads an another point at data entry, storage, integrity, and data cleaning, to analysis and decision making. At each step it presents an opportunity to address data quality, entry time is the first step to catch and correct errors after the data have been collected into a database, it focus on data collection and entry procedures should be adapted to correct those patterns and reduce future errors. Ongoing practices for data quality during entry come from the field of survey methodology, which offers principles that include questioning order manually, input constraints, and double entry of paper forms.

As this has become the de facto quality assurance standard in collecting data and transforming, so we believe this area can reconsider. For both double entry paper forms and direct digital entry, we suggest that a data-driven and more computationally sophisticated approach can significantly perform better these old static methods in both accurate and efficient data entry. The problem of data quality is enlarged with microscopic in low-resource in setting data collection. Recently, the Survey department connected the lack of quality health information in developing regions to a “gathering storm,” saying, “make people count, we should be able to count people”. Of course, many government Survey officers, mainly those collecting data with limited resources in developing regions, struggle to collect high-quality data. As of now data collection has become challenging task. First, many organizations lack expertise in paper and digital form design: designers approach question and answer choice selection with a defensive, limited area of adding answers as choice and questions that may not be necessary; further, they adopt in dynamic mapping of required data fields to data entry widgets by intuition, often ignoring or specifying ill-fitting constraints. Moreover double entry system is too expensive. In some cases it will not perform better, as a result cause poor data quality. In other situations, particularly where double entry is mandatory by third parties results unwanted negative answers and delay.

We observed this scenario in Aadhar card data entry in Telangana, where double entry was imposed which is too costly. Double entry leads delay in transactions which were postponed for months to enter data in batch and there were

mistakes in Aadhar card at fields like name, age, gender which did not benefit digital data for the organization. Finally, many organizations in some developing regions begin to use electronic device like smart phones to collect data for instance health workers are collecting direct digital data entry in remote areas. Collection of data through digital data entry causes more effective than paper entry manually which replace traditional form design and double entry. We frequently found that there was no quality of data with smart phone data collection which gave 10 times poor quality than entering data manually. To avoid the challenges of data quality, we have developed an end-to-end system which improves data quality and efficiency at the entry point with probabilistic models from present existing data, which randomly relate the questions of data entry form. The model we developed gives a principled foundation of information gain algorithms for form design, adapting form during entry and verifying answers: Since form layout and selecting question is often dynamic, question ordering will be optimized to a probabilistic function that maximize the content of information for form answers as early as possible it is also called as information gain principle.

1. A form lay-out is applied before entry, the model generates a static but entropy-optimal ordering, which focus on important questions first; during entry, it can be used to dynamically pick the next best question, based on answers so far appropriate in scenarios where question ordering can be flexible between instances.
2. probabilistic model is applied during data entry, an end-to-end system evaluate the conditional answers to a form question, which make easier for relative answers to be entered—we apply this the appropriate entry friction principle. For questions which are difficult to answer, such as those with many extraneous choices, we reformulate difficult question to be easier and more congruous with the available information. In this way, our form design effectively allows for a principled, controlled trade-off between data quality and form filling effort, time and cost.
3. Finally, the random answering model is adopted to predict which answers may be erroneous, so as to re ask those questions in order to verify their correctness we call this the contextualized error likelihood principle.

We consider re-asking questions both during the data-entry process (integrated re-asking) and after data entry has been finished (post hoc re-asking). In both cases, intelligent question re-asking approximates the benefits of double entry at a fraction of the cost.

Purpose

The next application probabilistic model is for the purpose of identifying errors made during entry. Because this determination is made during and immediately after form submission, our form layout chooses to re-ask questions during the same entry session. By focusing the re-asking effort only on questions that were likely to be mesenteric, an end-to-end system is likely to catch mistakes at a small incremental cost to the data-entry worker. Our approach is a data-driven alternative to the expensive practice of double entry. Rather than re-asking every question, we focus re-asking effort only on question responses that are unlikely with respect to the other form responses.

1.1 Scope

Most of the Organization and individuals are processing some data to full fill their needs in their daily life. But most of the times they are suffering from lack of Quality in the data, which causes irrelevant results. Data errors in some domains, such as medicine, may have serious backdrops. These errors can arise at a variety of points in the life cycle of data, from data entry, through storage, integration, and cleaning ……etc.

In Real time there are so many situations where we need to maintain qualified data, like Banks, Universities, Hospitals…….etc

1.2 Motivation

We are in the process of measuring the practical impact of our system, by piloting with our field partners, the United Nations Development Program's Millennium Villages Project in Uganda, and a community health care program in Tanzania. These organizations' data quality concerns were the original motivation for this work and thus serve as an important litmus test for our system.

2 SYSTEM

A probabilistic model is built for an arbitrary data entry form in two steps: first, by learning the relationships between form questions via structure learning, resulting in a Bayesian network; and second, by estimating the parameters of that Bayesian network, which then allows us to generate predictions and error probabilities for the form. After the model is built, it uses it to automatically order a form's questions for greedy information gaindescribes both static and dynamic algorithms that employ criteria based on the magnitude of statistical information gain that is expected in answering a question, given the answers that have been provided so far. This is a key idea in our approach. By front-loading predictive potential, we increase the models' capacity in several ways. First, from an information-theoretic perspective, we improve our ability to do multivariate prediction and outlier detection for subsequent questions. As we discuss in more detail in, this predictive ability can be applied by reformulating error-prone form questions, parameter zing data-entry widgets (type-ahead suggestions and default values), assessing answers (outlier flags), and performing in-flight re-asking (also known as cross validation in survey design parlance). Second, from a psychological perspective, frontloading information gain also addresses the human issues of user fatigue and limited attention span, which can result in increasing error rates over time and unanswered questions at the end of the form. Our approach is driven by the same intuition underlying the practice of curb stoning, which was related to us in discussion with survey design experts. Curb stoning is a way in which an unscrupulous door-to-door surveyor shirks work: he or she asks an interviewee only a few important questions, and then uses those responses to complete the remainder of a form while sitting on the curb outside the home. The constructive insight here is that a well-chosen subset of questions can often enable an experienced agent to intuitively predict the remaining answers question ordering algorithms formalize this intuition via the principle of greedy information gain, and use them (scrupulously) to improve data entry. It learning algorithm relies on training data. In practice, a data-entry backlog can serve as this training set. In the absence of sufficient training data, we can bootstrap itself on a "uniform prior," generating a form based on the assumption that all inputs are equally likely; this is no worse than standard practice. Subsequently, a training set can gradually be constructed by iteratively capturing data from designers and potential users in "learning runs." It is a common approach to first fit to the available data, and then evolve a model as new data become available. This process of semi-automated form design can help institutionalize new forms before they are deployed in production. We adapts to a form and data set by crafting a custom model. Of course, as in many learning systems, the model learned may not translate across contexts. We do not claim that each learned model would or should fully generalize to different environments. Instead, each context specific model is used to ensure data quality for a particular situation, where we expect relatively consistent patterns in input data characteristics. we illustrate functionality with examples. Further details, particularly regarding the probabilistic model, follow in the ensuing sections.

Examples We present two running examples. First, the patient data set comes from paper patient-registration forms transcribed by data-entry workers at an HIV/AIDS program in Tanzania.1 Second, the survey data set comes from a phone survey of political opinion in the San Francisco Bay Area, entered by survey professionals directly into an electronic form. In each example, a form designer begins by creating a simple specification of form questions and their prompts, response data types, and constraints. The training data set is made up of prior form responses. Using the learning algorithms we present in Bayesian network of

probabilistic relationships from the data, as shown in Figs. 1 and 2. In this graph, an edge captures a close stochastic dependency between two random variables (i.e., form questions). Two questions with no path between them in the graph are probabilistically independent. Fig. 2 illustrates a denser graph, demonstrating that political survey responses tend to be highly correlated. Note that a standard joint distribution would show correlations among all pairs of questions; the sparsity of these examples reflects conditional independence patterns learned from the data. Encoding independence in a Bayesian network is a standard method in machine learning that clarifies the underlying structure, mitigates data over fitting, and improves the efficiency of probabilistic inference. The learned structure is subject to manual control: a designer can override any learned correlations that are believed to be spurious or that make the form more difficult to administer. For the patient data set, generated the static ordering shown in Fig. 3. We can see in Fig. 3 that the structure learner predicted Region Code to be correlated with District Code. Our data set is collected mostly from clinics in a single region of Tanzania, so provides little information. It is not surprising then, suggested ordering has District Code early and Region Code last once we observe District Code, Region Code has very little additional expected conditional information gain. When it is time to input the Region Code, if the user selects an incorrect value, the model can be more certain that it is unlikely. If the user stops early and does not fill in Region Code, the model can infer the likely value with higher confidence. In general, static question orderings are appropriate as an offline process for paper forms where there is latitude for (re)ordering questions, within designer-specified constraints. During data entry, use the probabilistic machinery to drive dynamic updates to the form structure. One type of update is the dynamic selection of the best next question to ask among questions yet to be answered. This can be appropriate in several situations, including surveys that do not expect users to finish all questions, or direct-entry interfaces (e.g., mobile phones) where one question is asked at a time. We note that it is still important to respect the form designer's a priori specified question-grouping and –ordering constraints when a form is dynamically updated. It is also used during data entry to provide dynamic feedback, by calculating the conditional distribution for the question in focus and using it to influence the way the question is presented. We tackle this via two techniques: question reformulation and widget decoration. For the former, we could, for example, choose to reformulate the question about Region Code into a binary yes/no question based on the answer to District Code, since District Code is such a strong predictor of Region Code the reduced selection space for responses in turn reduces the chances of a data-entry worker selecting an incorrect response. For the latter, possibilities include using a "split" drop-down menu for Region Code that features the most likely answers "above the line," and after entry, coloring the chosen answer red if it is a conditional outlier. The design space and potential impact of data-entry feedback that is more specific and context-aware.
Algorithm:

3 CONCLUSIONS AND FUTURE WORK

In this paper, we have shown that a probabilistic approach can be used to design intelligent data-entry forms that promote high data quality. Leverages data-driven insights to automate multiple steps in the data-entry pipeline. Before entry, we find an ordering of form fields that promotes rapid information capture, driven by a greedy information gain principle, and can statically reformulate questions to promote more accurate responses. During entry, we dynamically adapt the form based on entered values, facilitating re-asking, reformulation, and real-time interface feedback in the spirit of providing appropriate entry friction. After entry, we automatically identify possibly erroneous inputs, guided by contextualized error likelihoods, and re-ask those questions, possibly reformulated, to verify their correctness. Our simulated empirical evaluations demonstrate the data quality benefits of each of these components: question ordering, reformulation and re-asking.

In this system we have presented is a cohesive synthesis of several disparate approaches to improving data quality for data entry. The three major components of the System ordering, re-asking, and reformulation—can all be applied under various guises before, during, and after data entry. This suggests a principled road map for future research in data entry. For example, one combination we have not explored here is re-asking before entry. At first glance this may appear strange, but in fact that is essentially the role that cross-validation questions in paper forms serve, as preemptive reformulated re-asked questions. Translating such static cross-validation questions to dynamic forms is a potential direction of future work. Another major piece of future work alluded is to study how our probabilistic model can inform effective adaptations of the user interface during data entry. We intend to answer this problem in greater depth through user studies and field deployments of our system.

4 FUTURE WORKS

We can also extend this work by enriching the underlying probabilistic formalism. Our current probabilistic approach assumes that every question is discrete and takes on a series of unrelated values. Relaxing these assumptions would make for a potentially more accurate predictive model for many domains. Additionally, we would want to consider models that reflect temporal changes in the underlying data. Our present error model makes strong assumptions both about how errors are distributed and what errors look like. On that front, an interesting line of future work would be to learn a model of data-entry errors and adapt our system to catch them.

Finally, we are in the process of measuring the practical impact of our system, by piloting with our field partners, the United Nations Development Program's Millennium Villages Project in Uganda, and a community health care program in Tanzania. These organizations' data quality concerns were the original motivation for this work and thus serve as an important litmus test for our system.

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METHOD DEVELOPMENT AND VALIDATION OF ACECLOFENAC AND TIZANIDINE PHARMACEUTICAL DOSAGE FORMS BY DEVELOPING NEW RP HPLC METHOD

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Abstract - A simple and selective LC method is selected for the determination of Aceclofenac and Tizanidine in tablet dosage forms. Chromatographic separation was achieved on a c18 column using mobile phase consisting of a mixture of 50 volumes of Triethylamine buffer, 50 volumes of acetonitrile with detection of 230nm. Linearity was observed in the range 5-15 µg/ml for Aceclofenac(r2 =0.999) and 1-3 µg /ml for Tizanidine (r2 =0.998) for the amount of drugs estimated by the proposed methods was in good agreement with the label claim. The proposed methods have a valid procedure. At three different levels the accuracy of the methods was assessed by recovery studies. The Recovery experiments indicated the absence of interference from commonly encountered pharmaceutical additives. Showing %RSD less than 2 this method was found to be precise as indicated by the repeatability analysis. All statistical data proves all methods have valid procedure and can be used for routine analysis of pharmaceutical dosage form

1 INTRODUCTION

Pharmaceutical analysis just means examination of pharmaceuticals. Webster' word reference portrays a pharmaceutical is a medication. An additionally fitting term for a pharmaceutical is dynamic pharmaceutical fixing to remember it from a planned thing or prescription thing is set up by figuring a solution substance with idle concentration (excipient) to set up a drug thing that is sensible for association to patients

Reverse Phase High Performance Liquid Chromatography (RP-HPLC)

Reverse phase chromatography uses hydrophobic bonded packing, usually with an octadecyl or octyl functional group and a polar mobile phase, often a partially or fully aqueous mobile phase.

Polar substances prefer the mobile phase and elute first. As the hydrophobic character of the solutes increases, retention increases. Generally, the lower the polarity of the mobile phase, the higher is its eluent strength. The elution order of the classes of compounds in table is reversed (thus the name reverse-phase chromatography).

Aceclofenac is a non-steroidal calming drug (NSAID) with stamped mitigating and pain relieving properties. It is accounted for to have a higher mitigating activity or if nothing else tantamount impacts than ordinary NSAIDs in twofold visually impaired investigations. Aceclofenac intensely hinders the cyclo-oxygenase protein (COX) that is engaged with the combination of prostaglandins, which are fiery middle people that reason torment, swelling, irritation, and fever. It is orally regulated for the alleviation of agony and aggravation in osteoarthritis, rheumatoid joint pain and ankylosing spondylitis. Aceclofenac has a place with BCS Class II as it has poor watery dissolvability. It shows high porousness to infiltrate into synovial joints where in patients with osteoarthritis and related conditions, the loss of articular ligament in the territory causes joint torment, delicacy, solidness, crepitus, and nearby aggravation. Aceclofenac is likewise answered to be compelling in other excruciating conditions, for example, dental and gynecological conditions . In 1991, aceclofenac was produced as a simple of a usually recommended NSAID, Diclofenac, by means of substance adjustment in push to enhance the gastrointestinal mediocrity of the medication. It is an all the more generally recommended medicate in Europe.

Through COX-2 hindrance, aceclofenac down regulates the generation of different provocative go betweens including prostaglandin E2 (PGE2), IL-1β, and TNF from the arachidonic corrosive (AA) pathway. Restraint of IL-6 is believed to be interceded by diclofenac changed over from aceclofenac. Stifled activity of incendiary cytokines diminishes the creation of receptive oxygen species.

Aceclofenac is appeared to diminished generation of nitrous oxide in human articular chondrocytes. Also, aceclofenac meddles with neutrophil bond to endothelium by diminishing the statement of L-selectin (CD62L), which is a cell grip atom communicated on lymphocytes. Aceclofenac is proposed to fortify the amalgamation of glycosaminoglycan in human osteoarthritis ligament which might be interceded through its inhibitory activity on IL-1 creation and movement. The chrondroprotective impacts are created by 4'- hydroxyaceclofenac which stifles IL-1 interceded generation of promatrix metalloproteinase-1 and metalloproteinase-3 and meddles with the arrival of proteoglycan from chrondrocytes.

Tizanidine is a short-acting medication for the administration of spasticity. Tizanidine is an agonist at a2-adrenergic receptor locales and apparently lessens spasticity by expanding presynaptic hindrance of engine neurons. In creature models, tizanidine has no immediate impact on skeletal muscle filaments or the neuromuscular intersection, and no significant impact on monosynaptic spinal reflexes. The impacts of tizanidine are most prominent on polysynaptic pathways. The general impact of these activities is thought to decrease assistance of spinal engine neurons.

Through COX-2 restraint, aceclofenac down regulates the creation of different incendiary middle people including prostaglandin E2 (PGE2), IL-1β, and TNF from the arachidonic corrosive (AA) pathway. Restraint of IL-6 is believed to be intervened by diclofenac changed over from aceclofenac. Stifled activity of fiery cytokines diminishes the creation of responsive oxygen species. Aceclofenac is appeared to diminished generation of nitrous oxide in human articular chondrocytes . Furthermore, aceclofenac meddles with neutrophil attachment to endothelium by diminishing the outflow of L- selectin (CD62L), which is a cell grip particle communicated on lymphocytes. Aceclofenac is proposed to animate the combination of glycosaminogly can in human osteoarthritic ligament which might be interceded through its inhibitory activity on IL-1 creation and movement. The chrondroprotective impacts are created by 4'- hydroxyaceclofenac which stifles IL-1 interceded generation of promatrix metalloproteinase-1 and metalloproteinase3 and meddles with the arrival of proteoglycan from chrondrocytes.

Quality investigation plays a very important role in quality specification establishment of chemical drugs. The number of drugs introduced into the market every year .very often there is a time lag from the date of introduction of a drug into the market to the date of its inclusion in pharmacopoeias.

Hence, standards and analytical procedures for these drugs may not be available in the pharmacopoeias. It becomes necessary, therefore to develop newer analytical methods for such drugs.

To develop new RP HPLC method for the simultaneous estimation of ACECLOFENAC and TIZANIDINE pharmaceutical dosage form. The plan of work includes Solubility determination of ACECLOFENAC and TIZANIDINE various solvents and buffers. Determine the absorption maxima of both the drugs in UV–Visible region in different solvents/buffers and selecting the solvents for HPLC method development. Optimize the mobile phase and flow rates for proper resolution and retention times. Validate the developed method as per ICH guidelines.

2 EXPERIMENTAL

2.1 Materials and Methods Instruments Used

The instruments which were used for this work were, UV Visible apparatus which was manufactured by Nicolet evolution 100, UV-Visible Software that was developed by Vision Pro, HPLC software that was developed by Spin chrome (LC SOLUTIONS), HPLC and Electronic balance manufactured by Shimadzu(LC 20 AT VP), Ultra sonicator which was manufactured Citizen, Digital Ultrasonic Cleaner, pH meter manufactured by Global digital, Syringe was used for injection which was

manufactured by Hamilton, HPLC Column was obtained from Inertsil ODS 3V(250x4.6mm) 5µm

2.2 Reagents Used
Water, Methanol, was used according to HPLC Grade, Ammonium acetate was used as per AR Grade.

2.3 Drugs Used
Aceclofenac and Tizanidine drugs are obtained as gift Samples obtained from Chandra labs, Hyd. ACENT(100/2mg) was Obtained from local pharmacy.

2.4 Mobile Phase:
A mixture of 50 volumes of Triethylamine buffer (pH-3.0) and same volume of acetonitrile were made. The mobile phase was sonicated for 10min to remove gases and filtered through 0.45µ membrane for degassing from the mobile phase

3 METHODOLOGIES
3.1 Determination of Wavelength using UV Visible Spectroscopy
Preparation of stock solution of Aceclofenac

Accurately weighed 10 mg of ACECLOFENAC was transferred in to a 100ml volumetric flask and drug was dissolved in methanol, make up to the 100ml with same solvent to prepare 100 µg /ml. From this solution pipette out 1ml and make up to 10ml with methanol to preprare 10 µg /ml of drug solution.

Preparation of stock solution of Tizanidine

Weighed 10 mg of drug was shifted in to a 100ml volumetric flask and tizanidine was dissolved in methanol, make up to the 100ml with same solvent to prepare 100µg /ml. From this solution pipette out 1ml and make up to 10ml with methanol to preprare 10 µg /ml of drug solution.

3.2 Method Development
Trial - 1
The Mobile phase that is used are Phosphate buffer: ACN :Methanol pH : 5.0 in an ratio : 40:30:30 weigh accurately 5 mg of ACECLOFENAC and 5 mg of TIZANIDINE in one hundred mil of meter flask and dissolve in 10ml of mobile section and conjure the degree with mobile section. From above stock solution 10µg/ml of ACECLOFENAC and 2µg/ml of TIZANIDINE is prepared by diluting 2.4ml to 10ml with mobile phase. This liquid is better used for chromatogram recording.

Trial- 2:
The mobile phase that is used are Triethylamine: ACN pH : 3.0 in an ratio : 50:50. weigh accurately 5 mg of ACECLOFENAC and 5 mg of TIZANIDINE in 100 ml of volumetric flask and dissolve in 10ml of mobile phase and make up the volume with mobile phase. From above stock solution 10µg/ml of ACECLOFENAC and 2µg/ml of TIZANIDINE is prepared by diluting 2.4ml to 10ml with mobile phase. This liquid is better used for chromatogram recording.

3.2 Assay
Preparation of samples for Assay

Preparation of mixed standard solution weigh accurately 5 mg of ACECLOFENAC and 5 mg of TIZANIDINE in 100 ml of volumetric flask and dissolve in 10ml of mobile phase and make up the volume with mobile phase. From above stock solution 10µg/ml of ACECLOFENAC and 2µg/ml of TIZANIDINE is prepared by diluting 2.4ml to 10ml with mobile phase. This liquid is better used for chromatogram recording.

3.3 Tablet sample
10 tablets (each tablet contains ACECLOFENAC -100 mg) were weighed and taken into a mortar and crushed to fine powder and uniformly mixed. Stock solutions of TIZANIDINE and ACECLOFENAC tablets (µg/ml) were made by solubilizing drugs

equivalent to 5 mg of and solubilised in sufficient mobile phase. After that filtered the solution using 0.45-micron syringe filter and Sonicated for 5 min and dilute to 10ml with mobile phase. Further dilutions are prepared in 5 replicates of 2µg/ml of TIZANIDINE and 10µg/ml of ACECLOFENAC was made by adding 2.4 ml of stock solution to 10 ml of mobile phase.

3.4 Validation

Linearity and range

Standard stock solutions of ACECLOFENAC and TIZANIDINE (microgram/ml) were prepared by dissolving 10 mg of ACECLOFENAC and TIZANIDINE dissolved in sufficient mobile section and dilute to one hundred mil with mobile section.

3.5 Accuracy

Accuracy of the tactic made up our minds by Recovery studies. To the formulation (pre analyzed sample), the reference standards of the drugs were added at the level of 50%, 100%, 150%. The recovery studies were dole out 3 times and also the share recovery and percentage mean recovery were calculated for drug is shown in table. To check the accuracy of the tactic, recovery studies were carried out by addition of standard drug solution to pre- analyzed sample solution at three different levels 50%, 100%, 150%.

3.6 Precision

Method precision

Prepared sample preparations of TIZANIDINE and ACECLOFENAC as per test method and injected 6 times in to the column.

3.7 Robustness

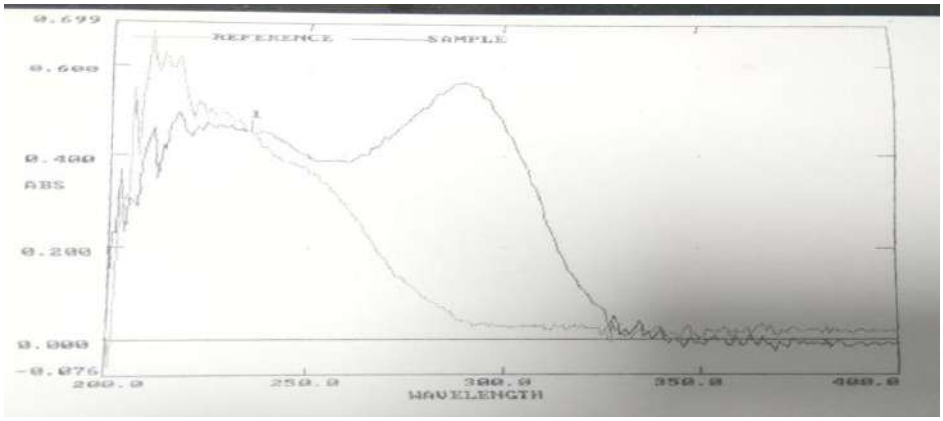
To demonstrate the strength of the tactic, prepared solution as per test method and injected at completely different completely different} variable conditions like exploitation different conditions like flow and wavelength. System suitableness parameters were compared thereupon of technique preciseness.

3.8 Ruggedness

The strength of the tactic was studied by the decisive the analyst to analyst variation by performing the Assay by two different analysts.

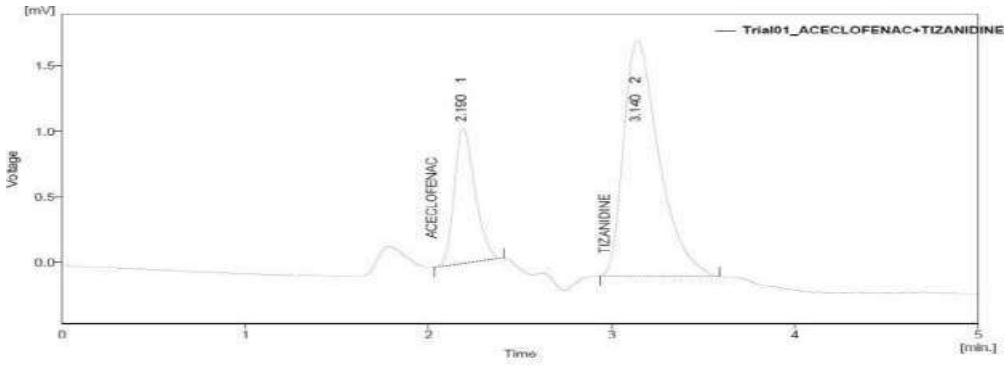
4 RESULTS

Determination of Wavelength of Aspirin and Clopidogrel using UV Visible Spectroscopy



The wavelength (λmax) at where maximum absorbance of the drug of 10 µg/ml concentration using methanol as solvent was scanned using UV-Visible spectrophotometer in the range of 200–400 nm comparing methanol as blank. and the isobestic point was found to be 230 nm for the combination.

Method Development of ACECLOFENAC And TIZANIDINE – Trial – 01 and Trial - 02

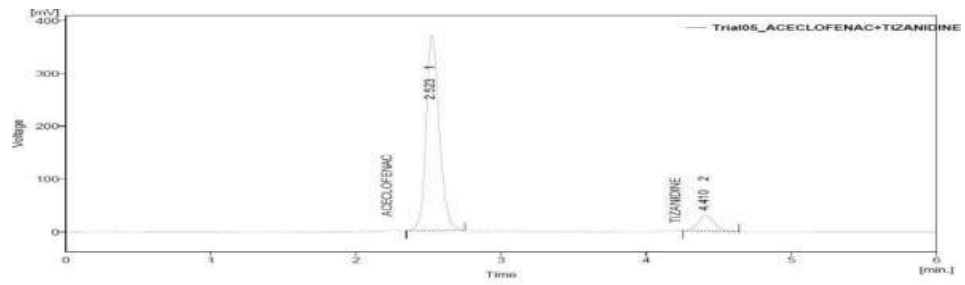


Result Table (Uncal - Trial01_ACECLOFENAC+TIZANIDINE

	Reten. Time [min]	Area [mV.s]	Height [mV]	Area [%]	Height [%]	W05 [min]
1	2.190	8.048	1.032	24.9	36.5	0.12
2	3.140	24.246	1.798	75.1	63.5	0.20
	Total	32.294	2.830	100.0	100.0	

Column Performance Table (From 50% - Trial01_ACECLOFENAC+TIZANIDINE

	Reten. Time	W05 [min]	Asymmetry [-]	Capacity [-]	Efficiency [th.pl]	Eff/l [t.p./m]	Resolution [-]
1	2.190	0.123	1.500	0.00	1747	17468	-
2	3.140	0.203	1.952	0.00	1321	13211	3.423



Result Table (Uncal - Trial05_ACECLOFENAC+TIZANIDINE

	Reten. Time [min]	Area [mV.s]	Height [mV]	Area [%]	Height [%]	W05 [min]
1	2.523	2325.117	369.999	91.2	92.6	0.10
2	4.410	224.128	29.732	8.8	7.4	0.12
	Total	2549.245	399.731	100.0	100.0	

Column Performance Table (From 50% - Trial05_ACECLOFENAC+TIZANIDINE

	Reten. Time	W05 [min]	Asymmetry [-]	Capacity [-]	Efficiency [th.pl]	Eff/l [t.p./m]	Resolution [-]
1	2.523	0.097	1.375	0.00	3775	75498	-
2	4.410	0.120	1.161	0.00	7482	149642	10.248

Trial – 01 Although the Efficiency was not satisfactory for ACECLOFENAC. The Baseline was not proper. Hence it was not taken for optimization.

Trial – 02 All the system suitability requirements were met. The peak Asymmetry factor was less than 2 for both TIZANIDINE and ACECLOFENAC. The efficiency was more than 2000 TIZANIDINE and ACECLOFENAC. Resolution between two peaks >1.5.

4.1 Assay Results

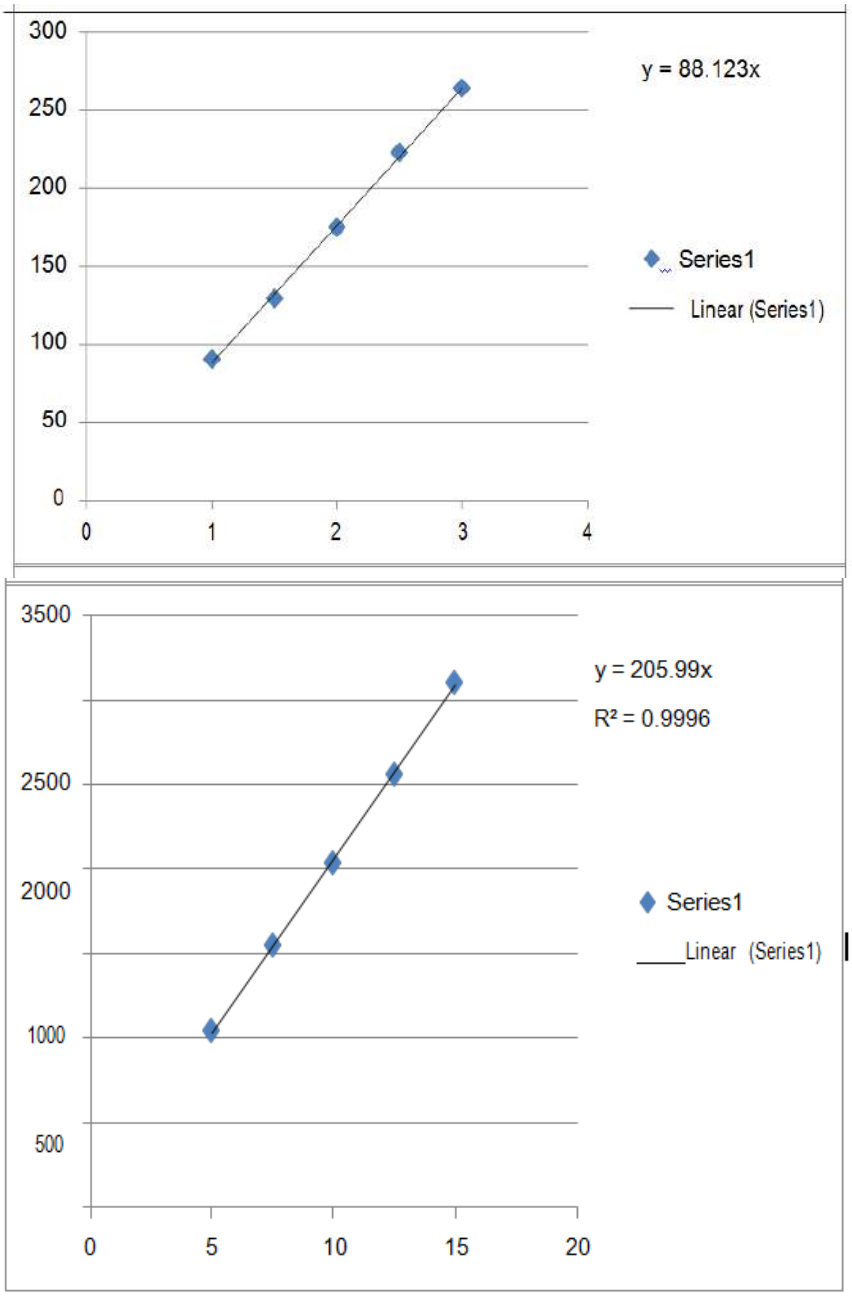
	ACECLOFENAC		TIZANIDINE	
	Standard Area	**Sample Area**	**Standard Area**	**Sample Area**
Injection-1	2334.362	2344.463	207.967	212.684
Injection-2	2323.199	2351.614	199.968	209.655
Injection-3	2337.863	2337.863	207.039	207.039
Injection-4	2331.502	2334.732	207.632	210.092
Injection-5	2328.483	2341.801	198.197	210.080
Average Area	2331.082	2342.095	204.1606	209.91
Standard deviation	6.489006		2.004044	
%RSD	0.276506		0.952806	
Assay(%purity)	100.27		102.61	

The amount of ACECLOFENAC and TIZANIDINE present in the taken dosage form was found to be 100.27% and 102.61 % respectively.

Linearity of ACECLOFENAC and TIZANIDINE

S.No.	Conc.(µg/ml)	Area	S.No.	Conc.(µg/ml)	Area
1	5	1044.606	1	5	1044.606
2	7.5	1549.853	2	7.5	1549.853
3	10	2038.421	3	10	2038.421
4	12.5	2563.186	4	12.5	2563.186
5	15	3106.591	5	15	3106.591

Test results for TIZANIDINE and ACECLOFENAC are showing that the %RSD of Assay results are within limits.



The correlation coefficient for linear curve obtained between concentration vs. Area for standard preparations of ACECLOFENAC and TIZANIDINE is 0.999 and 0.998. The relationship between the concentration of ACECLOFENAC and TIZANIDINE and

area of ACECLOFENAC and TIZANIDINE is linear in the range examined since all points lie in a straight line and the correlation coefficient is well within limits.

Accuracy Results for Aceclofenac and Tizanidine

Recovery level	Accuracy ACECLOFENAC			Average % Recovery
	Amount taken(mcg/ml)	Area	%Recovery	
50%	5	2326.313	96.27	
	5	2211.866		
	5	2194.643		
100%	10	2608.241	101.86	
	10	2609.160		
	10	2605.517		
150%	15	3112.744	102.72	
	15	3109.681		
	15	3106.682		100.28

Recovery level	Accuracy TIZANIDINE			Average % Recovery
	Amount taken(mcg/ml)	Area	%Recovery	
50%	1	224.953	103.20	
	1	280.286		
	1	280.051		
100%	2	236.388	97.60	
	2	234.158		

The percentage mean recovery of ACECLOFENAC and TIZANIDINE is 100.28 % and 102.25 % respectively.

4.2 Results For Method Precision Of Aceclofenac And Tizanidine

ACECLOFENAC		
S.No.	Rt	Area
1	2.510	2192.147
2	2.523	2322.573
3	2.523	2321.138
4	2.523	2333.196
5	2.507	2350.119
6	2.497	2341.355
avg	2.513833	2310.088
stdev	0.010926	58.82541
%RSD	0.433746	1.021

TIZANIDINE		
S.No.	Rt	Area
1	4.397	267.545
2	4.410	211.442
3	4.413	202.102
4	4.413	200.853
5	4.397	202.888
6	4.390	198.551
avg	4.403333	213.8968
stdev	0.009893	21.512
%RSD	0.224216	0.0213

4.3 Result of Robustness study

Parameter	ACECLOFENAC		TIZANIDINE	
	Retention time(min)	Tailing factor	Retention time(min)	Tailing factor
Flow Rate				
0.8 ml/min	3.130	1.258	5.443	1.167
1.2 ml/min	2.090	1.036	3.663	0.943
Wavelength				
233nm	2.513	1.222	4.380	1.088
237nm	2.517	1.179	4.380	1.125

From the observation it was found that the system suitability parameters were within limit at all variable conditions.

4.4 Results for Ruggedness

ACECLOFENAC	% Assay	TIZANIDINE	%Assay
Analyst 01	99.36%	Analyst 01	96.28%
Anaylst 02	99.30%	Anaylst 02	95.97%

5 DISCUSSIONS

A simple and selective LC method is described for the determination of Aceclofenac and Tizanidine in tablet dosage forms. Chromatographic separation was achieved on a c18 column using mobile phase consisting of a mixture of 50 volumes of Triethylamine buffer, 50 volumes of acetonitrile with detection of 230nm. Linearity was observed in the range 5-15 µg/ml for Aceclofenac (r2 =0.999) and 1-3 µg /ml for Tizanidine (r2 =0.998) for the amount of drugs estimated by the proposed methods was in good agreement with the label claim. The proposed methods were validated. The accuracy of the methods was assessed by recovery studies at three different levels. Recovery experiments indicated the absence of interference from commonly encountered pharmaceutical additives. The method was found to be precise as indicated by the repeatability analysis, showing %RSD less than 2. All statistical data proves validity of the methods and can be used for routine analysis of pharmaceutical dosage form.

6 CONCLUSIONS

From the above experimental results and parameters it was concluded that, this newly developed method for the simultaneous estimation Aceclofenac and Tizanidine was found to be simple, precise, accurate and high resolution and shorter retention time makes this method more acceptable and cost effective and it can be effectively applied for routine analysis in research institutions, quality control department in meant in industries, approved testing laboratories studies in near future.

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ISOLATION OF NOVEL PLANT CYCLOTIDES & DETECTING THEIR ACTIVITIES IN CLITORIA TERNATEA AND CENTROSEMUM VIRGINIANUM

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Abstract - Antimicrobial peptides (AMPs) are important components of natural plant defences. They are frequently related to common properties such as small molecular masses, amphipathicity and cationicity. Of these, most are related to a single promiscuous class with multiple functions. Among those multi-functional classes, one can cite the usual structural fold known as the cysteine-stabilized αβ motif (CSαβ), commonly found in the defensin class or the extremely well conserved disulfide-stabilized corecontaining six cysteines commonly characterized by an atypical knotted structure known as the cyclotides. Given that they are relatively small (<10 kDa) and the disulfide bonds are conserved, the number of potential folds is quite low. On the other hand, both peptide frameworks exhibit high tolerance for residue modifications, making the peptides excellent candidates for generating novel proteins by promiscuity processes**.**

Keywords : Cyclotides, Peptides, Knotted Structures.

Cyclotides are a unique in nature and growing family of cyclized peptides which act as backbone that also contain a cystine knot motif formed from six conserved cysteine residues. They all share a unique head-to tail circular knotted topology of three disulfide bridges, with one disulfide bond penetrating through a macro-cycle formed by the other two disulfides bonds and interconnecting peptide backbones, forming what is called a cystine knot topology (figure 1) [1] This cyclic cysteine knot (CCK) framework gives cyclotides a compact, highly rigid structure [2], which confers exceptional resistance to thermal/chemical denaturation, and enzymatic degradation [3, 4]. In fact, the use of cyclotide-containing plants in indigenous medicine first highlighted the fact that these peptides are resistant to boiling and are apparently orally bioavailable.[5] As a key feature, cyclotides are amandable to changes by various amino acids by peptide engineering, which highlights the nature of flexibility and plasticity of thei framework. Thus, their high sequence diversity is extensively under investigation for being utilized as scaffolds in the development of agrochemicals and pharmaceuticals [6].Plant cyclotides display a diverse range of biological activities although their primary role in plants has not yet been reported, appears that they are most likely present for defence purpose.

Cyclotides are widely distributed in the plant kingdom, found among the Violaceae, Rubiaceae, Fabaceae and Cucurbitaceae families where a single plant can express a suite of these peptides with tissue-specific expression in roots, leaves, stems and other tissues .Plants typically has a suite of cyclotides distributed throughout different tissues (leaves, roots, seeds and flowers , and it has therefore been proposed that they function in plant defence.[8]Although cyclotides may function in plant defence [9, 10], they have a wide range of bio-activities. They inhibit the replication and cytopathic effects of HIV [11-14], display antibacterial and antifungal activity, [15] inhibit neurotensin binding to cell membranes [16] and exhibit uterotonic activity in rat, rabbit, and human uteri.(17).The disruption of lipid membranes via pore-formation and an intact disulfide network play Critical roles in their cytotoxic activity [18,19,20], while membrane interactions may explain their antimicrobial and haemolytic activities, [21, 22] Their extraordinary stability and documented medicinal attributes make cyclotides promising candidates for drug design and protein engineering programs.[23,24,]

1. EXPERIMENTAL PROCEDURE

1.1 Cyclotides Isolation Protocol

Introduced the plant material (fresh, frozen or dried) into the pre-cooled mortar, and added extra liquid nitrogen to freeze sample. Continued grinding the sample followed by addition of extra liquid nitrogen may be required to keep the sample frozen. Added 50% acetonitrile, 1% formic acid buffer to the sample at a rate of

approximately 1:4 (w/v). Magnetic stirrer is used to mix sample followed by collection of supernatant, which was centrifuged at maximum speed (>10 000 g) for 5 minutes, and new supernatant was collected. Crude plant extract (supernatant) was stored at 4°C. Crude extracts were subjected to preparative HPLC using a Grace Vydac C18 RP-HPLC column (250 x 20 mm, 300 Å, 15 m particle size) Gradients of buffer A (0.05% aqueous trifluoroacetic acid) and buffer B(90% acetonitrile, 0.05% trifluoroacetic acid) were employed with a flow rate of 8 ml/min and a gradient of1% buffer B per minute supplied over a waters-515 HPLC system. Eluent was monitored at 214 nm and fractions collected manually. HPLC was carried out at GIPS College, Guwahati.

1.2 Detection of Cyclotides by Thin Layer Chromatographyge nei thin layer chromatography kit was used

The samples were dotted on one side of 5 identical 30mm×50 mm silica gel G plates (plates 1—5) and these plates were developed with n-butanol:acetic acid: water (3:1:1, v:v:v). After removal of the solvent, plates 1, 2 and 5 were detected with iodine, Dragendorff's and Coomassie brilliant blue G-250 reagents separately. Plate 4 was hanged in a sealed glass vessel with about 1mL concentrated HCl and hydrolyzed in a drying incubator. Cooled for a few minutes, plate 4 was taken out and the HCl was volatilized with a ventilator. Then plates 3 was sprayed with 0.2% ninhydrin reagent and detected after heating in drier for several minutes.

Separation of Protein by Molecular Weight Using Sds-page Electrophoresis The two gels 12% resolving gel and 4% stacking gel were prepared. The resolving gel mixture was poured in between the glass plates of the apparatus, leaving a space of 1cm for the stacking gel. This space was filled with water to overlay the gel, and obtain a uniform surface. The gel was left to polymerise. After polymerization, and the stacking gel mixture was poured over the resolving gel. A comb of 0.75mm thickness was then inserted into the stacking gel. The stacking gel was left undisturbed for 40 minutes to polymerize. Gel was mixed with sample in an eppendorf tube and was boiled at 90-100C to allow SDS to bind to proteins for 5 minutes. The electrophoresis was performed, the gel was immersed in the staining solution for 30-40 minutes, followed by de-staining overnight. The gel was then observed for the bands developed for the protein in the sample.

1.2 Assays

Total Protein Assay Test samples were diluted with 0.85% Sodium Chloride Solution, Labelled one test tube for the Blank and one for each test sample (Test 1 and Test 2). To the test tube (Blank), added Sodium Chloride Solution. Added diluted test sample solution prepared in step 1 to the appropriately labeled test tube. Biuret Reagent added to each test tube, Followed b Folin and Ciocalteau's Phenol Reagent to each tube. Read absorbance using the blank as reference at the same wavelength and on the same instrument used to prepare the calibration curve. Completed readings within 30 minutes. Determined the protein concentration (µg/ml) was determined of each diluted test sample from the calibration curve.

Tryptan Blue Assay The cell lines Dalton's Ascites lymphoma(DAL) & Ehrlich Ascite carcinoma (EAC) were collected from mice. DLA cells in phosphate buffer saline (PBS) with varying different concentrations of herbal samples. Standardized extracts and 5-FU as positive control prepared in 0.1% DMSO as solvent were incubated at 37° c for 3hrs in 5% CO2 atmosphere in the filtered cap, flat bottom cell culture flasks. Cell viability is determined with the help of tryphan blue placed on haemocytometer and counted with the help of Leica micro scope. Percentage(%) cell death was calculated.

1,1-Diphenyl-2-Picryl Hydrazyl (Dpph) Assay DPPH solution & Ascorbic acid standard solution were taken. DPPH solution in methanol was mixed with samples. The reaction mixture was vortexed and left in the dark at room temperature for 30 min. The absorbance was measured at 517 nm. A reaction mixture without test sample was served as control. Percentage of scavenging activity was measured.

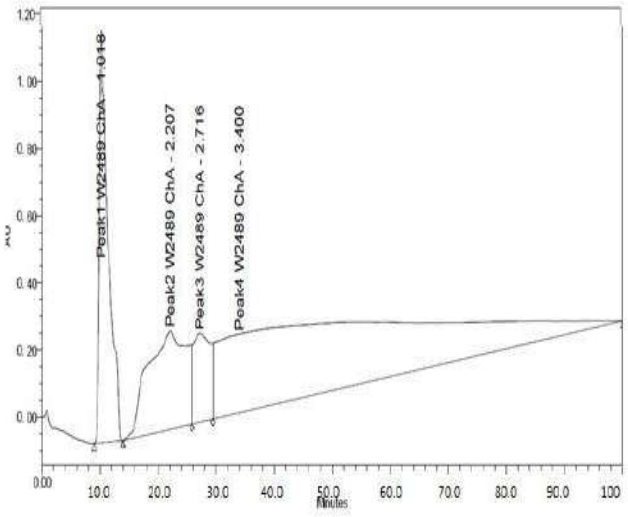
2. RESULTS AND DISCUSSIONS

The results obtained from the study are summarised in the form graphs and tables.The present study is mainly based on (i) isolation, detection of cyclotides (ii) checking of activities of cyclotides parameters as mentioned therein.

HPLC Profiling Of Plant Samples HPLC is carried out for different parts (seeds, flowers, and leaves) of Clitoria ternata and Centrosema virginianum. Hplc is carried out in GIPS College of pharmacy, Guwahati. In the present work experimental procedures include: a preliminary overview of the cyclotide contents unless proceeding to large-scale extraction or instead of large scale screening purposes, a fast small-scale extraction using only milligram to few grams quantities of plant material was performed. Formic acid in high concentration is an extremely potent solvent for proteins, particularly for hydrophobic ones. solubilization of structural polypeptides of poliovirus and other proteins, modified at the cysteines. Present protocol of isolating cyclotides includes Reverse Phase High Performance liquid chromatography to obtained pure cyclotide fractions. Reversed phase HPLC (RP-HPLC) is a very powerful and widely-used technique for separating biomolecules, both large and small. Its primary advantages over other separation modes are high efficiency and the ability to distinguish between compounds that are chemically very similar.

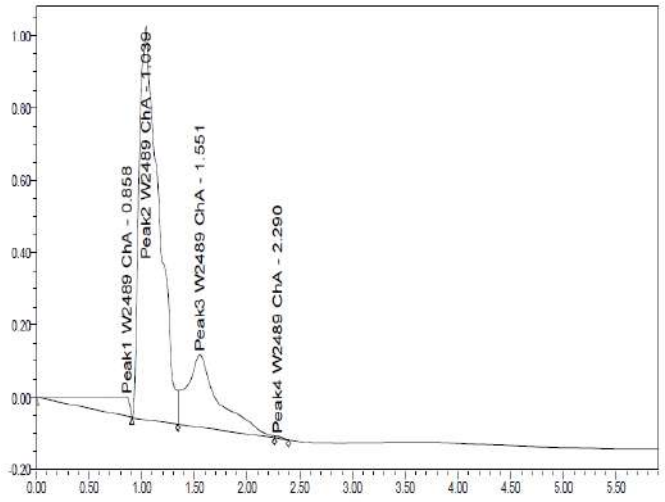
Clitotia ternatea

a) Seeds



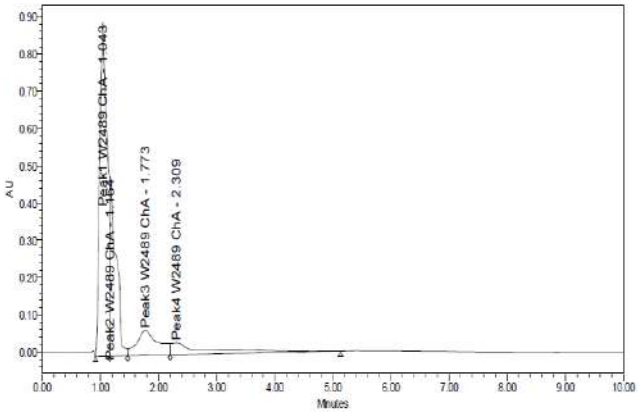
HPLC profile of Clitoria ternata seeds

b) Flower



HPLC profile of Clitoria flower

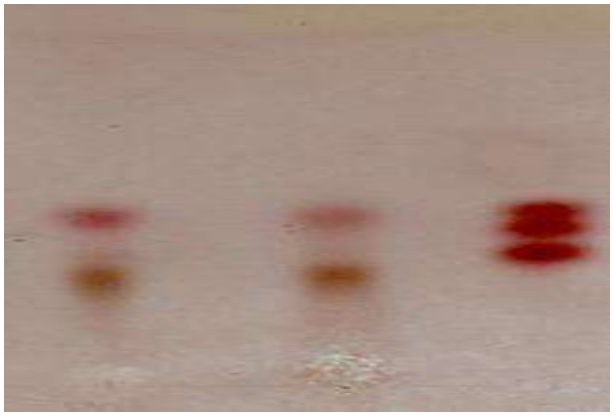
c) Leaves



2.1 HPLC Profile of Clitoria Ternatea Leaves

2.1.1 Thin Layer Chromatography

Isolation of cyclotide enriched fractions by RP-HPLC was subjected to identification test by using thin layer chromatography. TLC is carried out by GeNei thin layer chromatography kit containing different amino acid samples and mobile phase. Iodine is a common reagent for detecting organics, and Dragendorff's reagent is a common reagent for detecting alkaloids. These two reagents can be used to detectcyclopeptides, linear-peptides and proteins, which are not specific. The TLC protosite reaction with ninhydrin reagent is a good specific and sensitive chemical method for detecting cyclopeptides, which can be used effectively to distinguish cyclopeptides and cyclotides fromamino acids, linear-peptides and proteins by comparing the colours of the spots on non-hydrolyzed plate and hydrolyzed plate. If there were some purplish red or yellow spots in some cases in plate hydrolysed plates there would be no such spots at the same sites in non-hydrolysing plate, indicating that the detected samples contained cyclopeptides or cyclotides



2.1 a) identification test by TLC plate

Reagents	Amino acids	Cycloti de	Linear peptide	Protein
Iodine	- or + or +++	+++	+	+
Dragendorff's	- or +	+++	+	+++
Ninhydrin(Non-Hyrolysed)	+++	- or +	+++	+
Ninhydrin(Hydrolysed)	+++	+++	+++	+++
Coomassie Brilliant Blue G-250	-	+	-	+++

2.2.1. (A) Identification Tests By Different Reagents

Chemical constituents	**Clitoria ternata**		
	Flowers	Seeds	Leaves
Protein	++	+++	++
Cyclotides	+	++	+

2.2.2(b) Identification Of Cyclotides

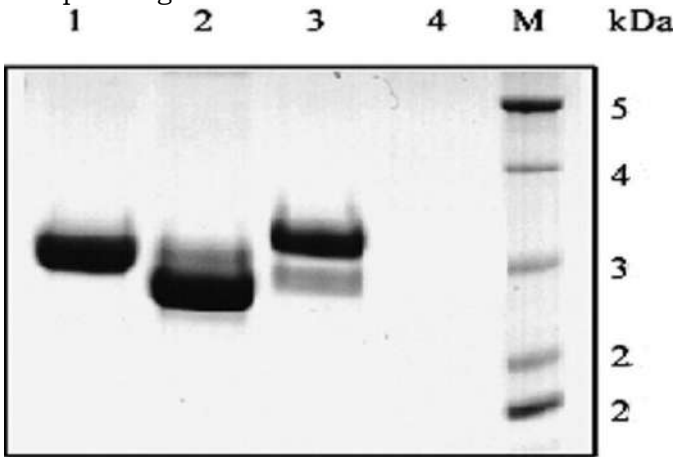
Cyclotides were detected in Clitoria ternatea.

For proteins, SDS-PAGE is usually the first choice as an assay of purity due to its reliability and ease. The presence of SDS and the denaturing step causes proteins to be separated approximately based on size, but aberrant migration of some proteins may occur. β-mercaptoethanol breaks the disulphide bridges and the peptides gets linearised and separated base on its size compared to the protein marker . In the present study protein ladder of 1kda to 97kda is used.

In present study the isolated cyclotides were identified by thin layer chromatography studies and further confirmed by separation by its molecular weight.

2.2.3 Sds gel electrophoresis

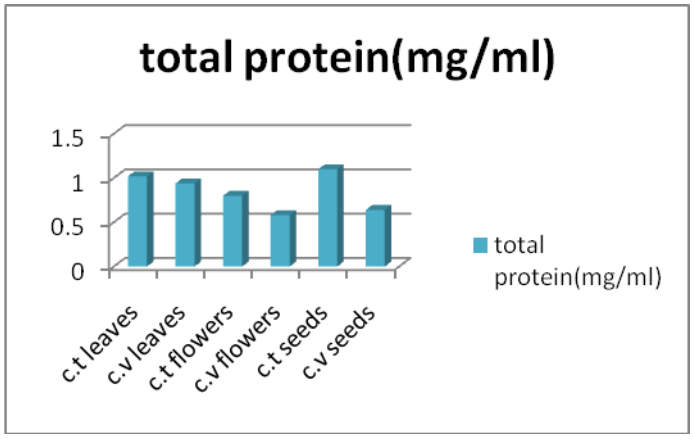
SDS-Polyacrylamide gel electrophoresis (SDS-PAGE) to determine molecular weight of protein/peptide if ions of similar charge are placed in solution between two oppositely charged electrodes, the smaller ions of the same charge move faster toward the electrode of opposite charge faster than the larger ions. If ions of different charge are placed in solution, the more highly charged ions migrate faster than the lower charged ions. This process, called electrophoresis, is a good technique for separating substances. SDS-Polyacrylamide gel electrophoresis (SDS-PAGE) to determine molecular weight of protein/peptide if ions of similar charge are placed in solution between two oppositely charged electrodes, the smaller ions of the same charge move faster toward the electrode of opposite charge faster than the larger ions. If ions of different charge are placed in solution, the more highly charged ions migrate faster than the lower charged ions. This process, called electrophoresis, is a good technique for separating substances.



2.2.3 Bands are shown by cyclotides present in Clitoria ternatea

2.2.4) Determination of Protein concentration

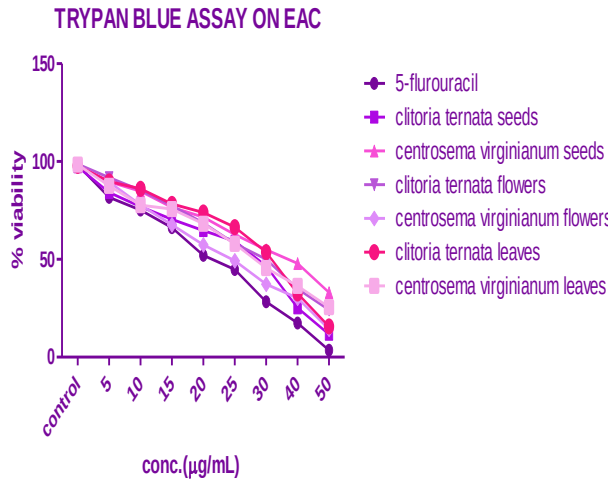
Amount of protein in different plant parts are determined by total protein assay. Here concentration is measured in mg/ml. Total protein concentration of each plant sample is determined by Total protein assay kit. Protein concentrations of different parts of same plants, and different plants were determined. In the present study clitoria seeds showed highest amount of protein concentration, and it is followed by clitoria leaves. Lowest amount of protein is present in Clitoria leaves.



3. CYTOTOXICITY DETERMINATION

Tryphan Blue Assay The experiments conducted were and Tryphan blue Exclusion Dye assay measurement of cytotoxicity. In cytotoxic activity assay, result has shown good anti cancer properties on the DAL & EAC cells. The IC50 values for the plant samples are shown in the table. As concentration of plant samples increased cytotoxicity effect is increased.The results for Cytotoxicity assay have been shown in table. The data obtained have shown range of significance in terms of p-value. The data was compared with control untreated group.

The statistical value of P<0.05 is considered as significant



3.1 Invitro Dpph Assay

The DPPH assay has shown that complexes possess good antioxidant activity. The values were shown in the table in results. Eventhough centrosema did not show any cyclotides it is also showing good anti oxidant activity but not much as clitoria, which shows better anti oxidant activity.

Cyclotides have an extreme structural stability that lacks parallels in other protein families. Their natural role is thought to be as plant defense agents, most notably against insect pests, but they also have potential applications in drug design and agriculture. The structural, biochemical, and functional diversity of peptides and proteins found in nature have exceptional opportunities for future research

In vitro DPPH assay has shown good antioxidant of plant samples. Various parts of Clitoria ternate activities are represented in the graph below.

4. CONCLUSIONS

Medicinal plants used may be an interesting and largely unexplored source for the development of potential new compounds. Isolation, identification and purification of these purification of these phyto constituents and determination of their potencies with the view to formulating novel chemotherapeutic agents should be the future

direction for investigation. From the results and observations we may conclude that plant sources better alternatives to synthetic drugs. The plants also used to discover bioactive natural products that may serves as leads for the development of new pharmaceuticals that address hither to unmet needs. Furthermore, Active plant extracts can be subjected to various chemical evaluations by several methods such as GC-MS, NMR, MASS SPECTROSCOPY, etc for isolation of therapeutic compounds.

The present investigations carried out on Fabaceae family are summarized as follows:

- IN Clitoria ternate plant all the plant parts i.e seeds, flowers, leaves are showed prescence of cyclotides, where as different plant parts of Centrosema virginianum did not give any peaks for cyclotides
- Both cyclotides and centrosema gives positive results for identification tests for proteins.
- Clitoria Cyclotides shows red or yellow coloured spots with ninhydrin(non-hydrolysed), which are identification tests for cyclotides. In case of centrosema virginianum cyclotides are not detected .
- BANDS OF 3000daltons are separated on SDS-PAGE for clitoria, and not shown in centrosema
- Clitoria seeds shows high amount of protein concentration and centrosema flowers showed the list amount of protein.
- In Tryphanblue assay , good cytotoxic activity was shown by clitoria ternata.
- Both clitoria and centrosema were shown good anti-oxidant activity

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GROWTH INDEX DETERMINATION OF GENETICALLY TRANSFORMED HAIRY ROOTS AND HAIRY ROOT CALLUS OF WITHANIA SOMNIFERA

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Abstract – Withania somnifera, known as Ashwagandha, widely considered as Indian Ginseng, is a plant of repute in Indian system of traditional medicine. The present study was emphasized to investigate growth index determination of hairy roots extarct and callus obtained from hairy root of Witahnia somnifera. Hairy root is a typical disease syndrome characterized by numerous, fast growing highly branched adventitious roots at the site of infection. Transgenic hairy roots were induced in W. somnifera by infecting leaf explants with two wild type strain of Agrobacterium rhizogenes ATCC 15834 and MTCC 4364 using MS media. The use of plant cell cultures and hairy root cultures for production of bioactive secondary metabolites is an alternative approach.

In present investigation, for hairy root initiation and callus initiation from hairy roots of W. somnifera, three different media were used to meet the growth parameter, which was determined by growth index comparison. The best combination for initiation of callus from hairy roots of W.somnifera was observed in MS medium supplemented with 6- Benzyl amino purine i.e. BAP (1ppm), Indole-3-Acetic Acid i.e. IAA (1ppm), and Kinetin i.e.Kn (0.5ppm) in combination with 20% Coconut water. However, the hairy root initiation and elongation was observed in solid as well as in liquid MS medium supplemented with 20% CW after 15 days of incubation.

Keywords: Withania somnifera, Growth index, Coconut water, Hairy root culture.

1 INTRODUCTION

India has one of the oldest, richest and most diverse cultural traditions associated with the use of medicinal plants. This knowledge is accessible from thousands of medical texts and manuscripts. The substances having medical value have been extensively used for treating various disease conditions. Herbs being easily available to human beings have been explored to the maximum for their medicinal properties. Products of primary metabolism such as amino acids, carbohydrates and proteins are vital for the maintenance of life processes, while others like alkaloids, phenolics, steroids, terpenoids are products of secondary metabolism and have toxicological, pharmacological and ecological importance.[1] Many medicinal plants, traditionally used for thousands of years, are present in a group of herbal preparations of the Indian traditional health care system (Ayurveda) and proposed for their interesting multilevel activities. Amongst the medicinal plants used in Ayurvedic preparations for their therapeutic action, some have been thoroughly investigated and some need to be explored. [2,7] The goals of using plants as sources of therapeutic agents are to isolate bioactive compounds for direct use as drugs, to produce bioactive compounds of novel or known structures as lead compounds for semi synthesis to produce patentable entities of higher activity and/or lower toxicity, to use agents as pharmacological tools, to use the whole plant or part of it as a herbal remedy [1]. Ashwagandha [Withania somnifera L. Dunal Solanaceae)] is an important medicinal plant, widely used as a home remedy for several diseases in India as well as other parts of the world. Historically, the plant has been used as an aphrodisiac, liver tonic, anti-inflammatory agent, astringent, and more recently to treat bronchitis, asthma, ulcers, emaciation, insomnia, and senile dementia. Clinical trials and animal research support the use of ashwaganda for anxiety, cognitive and neurological disorders, inflammation, and Parkinson's disease. Ashwaganda's chemopreventive properties make it a potentially useful adjunct for patients undergoing radiation and chemotherapy. It is described as an herbal tonic and

health food in Vedas and considered as 'Indian Ginseng' in traditional Indian system of medicine.[6]

In present investigation, aim is to optimize condition for hairy root propagation to enhance growth index Withania somnifera hairy root and hairy root callus, to study the effects of culture media composition on genetically modified hairy roots and its callus.

2 MATERIALS AND METHODS

2.1 Collection and Authentication of Drug Material

Plant material was collected from medicinal plant garden of Poona College of Pharmacy, Bharati Vidyapeeth University, Pune. It was authenticated by Agharkar Research Institute, Pune (Authentication No. 1946-2006).

2.2 Initiation of Hairy Roots of Withania Somnifera

The hairy root culture were initiated from W. somnifera leaf explants which was infected by A. rhizogene (ATCC15834).The standard protocol was followed for establishment of genetically transformed hairy root cultures from W. somnifera leaf explants.[1,8]

2.3 Morphological Studies:

The physical changes observed in colour and texture of hairy root callus and hairy roots of W.somnifera was determined.

2.4 Callus Initiation from Hairy Roots of W. Somnifera:

Initiation of Friable Callus:

Different media used for initiation of friable callus from hairy roots of Withania somnifera given in Table No.1. Cultures were incubated at 25 ± 2°C with 16hr photoperiod.[4,15]

Table No. 1. Media Composition for initiation of hairy root callus

Sr. No.	Media used	Growth hormone combination (in ppm)
1.	MSA	1IAA+1 BAP + 0.5Kn+20%CW
2.	MSB	1IAA+1BAP + 0.5Kn
3.	MSC	20%Coconut Water

2.5 ESTIMATION OF FRIABLE CALLUS GROWTH:

THE APPEARANCE OF FRIABLE CALLUS WAS RECORDED PERIODICALLY (IN WEEKS) AND THE GROWTH WAS OBSERVED BOTH AS QUALITATIVELY (CHANGES IN MORPHOLOGICAL CHARACTER) AND QUANTITATIVELY (CHANGE IN DRY WEIGHT). DRY WEIGHT (MG) OF CALLUS WAS DETERMINED BY DRYING THE GROWN CALLUS IN OVEN AT 60°C TO CONSTANT WEIGHT.

2.6 INITIATION OF SUSPENSION CULTURE

The callus initiated in MS plane liquid medium containing IAA(1ppm), BAP(1ppm), Kn(0.5ppm) and 20% CW was subculture every 3rd week in same medium. After 3 to 4 subcultures friable callus was obtained. Suspension cultures were initiated from four-week-old friable callus in 20 ml MS liquid medium in 150ml conical flask. The suspension was maintained for thirty days on a rotary shaker at 100 rpm under continuous light and 25 ± 2°C temperature.

2.7 Growth Measurements Studies:

Following parameters were recorded from 0 day to 30 days to assess the growth of W.somnifera cells in suspension cultures.[15]

Fresh weight (FW): - Cell suspension (50 ml) was filtered through previously weighted wet filter paper and the weights of biomass were determined.

Dry weight (DW): - Biomass obtained after filtering (50ml) suspension was dried at 60°C hot air oven to a constant weight.

Growth index (GI):

$$\text{Growth index} = \frac{\text{DW of treatment or harvest}}{\text{DW (control) or inoculums}} \times 100$$

3 RESULT

3.1 Morphological Study

Determination Of Physical Changes In Hairy Root Callus And Hairy Roots:

The physical changes observed in colour and texture of callus and hairy roots in W.somnifera are also shown in Table No.2. Initiation of W. somnifera hairy root callus and hairy roots in different media shown in Fig.No.1.

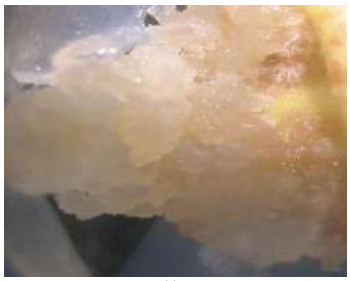
Table No. 2. Media composition for initiation of hairy root callus and hairy roots:

Sr. No.	Media	Colour of callus	Colour of hairy roots
1.	MS	Light brown	Whitish brown
2.	MSA	Brownish green	Brownish
3.	MSB	Yellowish green	Brownish dark
4.	MSC	Creamish Brown	Whitish brown

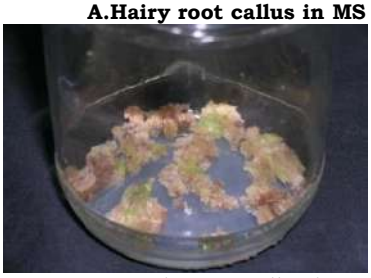
Fig.1.Initiation of hairy root callus and hairy roots in different media:

A.Hairy root callus in MS

B.Hairy roots in MSC



C.Hairy root callus in MSB



D.Hairy root callus in MSB E.Hairy root callus in MSC F.Hairy root callus in MSC

2 GROWTH MEASUREMENT STUDY:

2.1. Growth index of hairy root callus and hairy roots:

Following tables illustrates the pattern of friable callus initiation and hairy root initiation from W.somnifera in MSA, MSB, and MSC. The growth of the callus was observed in each medium. FW and DW measured every week up to 2 weeks. The maximum growth of friable callus was observed in MSA medium containing IAA (1ppm), BAP (1ppm), Kn (0.5ppm) and 20% CW whereas in case of hairy root maximum growth pattern was observed in MSC medium containing 20% CW. Table No.3. showed pattern of W.somnifera callus initiation and hairy root initiation grown in different MS media. Table No.4. showed growth index of W.somnifera callus and hairy root grown in different MS media.(5)

Table No.3. Growth pattern of hairy root callus and hairy rootTable No.4.

Media	1st week (Hairy Root Callus)		2nd week (Hairy Root Callus)		1st week (Hairy Root)		2nd week (Hairy Root)	
	FW (g)	DW (g)	FW (g)	DW (g)	FW (g)	DW (g)	FW (g)	DW (g)
MSA	3.80	0.25	7.45	0.30	2.52	0.16	4.20	0.21
MSB	3.23	0.18	5.21	0.24	1.23	0.12	3.45	0.19
MSC	3.46	0.21	4.37	0.26	2.40	0.13	4.37	0.25

Growth index in hairy root callus and hairy roots

Media	Hairy root callus		Hairy root	
	1st week	2nd week	1st week	2nd week
MSA	100	142.85	100	190.90
MSB	100	114.28	100	172.72
MSC	100	123.80	100	227.27

3 DISCUSSIONS

Withania somnifera, known as Ashwagandha, widely considered as Indian Ginseng, is a plant of repute in Indian system of traditional medicine. The present study was emphasized to investigate growth index determination of hairy roots extarct and callus obtained from hairy root of Witahnia somnifera. Hairy root is a typical disease syndrome characterized by numerous, fast growing highly branched adventitious roots at the site of infection. Transgenic hairy roots were induced in W. somnifera by infecting leaf explants with two wild type strain of Agrobacterium rhizogenes ATCC 15834 and MTCC 4364 using MS media. In present study, hairy root initiation and callus initiation from hairy roots of W. somnifera, three different media were used, which were MS medium (both solid and liquid) supplemented with BAP (1ppm), IAA (1ppm) in combination with Kn (0.5ppm) and 20% CW; MS medium supplemented with BAP (1ppm), IAA (1ppm) in combination with Kn (0.5ppm); MS medium supplemented with 20% CW. Callus initiation was observed within 10 days of incubation. The best combination for initiation of callus from hairy roots of W. somnifera was observed in MS medium supplemented with BAP (1ppm), IAA (1ppm), and Kn (0.5ppm) in combination with 20% CW. However, the hairy root initiation and elongation was observed in solid as well as in liquid MS medium supplemented with 20% CW after 15 days of incubation.

Table No.4. which is mentioned above indicates the growth index of friable callus of W.somnifera grown in different MS medium. The growth index was calculated weekly by the mentioned formula from their fresh weights and dry weights. Maximum growth index (142.85%) was observed in medium containing IAA (1ppm), BAP (1ppm) and Kn (0.5ppm) in combination with 20%CW whereas the minimum growth index (114.28%) was observed in medium supplemented with IAA (1ppm),BAP (1ppm) and Kn (0.5ppm) medium after of incubation.

Fig.No. 2. exhibited the growth index of callus grown in various media using graph.

Fig.No.2. Growth index of W.somnifera hairy root callus:

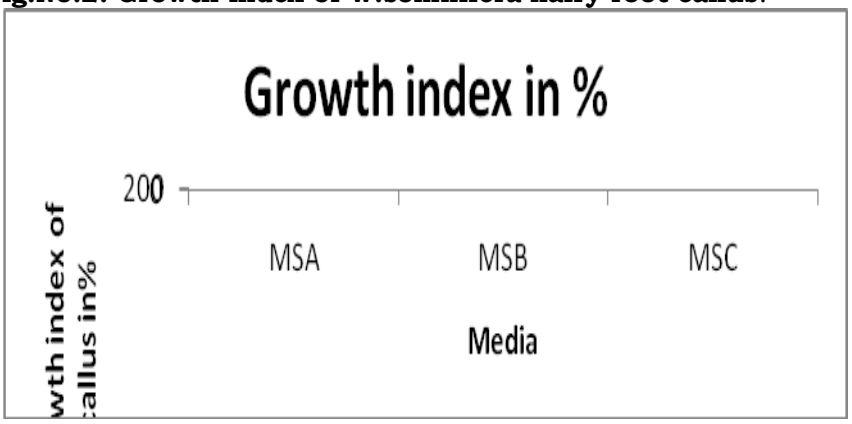
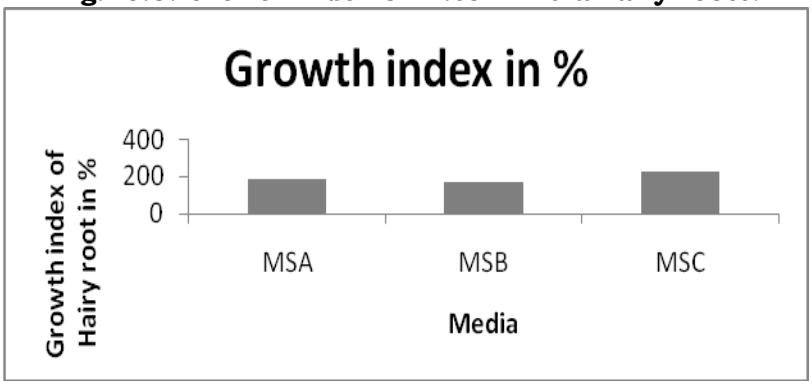


Table No.4. which is mentioned above indicates indicates the growth index of hairy roots of W.somnifera grown in MS medium containing 20% coconut water. Maximum growth index (227.27%) was observed in medium containing 20%CW whereas the minimum growth index (172.72%) was observed in medium supplemented with IAA (1ppm), BAP (1ppm)and Kn (0.5ppm) medium after incubation. Fig.No.3. exhibited the growth index of hairy roots grown in various media using graph.

Fig.No.3. Growth index of W.somnifera hairy roots:



4 INCREASE BIOMASS OF HAIRY ROOT CALLUS AND HAIRY ROOTS OF W. SOMNIFERA USING DIFFERENT MEDIA COMPOSITION

In present investigation, the biomass of Withania somnifera hairy roots callus and hairy roots of W. somnifera were initiated using different media composition. It was noticed that maximum growth pattern of callus was observed in 1IAA+1BAP+0.5Kn+20% CW. In case of hairy roots, maximum growth pattern and withanolides content of was observed in 20% coconut water (CW).The research work shows that different media composition will affect growth pattern of hairy root and hairy root callus which is determined by using growth index formula.

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DESIGN AND INVITRO CHARACTERIZATION OF VORICONAZOLE GEL FOR TRANSDERMAL DRUG DELIVERY SYSTEM

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Abstract - Transdermal route offers several potential advantages over conventional routes. These advantages includes avoidance of first pass metabolism, predictable and extended duration of action, minimizing undesirable side effects, utility of short half-life drugs, improving physiological and pharmacological response, avoiding the fluctuation in the blood levels, and most important it provides patient convenience. Voriconazole, (trade name Vfend) is a triazole antifungal medication used to treat and prevent invasive fungal infections including aspergillosis and candidiasis and fungal infections caused by Scedosporium and Fusarium species. In the present work an attempt was being made to formulate and evaluate Transdermal gel containing anti-fungal drug Voriconazole.Carbopol 971, Sodium CMC and carbopol 934 were selected as polymers. The drug and excipient compatability was studied by using FTIR Nine formulations of gels were prepared by taking different quantities of polymers. The prepared gel was subjected to various evaluation tests like pH, spreadability, viscosity, content uniformity and diffusion studies conducted upto 12hrs. All the results were within the limits, by diffusion studies it was observed that formulation F8 shown maximum drug release of 95.49% which was considered as optimized formulation.
Keywords: Voriconazole, Transdermal , Carbopol 971, Sodium CMC and carbopol 934.

1 INTRODUCTION

For many decades onwards sustained release drug delivery system is existed in the medical and pharmaceuticalIn pharmaceutical industry developing a controlled dosage form has become increasingly important. Therefore various forms of Novel drug delivery system such as Transdermal drug delivery systems, Controlled release systems, Transmucosal delivery systems etc. has been developed. Transdermal delivery has been emerged as a novel tool over injectables and oral routes as it increases the patient compliance and avoids the first pass hepatic metabolism. In transdermal drug delivery system the drug is delivered in a controlled rate into systemic circulation through the skin. The intact skin is used as a port to administer a drug in transdermal gels but skin act as a barrier to ingress the material, it only allows a small material to penetrate over a period of time into systemic circulation. The one way to deliver a sufficient amount of drug transdermally is in which the drug agent is applied to skin in a patch and another one is by incorporating a drug in a gel. From both patches and transdermal gels medicament is delivered in a controlled diffusion mechanism.

Description: Voriconazole (Vfend®, Pfizer) is a triazole antifungal medication used to treat serious fungal infections. It is used to treat invasive fungal infections that are generally seen in patients who are immunocompromised. These include invasive candidiasis, invasive aspergillosis, and emerging fungal infections

2 MATERIALS AND METHODS

Voriconazole purchased from NATCO PHARMALABS, carbapol 971 was purchased from Research lab fine chem. INDUSTRIES, Mumbai, Carbopol 934 purchased from Jiangsu Huaxi International Trade Gels are semisolid systems in which a liquid phase is constrained within a three dimensional polymeric matrix of natural or synthetic gums in which a high degree of physical or chemical cross linking has been established. Gels are defined as a substantially dilute cross-linked system, which exhibits no flow when in the steadystate The USP defines gel as semisolid system consisting of either suspension of small inorganic particles or large organic molecules within the liquid. Gels have higher aqueous component which allows

greater dissolution of drugs, which in turn easily migrate the drug through a vehicle, compared to ointment and creams.

3 METHODS

3.1 Preparation of Voriconazole gel

Above mentioned quantity of carbopol 934, Carbopol 971 was soaked in water for a period of 2 hours. Carbopol was then neutralized with triethanolamine (TEA) with stirring. Then specified amount of drug was dissolved in appropriate and preweighted amounts of propylene glycol and ethanol. Solvent blend was transferred to carbopol container and agitated for additional 20 min. The dispersion was then allowed to hydrate and swell for 60 min, finally adjusted the pH with 98% TEA until the desired pH value was approximately reached (6.8-7). During pH adjustment, the mixture was stirred gently with a spatula until homogeneous gel was formed. All the samples were allowed to equilibrate for at least 24 hours at room temperature prior to performing rheological measurements

Formulation (F)	Drug (mg)	Carbopol 971 (mg)	Sodium CMC	Carbopol 934 (mg)	Methanol (ml)	Triethanolamine(ml)	Poly ethylene glycol (mg)	Methyl parabben (mg)	Water
F_1	200	500	-	-	10	5	10	5	Q.s
F_2	200	1500	-	-	10	5	10	5	Q.s
F_3	200	2000	-	-	10	5	10	5	Q.s
F_4	200	-	500	-	10	5	10	5	Q.s
F_5	200	-	1500	-	10	5	10	5	Q.s
F_6	200	-	2000	-	10	5	10	5	Q.s
F_7	200	-		500	10	5	10	5	Q.s
F_8	200	-		1500	10	5	10	5	Q.s
F_9	200	-		2000	10	5	10	5	Q.s

3.2 Evaluation Studies

In-Vitro Release Studies

Drug Release Study From Dialysis Membrane

The skin permeation of Voriconazole from gel formulation was studied by using an open ended diffusion cell specially designed laboratory according to the literates. The effective permeation area of the diffusion cell and receptor cell volume was 2.4 cm and 200 ml respectively. The temperature was maintained at 37 ± 0.5°C.The receptor compartment contained 200 ml of pH 6.8 phosphate buffer and was constantly stirred by magnetic stirrer at 100 rpm. The dialysis was prepared by using semi permeable membrane from egg. The membrane was tied to an open end tube. This served as the donor compartment where as the beaker containing phosphate buffer served as the receptor compartment. Gel formulation [F1-F7 (20ml suspension) and for optimized gel (10gm)] was applied to the dialysis membrane and the content of diffusion cell was kept under constant stirring. Then 5 ml of samples were withdrawn from receptor compartment of diffusion cell at predetermined time intervals and analyzed by spectrometric method at 250 nm after suitable dilution. The receptor phase was immediately replenished with equal volume of fresh pH 6.8 buffer. Triplicate experiments were conducted for drug release studies.

Application of Release Rate Kinetics to Dissolution Data:

Various models were tested for explaining the kinetics of drug release. To analyze the mechanism of the drug release rate kinetics of the dosage form, the obtained data were fitted into zero-order, first order, Higuchi, and Korsmeyer-Peppas release model.

Zero order release rate kinetics:

To study the zero–order release kinetics the release rate data ar e fitted to the following equation.

$$F = K_o t$$

Where, 'F' is the drug release at time't', and 'Ko' is the zero order release rate constant. The plot of % drug release versus time is linear.

First order release rate kinetics: The release rate data are fitted to the following equation

$$\text{Log } (100\text{-}F) = kt$$

A plot of log cumulative percent of drug remaining to be released vs. time is plotted then it gives first order release.

Higuchi release model: To study the Higuchi release kinetics, the release rate data were fitted to the following equation.

$$F = k\ t1/2$$

Where, 'k' is the Higuchi constant.
In higuchi model, a plot of % drug release versus square root of time is linear.

Korsmeyer and Peppas release model:
The mechanism of drug release was evaluated by plotting the log percentage of drug released versus log time according to Korsmeyer- Peppas equation. The exponent 'n' indicates the mechanism of drug release calculated through the slope of the straight Line.

$$Mt/\ M\infty = K\ tn$$

Where, $Mt/\ M\infty$ is fraction of drug released at time 't', k represents a constant, and 'n' is the diffusional exponent, which characterizes the type of release mechanism during the dissolution process. For non-Fickian release, the value of n falls between 0.5 and 1.0; while in case of Fickian diffusion, n = 0.5; for zero-order release (case I I transport), n=1; and for supercase II transport, n > 1. In this model, a plot of log ($Mt/\ M\infty$) versus log (time) is linear.

Hixson-Crowell release model:

$$(100\text{-}Qt)1/3 = 1001/3 – KHC.t$$

Where, k is the Hixson-Crowell rate constant.

Hixson-Crowell model describes the release of drugs from an insoluble matrix through mainly erosion. (Where there is a change in surface area and diameter of particles or tablets.

4 RESULTS AND DISCUSSIONS

4.1 Scanning of drug

Voriconazole pure drug was scanned in methanol between 200 nm and 400 nm using ultraviolet spectrophotometer. Voriconazolewas identified by its light absorption pattern which follows the absorption of light in the range 220 to 400 nm and a maximum absorbance at about 250 nm. A broad shoulder at about 250 nm was observed which confirm the presence of Voriconazole.

Voriconazolegave highest peak at 250 nm and the same was selected for further evaluations

Standard solutions of different concentrations were prepared and their absorbance was measured at 250 nm (Table 13). Calibration curve was plotted against drug concentrations versus absorbance as given in the (Figure.7).

4.2 Characterization of Voriconazole Gel

Since the physical characterization is meant for physical integrity of the dosage form, the results were pooled at one place. Discussion on the results, described for gel formulation under the same heading.

4.3 In-Vitro Drug Permeation Studies

State transversal flux was calculated from the slop of linear portion

In-Vitro Release Studies:

Table- In-vitro cumulative % drug release profile for Voriconazole

Time	Cumulative % drug release								
	F_1	F_2	F_3	**F_4**	F_5	F_6	F_7	F_8	F_9
0	0	0	0	0	0	0	0	0	0
30min	13.56	18.5	11.09	18.09	12.39	12.01	10.21	3.11	5.54
1hr	24.55	33.52	19.26	32.51	22.21	17.09	20.62	7.15	12.17
2hr	31.86	35.3	25.21	37.42	26.22	25.31	30.72	14.21	24.58
3hr	34.22	40.52	31.71	46.42	32.09	29.69	33.32	27.54	33.19
4hr	39.26	45.81	35.21	50.31	35.21	31.03	37.29	35.45	39.79
5hr	41.62	55.32	39.05	56.51	38.02	33.61	40.25	45.21	48.69
6hr	44.72	59.5	45.02	59.41	43.3	35.3	44.91	53.77	52.75
7hr	49.25	62.32	49.05	61.21	47.31	41.65	52.41	59.34	61.38
8hr	53.45	66.92	55.51	65.72	49.85	43.32	57.86	66.73	67.54
9hr	60.53	70.07	59.37	72.46	55.31	47.32	59.92	77.69	75.28
10hr	67.02	75.41	68.42	78.32	65.21	51.09	62.59	85.54	79.19
11hr	73.52	79.2	71.31	85.31	69.71	56.31	65.43	91.15	81.14
12hr	76.89	82.41	74.62	87.42	73.09	65.21	67.19	95.49	86.68

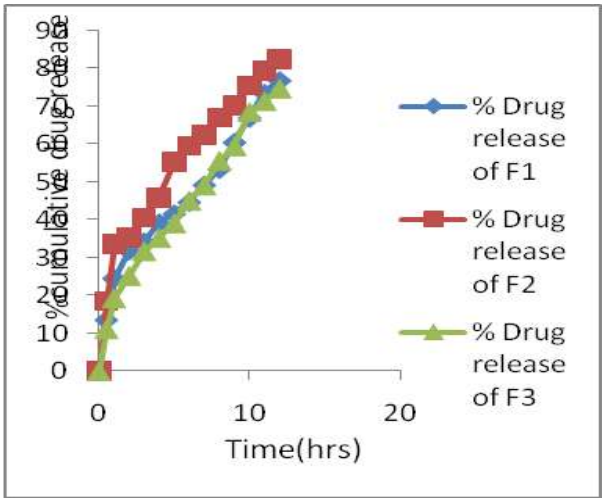

Fig. 1 Dissolution graphs for the formulations F1,F2,F3

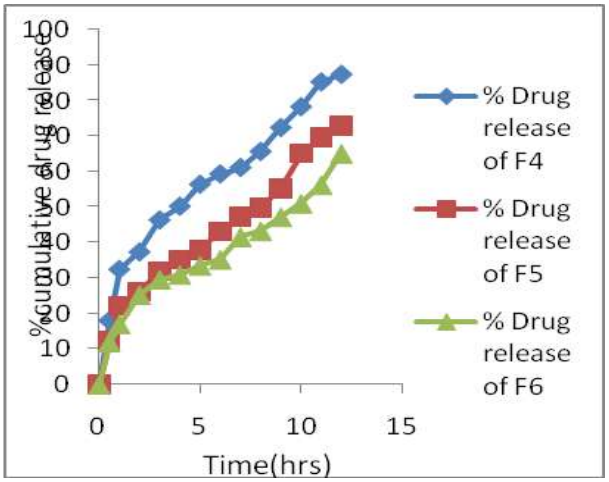

Fig. 2 Dissolution graphs for the formulations F4,F5,F6

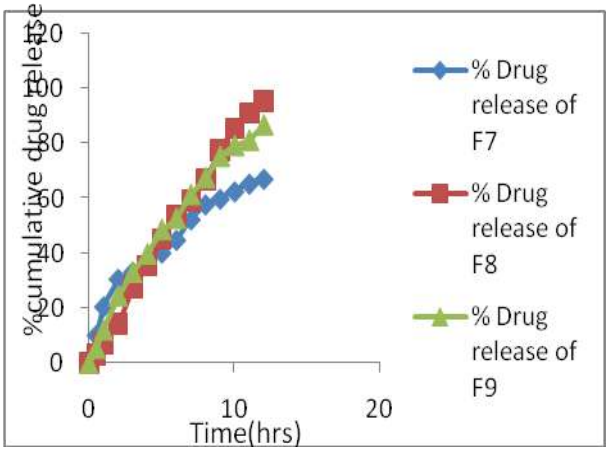

Fig. 3 Dissolution graphs for the formulations F7,F8,F9 7.8 Release

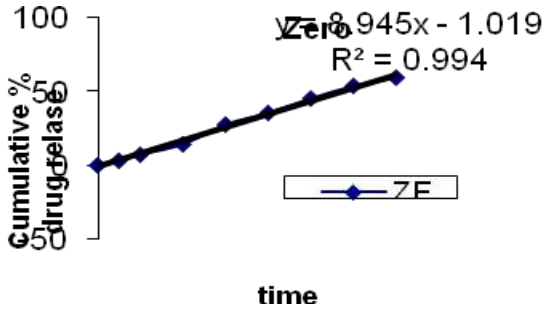

Fig: 4 kinetic model Zero order

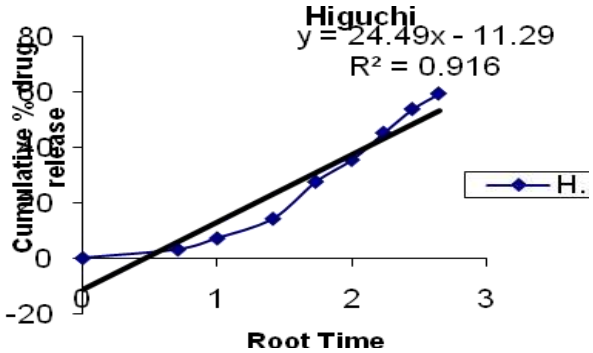

Fig. 5 kinetic model-higuchi

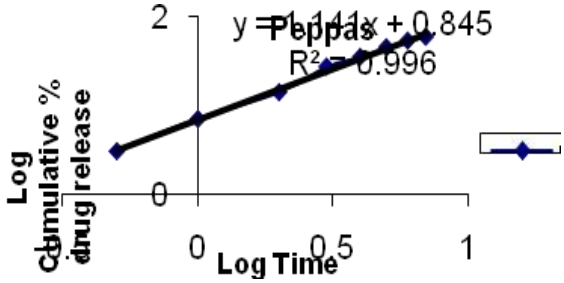

Fig : 6 kinetic model-peppas

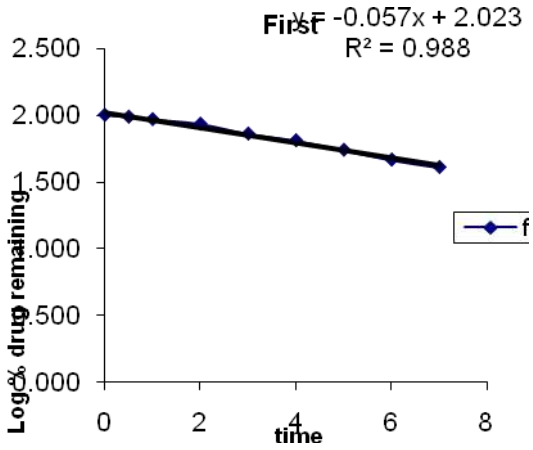

Fig. 7 kinetic model First order

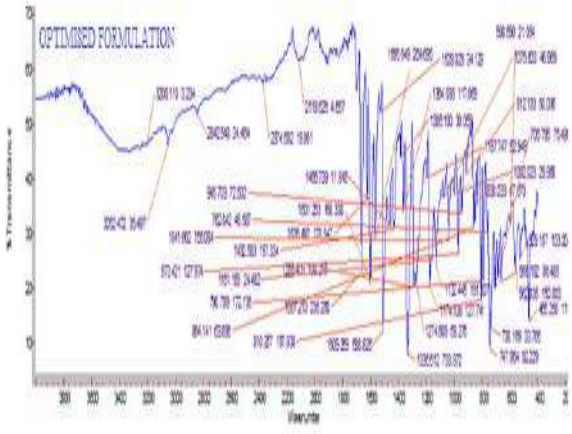

Fig. 8 FTIR spectrum of optimized formulation

5 CONCLUSIONS

In the present work an attempt was being made to formulate and evaluate transdermal gel containing anti fungal drug Voriconazole. Carbopol 971, Sodium CMC and carbopol 934 were selected as polymers.The drug and excipient compatability was studied by using FTIR Nine formulations of gels were prepared by taking different quantities of polymersThe prepared gel was subjected to various evaluation tests like pH, spreadability, viscosity, content uniformity and diffusion studies conducted upto 12hrs.All the results were with in the limits , by diffusion studies it was observed that formulation F8 shown maximum drug release of 95.49% which was considered as optimized formulation.

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A MULTI_LAYER SECURE PROTECTIVE CLOUD STORAGE SCHEME SUPPORTED PROCESS INTELLIGENCE IN FOG COMPUTING

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Abstract - Recent years witness the event of cloud computing technology. With the explosive growth of unstructured data, cloud storage technology gets loads of attention and better development. However, in current storage schema, user's data is totally held on in cloud servers. In different words, users lose their right of management on data and face privacy escape risk. Ancient privacy protection schemes unit usually supported secret writing technology, but these kinds of methods cannot effectively resist attack from the at intervals of cloud server. therefore, on resolve this draw back, we have a tendency to tend to propose a three-layer storage framework supported fog computing. The projected framework can every take full advantage of cloud storage and defend the privacy of knowledge. Besides, Hash-Solomon code formula is supposed to divide data into whole totally different parts. Then, we are going to place a little a district of knowledge in native machine and fog server therefore on safeguard the privacy. Moreover, supported machine intelligence, this formula can calculate the distribution proportion hold on in cloud, fog, and native machine, severally. Through the theoretical safety analysis and experimental analysis, the usefulness of our theme has been valid, that's fully a powerful supplement to existing cloud storage theme.
Key words: - Evolutionary algorithm, Service Rating Software as a service, Service utility.

1 INTRODUCTION

Cloud computing is that the use of computing resources (hardware and software) that square measure delivered as a service over a network (typically the Internet). The name comes from the common use of a cloud-shaped image as associate degree abstraction for the advanced infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's information, software package and computation. Cloud computing consists of hardware and software package resources created obtainable on the web as managed third-party services. These services usually give access to advanced software package applications and high-end networks of server computers.

1.1 Characteristics and Services Models:

The salient characteristics of cloud computing supported the definitions provided by the National Institute of Standards and language (NIST) unit of measurement created public below:

- **On-demand self-service:** a consumer can unilaterally provision computing capabilities, like server time and network storage, professional re nata automatically whereas not requiring human interaction with each service's provider.
- **Broad network access:** Capabilities unit of measurement procurable over the network and accessed through customary mechanisms that promote use by heterogeneous skinny or thick shopper platforms (e.g., mobile phones, laptops, and PDAs).
- **Resource pooling:** The provider's computing resources unit of measurement pooled to serve multiple shoppers using a multi-tenant model, with utterly totally different physical and virtual resources dynamically appointed and reassigned keep with shopper demand. there's how of location-independence in this the consumer generally has no management or data over the precise

location of the provided resources but may even be ready to specify location at future level of abstraction (e.g., country, state, or data center). samples of resources embrace storage, processing, memory, network system of measurement, and virtual machines.

- **Rapid elasticity:** Capabilities are usually quickly and elastically provisioned, in some cases automatically, to quickly scale out and quickly liberal to quickly scale in. To the client, the capabilities procurable for provisioning generally appear to be unlimited and should be purchased in any quantity at any time.
- **Measured service:** Cloud systems automatically management and optimize resource use by leverage a metering capability at some level of abstraction acceptable to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage are usually managed, controlled, and reportable providing transparency for every the provider and shopper of the used service.

1.2 Services Models:

Cloud Computing contains three utterly totally different service models, specifically Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). the three service models or layer unit of measurement completed by associate user layer that encapsulates the highest user perspective on cloud services. The model is shown in figure below. If a cloud user accesses services on the infrastructure layer, as AN example, she is going to be ready to run her own applications on the resources of a cloud infrastructure and keep answerable for the support, maintenance, and security of these applications herself. If she accesses a service on the applying layer, these tasks unit of measurement ordinarily taken care of by the cloud service provider.

1.3 Advantages:

1. **Price:** buy beneath the resources used.
2. **Security:** Cloud instances unit of measurement isolated inside the network from totally different instances for improved security.
3. **Performance:** Instances are usually superimposed instantly for improved performance. purchasers have access to the total resources of the Cloud's core hardware.
4. **Scalability:** Auto-deploy cloud instances once needed.
5. **Uptime:** Uses multiple servers for Georgia home boy redundancies. simply just in case of server failure, instances are usually automatically created on another server.
6. **Control:** able to login from any location. Server picture and a package package library permits you to deploy custom instances.
7. **Traffic:** Deals with spike in traffic with quick activity of more instances to handle the load.

2 RELATED WORK

1) Security and Privacy in Fog Computing: Challenges

AUTHORS: Lei Shu , X. Leandros Maglaras. Mithun Mukherjee

Fog computing paradigm extends the storage, networking, and computing facilities of the cloud computing towards the sting of the networks whereas offloading the cloud information centers and reducing service latency to the highest users. However, the characteristics of fog computing arise new security and privacy challenges. this security and privacy measurements for cloud computing can't be directly applied to the fog computing as a result of its choices like quality, heterogeneity, large-scale geo-distribution. this text provides an overview of existing security and privacy concerns, considerably for the fog computing. Afterward, this survey highlights current endeavor, open challenges, and analysis trends in privacy and security issues for fog computing.

2) Security and Privacy-Preserving in Edge Computing Paradigm: Survey and Open Issues

- **AUTHORS:** Jiale Zhang, Bing Chen, Yanchao Zhao, Xiang Cheng, Feng hu

With the explosive growth of net of Things devices and massive info created at the sting of the network, the traditional centralized cloud computing model has come to a bottleneck as a result of the knowledge live limitation and resources constraint. Therefore, edge computing, that permits storing and method info at the sting of the network, has emerged as a promising technology in recent years. However, the distinctive choices of edge computing, like content perception, fundamental quantity computing, and parallel processing, has collectively introduced several new challenges among the sector of data security and privacy-preserving, that are the key concerns of the other prevailing computing paradigms, like cloud computing, mobile cloud computing, and fog computing. Despites its importance, there still lacks a survey on the recent analysis advance of data security and privacy-preserving among the sector of edge computing. throughout this paper, we've a bent to gift a comprehensive analysis of the knowledge security and privacy threats, protection technologies, and countermeasures inherent in edge computing. Specifically, we've a bent to first produce an overview of edge computing, in conjunction with forming factors, definition, design, and variety of different essential applications. Next, an in depth analysis of data security and privacy desires, challenges, and mechanisms in edge computing area unit given. Then, the cryptography-based technologies for determination info security and privacy issues area unit summarized. The progressive info security and privacy solutions in edge-related paradigms are surveyed. Finally, we've a bent to propose several open analysis directions of data security among the sector of edge computing.

3) Fog computing security: a review of current applications and security solutions

- **AUTHORS:** Saad Khan, Simon Parkinson, Yongrui Qin

Fog computing could also be a replacement paradigm that extends the Cloud platform model by providing computing resources on the perimeters of a network. It are typically described as a cloud-like platform having similar information, computation, storage and application services, but is largely utterly completely different during this it's localised. in addition, Fog systems area unit capable of method big amounts of data domestically, operate on-premise, area unit wholly mobile, and could be place in on heterogeneous hardware. These choices produce the Fog platform extraordinarily applicable for time and location-sensitive applications. as associate example, internet of Things (IoT) devices area unit required to quickly technique associate outsized amount of data. This wide selection of utility driven applications intensifies many security issues regarding information, virtualization, segregation, network, malware and observance. This paper surveys existing literature on Fog computing applications to identify common security gaps. Similar technologies like Edge computing, Cloudlets and Micro-data centres have collectively been closed to provide a holistic review technique. the majority of Fog applications area unit driven by the requirement for utility and end-user desires, whereas the security aspects area unit sometimes unobserved or thought-about as Associate in Nursing afterthought. This paper collectively determines the impact of those security issues and realizable solutions, providing future security-relevant directions to those in command of turning out with, developing, and maintaining Fog systems.

3 PROPOSED MODEL

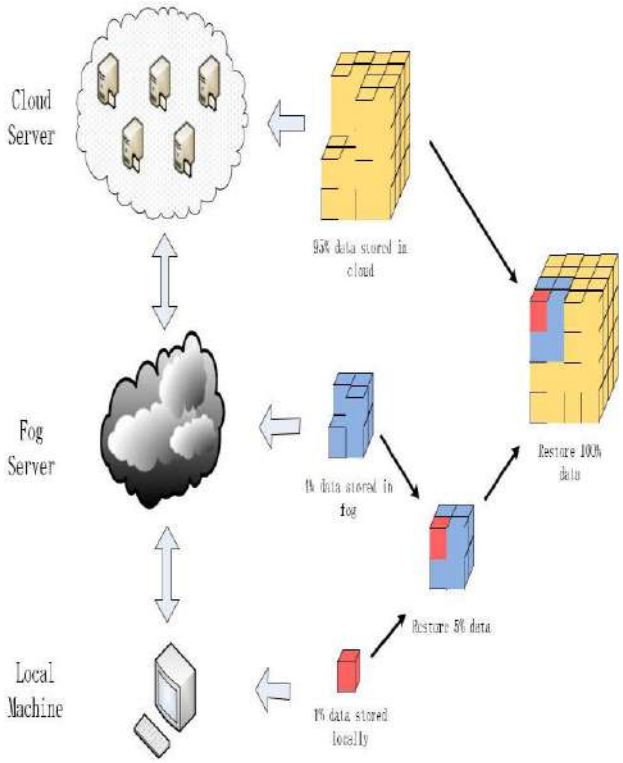
- We propose a three-layer storage framework supported fog computing.
- The projected framework will each take full advantage of cloud storage and shield the privacy of information.
- Besides, Hash-Solomon code formula is intended to divide information into totally different components. Then, we are able to place alittle a part of information in native machine and fog server so as to safeguard the privacy.

- Moreover, supported process intelligence, this formula will work out the distribution proportion hold on in cloud, fog, and native machine, severally.
- The introduction of fog computing will relief the cloud computing layer, up the work potency.

3.1 Advantages of projected system:

- Users do have full management of their hold on information.
- The CSP (Cloud service provider) or attackers cant access hold on information within the cloud, with the protection of 3 layer security system

Introduced TLS make sure the original information can't be recovered by partial information



4 MULTI-LAYER SECURE CLOUD COMPUTING

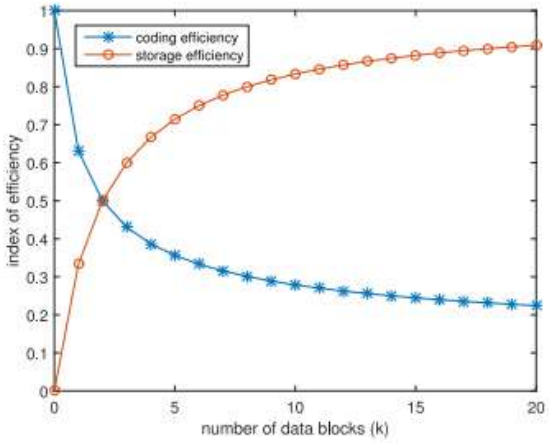
In order to safeguard user's privacy, we have a tendency to propose a TLS framework supported fog computing model. The TSL framework will offer user an explicit power of management and effectively defend user's privacy. As mentioned, the inside attack is troublesome to resist. ancient approaches work well in finding outside attack, however once CSP itself has issues, ancient ways in which ar all invalid. totally different from the normal approaches, in our theme, user's knowledge is split into 3 different-size components with secret writing technology. every of them can lack a vicinity of key info for confidentiality. Combining with the fog computing model, the 3 components of information are going to be keep within the cloud server, the fog server and user's native machine consistent with the order from giant to tiny. By this technique, the offender cannot recover the user's original knowledge even though he gets all the information from an explicit server. As for the CSP, they additionally cannot get any helpful info while not the information keep within the fog server and native machine as a result of each of the fog server and native machine ar controlled by users

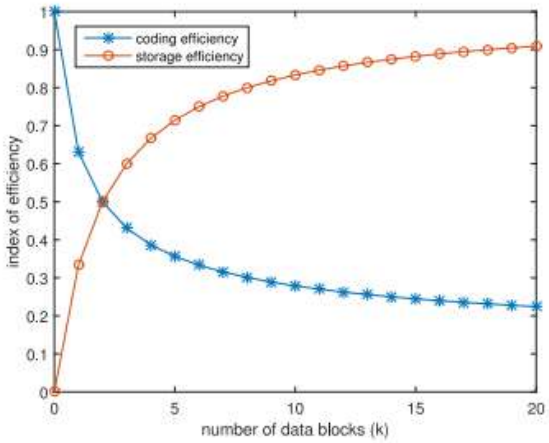
$$\frac{m}{k+m} \leq \frac{k+m}{k} * r$$

$$k = \frac{(m - 2mr) + \sqrt{(2mr - m)^2 - 4m^2r^2}}{2r}$$

CRACKING DIFFICULTY DEGREE

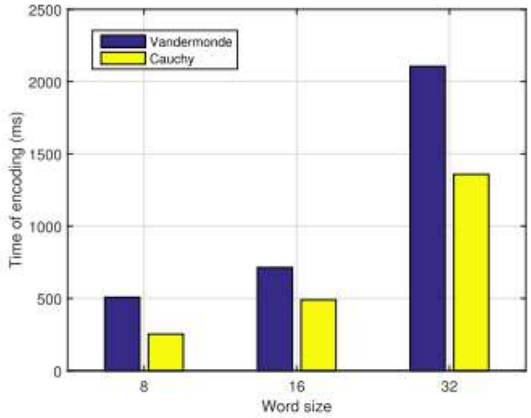
Galois Field	m	k	Times of exhaustion
$GF(2^4)$	1	6	256^3
$GF(2^4)$	2	6	256^6
$GF(2^8)$	1	6	256^6
$GF(2^8)$	2	6	256^{12}
$GF(2^{16})$	1	6	256^{12}
$GF(2^{16})$	2	6	256^{14}





5 EXPERIMENT RESULTS

In this section, we have a tendency to valuate the performance and practicableness of the TLS framework supported fog computing model through a series of tests, as well as coding, decipherment and check of various sizes of knowledge.



6 CONCLUSIONS

In this section, we've got a bent to evaluate the performance and usefulness of the TLS framework supported fog computing model through a series of tests, still as secret writing, coding and check of varied sizes of data.

The development of cloud computing brings us of America a lot of benefits. Cloud storage could also be a convenient technology that helps users to expand their storage capability. However, cloud storage to boot causes a series of secure problems. once victimization cloud storage, users don't very management the physical storage of their info and it results in the separation of possession and management of data. therefore on resolve the matter of privacy protection in cloud storage, we've got a bent to propose a TLS framework supported fog computing model and magnificence a Hash-Solomon formula. Through the theoretical safety analysis, the theme is tested to be attainable. By allocating the relation of data blocks confine many servers moderately, we are going to certify the privacy of data in each server. On another hand, cracking the secret writing matrix isn't attainable in theory. Besides, victimization hash transformation can defend the fractional information. Through the experiment check, this theme can potency} complete secret writing and coding whereas not influence of the cloud storage potency. what's additional, we've got a bent to vogue a reasonable comprehensive efficiency index, therefore on understand the foremost efficiency, which we have a tendency to to boot notice that the Cauchy matrix is further economical in cryptography technique.

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STUDY ON MECHANICAL PROPERTIES OF HYBRID NANO COMPOSITE MODIFIED WITH POLYETHYLENE GLYCOL

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Abstract - The effect of reactive (Polyethylene Glycol) diluents on mechanical properties of Epoxy (DEGBA)/Nano clay/Pineapple fiber nano composite is observed in the study. The mechanical properties of nano hybrid composite modified with PEG at different weight percent were investigated using tensile test and hardness test. The weight percent of pineapple added in the preparation of sample was 2.5%, 5%, 7.5%, 10% and the weight percent of nano clay added was kept constant at 5%. The test specimen samples were made as per the ASTM D638 standard. The tensile strength of 73.110MPA was recorded with 7.5 weight percentage of fiber which is the highest strength observed, further addition of fiber decreases the strength. A minor variation of tensile strength observed in Epoxy/Pineapple and Epoxy/Pineapple/PEG when compared to neat Epoxy. The hardness values increased up to 5% for Epoxy/Pineapple, increased up to 10% for Epoxy/Pineapple/PEG and increased up to 25% for Epoxy/Pineapple/PEG/Nano clay when compared to neat Epoxy. The specimen with highest tensile and hardness were analyzed in FTIR (Fourier Transformation Infrared Spectroscopy). Presence of functional group analyzed by FTIR (Fourier Transformation Infrared Spectroscopy). It is observed that the reduction in intensity of OH group peak of Epoxy/Pineapple/PEG/Nano clay indicates the decrease in proportion of hemicelluloses, lignin, pectin, wax and oil covering materials. Epoxy/Pineapple composites due to poor compatibility between non-polar matrix and natural fiber which reflects in the poor fiber/matrix bond and insufficient stress transfer from matrix to fiber. The compatibility increased after addition of PEG as diluents and Nano clay-hydrophilic bentonite as another filler material.
Keywords: DEGBA, Nano clay (hydrophilic bentonite), pineapple fiber.

1 INTRODUCTION

The main focus is to study the tensile and hardness behavior of pineapple fiber which are biodegradable, eco-friendly, cost effective, having high corrosion resistance and suitable for several applications. Composite market of United States has been recorded 2.7–2.8 billion pounds from 2006 to 2007. On the basis of compound annual growth rate of 3.3%, it is estimated to cross over 3.3 billion pounds [1,2]. Composites are not only used for their structural properties, but also for electrical, thermal and environmental applications. Now-a-days industries are more inclined towards biodegradable and eco-friendly polymer composites for reasons such as low cost and minimal health hazards. Epoxies are thermosetting polymer resins where the resin molecule contains one or more or more epoxide groups. There are two primary types of epoxies: glycidyl epoxy and non-glycidyl epoxy. Glycidyl epoxy resins can be further defined as either glycidyl-amine, glycidyl-ester prglycidyl-ether [3-7].

It has investigated that results of the synthesized Nano composites where the addition of 5wt% of Nano clay obtained good results in comparison to other percentage of Nano clay and if wt.% of Nano clay is more than 5wt% in composite it become brittle material and also very hard to prepare composite [8,9]. It is stated that the mechanical properties of the hybrid composites increased with increase in Nano clay loading up to 5wt% and decreased for further loading. The increase in properties was attributed to the good dispersion of Nano clay in epoxy resin system [10-12]. It is observed that addition small quantity will contribute to the modulus of nanocomposite, that pure polyester composite fails under a brittle mode; whereas the nanocomposite fails at a ductile mode [13]. The pineapple leaf fiber is one of the

natural fibers, having highest cellulosic content nearly 80% while Young's modulus shows highest tensile strength when compared to other natural fiber which are suitable for the application as building and construction materials, automotive components and furniture [14,15]. Nano clays have been used in many applications and their uses are depending on their structural and physical characteristics. An interesting concern, along with the studies addressing how Nano clays change the behavior of polymeric materials, is to discover more about Nano clays [16,17]. The study of lingo cellulosic fibers tells that, these fibers can be used in automotive applications; they can be perfect competitors for the non-renewable, which is of higher petroleum-based synthetic fibers in composite materials. Optimal amount of Nano clay should not exceed 5 wt. % and also retrieved that the addition of Nano clay can bridge up the voids to avoid the formation of crack due to the interlocking effect [18]. Produced hybrid polymer Nano composites exhibited an intercalated and/or exfoliated structure, which promoted improved thermal stability and mechanical properties compared with pure polymer. The formatter will need to create these components, incorporating the applicable criteria that follow [19]. Fatty acid and methyl esters as reactive diluents proposed Transesterification with the hydroxyl groups in the polyester resin. The stoichiometry between the hydroxyl groups in the polyester resin and the cross-linker must be adjusted to allow the cross linking to occur [20]. Reactive diluents for free radical based UV-curing systems are usually acrylic or methacrylic monomers can be added to reduce the viscosity of precured liquid oligomer and modify the property of final cured solid film. Generally, mono-functional reactive diluents lead to decreased modulus and increased ductility, whereas di- and multi-functional reactive diluents leads to the opposite effect and it was found that high degree of functionality leads to higher reaction rate and higher degree of crosslink density [21,22]. Triethyleneglycol-dimethacrylate (TEGDMA) have been widely used with bisphenol-A-glycidyl-dimethacrylate (Bis-GMA) to achieve the appropriate viscosity and higher conversion. One of the dis advantage is the increased volumetric shrinkage with the incorporation of TEGDMA because of its higher molar double bond concentration and increased ultimate conversion of Bis-GMA/TEGDMA [23,24]. The newly synthesized oil-modified acrylic monomers have shown excellent compatibility with a wide variety of conventional and modified alkyd resins [25]. polyethylene glycol (PEG) with the molecular weight of 4000 g/mol (PEG-4000) is use to modify the epoxy system of diglycidyl ether of bisphenol A (DGEBA)/methyl tetra hydrophthalic anhydride (MeTHPA) which is employed for enhancing their cryogenic tensile strength, ductility and impact resistance [26].

2 EXPERIMENTAL

Lapox L12 resin (DGEBA) with viscosity 9000-12000 mPa.s at 25^0C with hardner k-6 (TETA) , viscosity 5-10 mPa.s with density 0.95-1.1 gram/cm^3 at 20^0C were used as base material supplied by ATUL INDIA LTD. It is a stable liquid under the normal conditions of storage and can be decomposed at elevated temperatures. The polyethylene glycol PEG (400) with average molecular weight of 380-420 g/mol having viscosity 90 mPa.s at 25^0C were used to modify the epoxy resin system. The pineapple leaf fiber having highest cellulose content nearly 80% shows the highest tensile strength compared to other natural fiber. Nano clay – Hydrophylic bentonite with bulk density 779 kg/m^3 with average particle size < 25µm were supplied by SIGMA ALDRICH BENGALURU, INDIA used in above experimental investigation shows in Fig. 1(a) & (b)

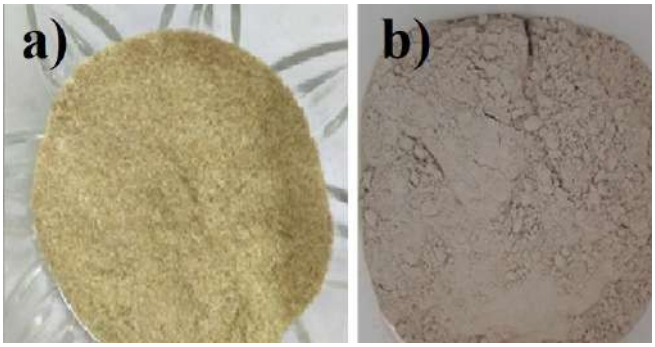


Fig.1(a) Shows powdered pineapple fiber (b) shows powdered hydrophilic bentonite.

A. Fabrication process

In this work mixing of resin and hardener to the system at (12:1) ratio by weight has been prepared. Samples of varying wt.% (2.5,5,7.5,10) of fiber and PEG with constant wt.% (5) of Nano clay has been taken into consideration. Mixtures by done by electrical stirrer with maximum speed of 3000rpm. Vacuum desiccators are used to remove entrapped air after stirring. The curing of samples was done at 120oc temperature for 30mins as per the TDS of epoxy resin. The code of prepared samples are represented in the Table I.

Table I. Sample Preparation

Sample name	Sample with varying wt.% of fiber, diluent and Nano clay				
	Resin (Wt.%)	Hardener (Wt.%)	Fiber (Wt.%)	PEG (Wt.%)	Nano clay (Wt.%)
NE	100	8.5	0	0	0
EPINE	100	8.5	2.5	0	0
	100	8.5	5	0	0
	100	8.5	7.5	0	0
	100	8.5	10	0	0
EPINE/PEG	100	8.5	2.5	2.5	0
	100	8.5	5	5	0
	100	8.5	7.5	7.5	0
	100	8.5	10	10	0
EPINE/PEG/NC	100	8.5	2.5	2.5	5
	100	8.5	5	5	5
	100	8.5	7.5	7.5	5
	100	8.5	10	10	5

B. Characterization

Experimental investigation of epoxy resin modified with PEG was done by mechanical (tensile & hardness) characterization of cured epoxy system. The dog bone tensile specimen of epoxy resin system has been prepared as ASTM D-638(type V) and tested under UTM (model 5969 with 50 kN load cell, INSTRON, USA) with cross head speed of 1mm/min.

Micro hardness test sample were prepared according to ASTM E384 where load is applied and must be controlled to get accurate result. Two impressions of diagonals were measured after the load was removed. Vickers hardness(HV) was calculated using equation(1)

$$HV=1854.4L/d^2 \quad (1)$$

Where L is the load in gf and d is the average diagonal distance in μm.

3 RESULTS AND DISCUSSIONS

A. Equilibrium swelling ratio

The effect of adding pineapple fiber, reactive diluent (PEG) and Nano clay was observed from the equilibrium swelling ratio. Cross linking density of epoxy/resin system was measured and described by the technique used by Barikani and Hepburn [27]. The specimens of approximate (10 mm X 10 mm X 2 mm) were

prepared and test was carried out in controlled conditions. The solvent Ethanol used for the test was chosen due to its easy interaction capability with amine and hydroxyl group of epoxy hardener system. It was observed from the above test that the swelling is more in case of neat epoxy compare to all other sample which is due to more absorption of ethanol [28]. In every 8 h the weight of the specimen were measured and equilibrium swelling ratio results were calculated using the equation (2). The above results are shown in the Fig. 2.

$$ESR=(m_2- m_1)/m_1 * 100 \quad (2)$$

Where m_1 and m_2 are the weight of samples respectively before and after swelling.

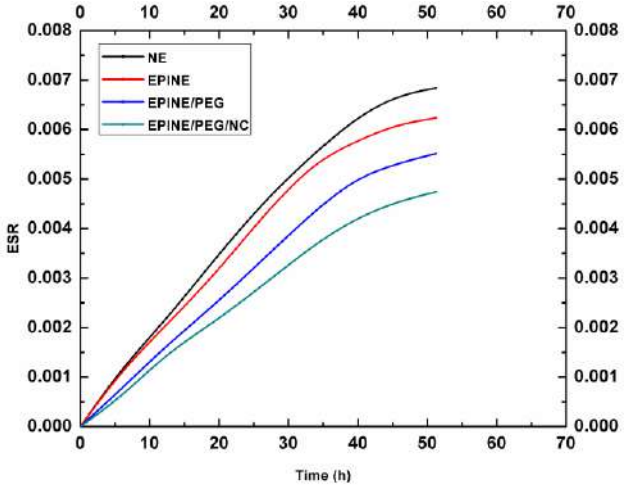


Fig.2 Variation in equilibrium swelling ratio with time

Epoxy resin containing pineapple fiber swells less in some percentage compare to neat epoxy due to more cross linking density, epoxy containing pineapple fiber and PEG has lower and epoxy system containing Nano clay with fiber and diluent shows lowest increment in swelling. Degree of swelling (amount of solvent assimilate) which is very much dependent upon the cross linking density of epoxy system. The depletion in cross linking density in case of EPINE and EPINE/PEG system with 7.5 wt.% of fiber shows the highest cross linking density due to generation of less free volume where addition of Nano clay with 5 wt.% shows the highest cross linking density. The excess amount of pineapple fiber and PEG were not capable to interact with epoxy system and settled with the space between reaction sites which decreases the cross linking density.

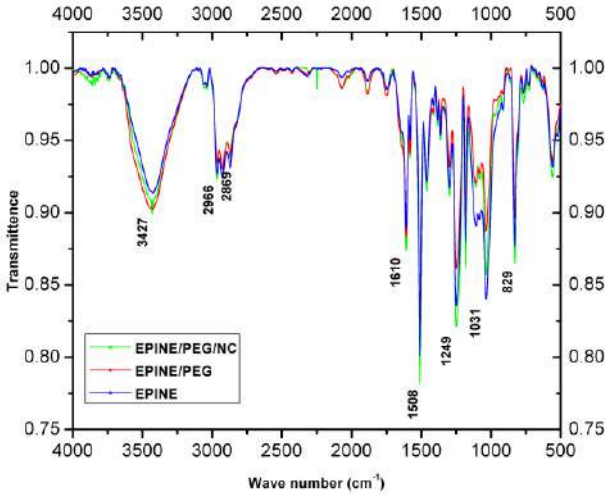


Fig.3. FTIR spectra with various wt% of PEG, fiber and Nano clay in the epoxy system.

Fourier transform infrared spectroscopy (FTIR) analysis was conducted to explain the effect of pineapple fiber, PEG and Nano clay. It has been observed that all characteristics peaks of three combinations fall within the same wavelength ranges with reflect that they are of similar chemical constituents. Very few differences were observed in addition of PEG and Nano clay. Intensity at 3427 cm-1, 2966-2869 cm-1 indicates presence of –OH and C-H stretching of epoxy resin with medium bond strength where 1508-1610cm-1 indicates the presence of amine group N-H group [29]. The peak at 1031 cm-1 and 1249 cm-1 shows the strong bend with C-N stretching. 829 cm-1 shows the C-H aromatic stretching. The strong intensity of has been found in EPINE/PEG/Nano clay system which is mainly attributed to the formation of effective cross linking density. These results indicated that the Nano clay has strongly integrated with epoxy and fiber.

B. Mechanical properties

Tensile properties: The stress-strain curve of NE, epoxy/pineapple with 7.5 wt.% of fiber, epoxy/pineapple/ PEG with 7.5 wt.% of fiber and diluents and epoxy/ Pineapple/PEG/Nano clay with 7.5 wt.% of fiber and diluents and constant 5 wt.% of Nano clay is shown in Fig. 4. The tensile strength ( ) and tensile modulus (E) of the neat epoxy and other fiber and diluents wt. % system were obtained from stress-strain curve are shown in Fig. 5 (a)&(b) The tensile strength of neat epoxy system has been observed to be 75.43±3.51 MPa.

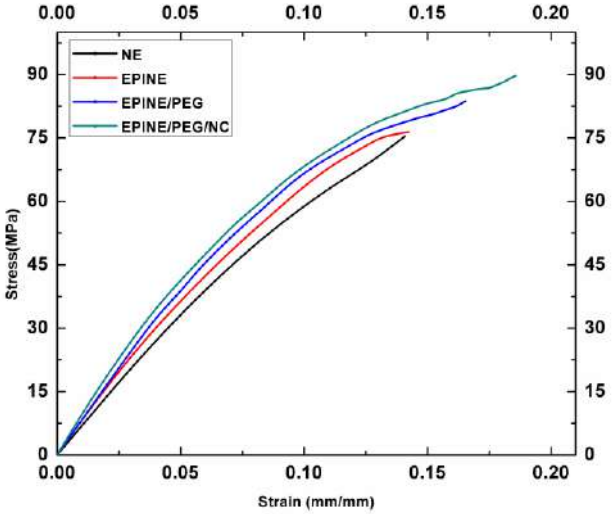


Fig.4.Stress-strain plot for various wt% of PEG, fiber and Nano clay in the epoxy system.

It was obtained that the tensile strength of epoxy/ pineapple with 7.5 wt.% of fiber has the highest value of strength comparing 2.5, 5, 7.5, 10 wt.% of fiber. The highest value of strength observed was 76.43±3.91 MPa which is almost 1.32 % of enhancement compare to neat epoxy. Incorporation of PEG in the above system results in more number of flexible chain networks which reduces stresses in the system and increases the tensile strength.

Table II. Tensile Properties

Sample code	Tensile properties of various concentration of PEG				
	Fiber (wt%)	PEG (wt%)	Nanoclay (wt%)	Tensile strength (MPa)	Tensile Modulus (GPa)
NE	0	0	0	75.4±3.5	3.1± 0.4
EPINE	2.5	0	0	75.4±5.2	3.0± 0.3
	5	0	0	75.9±3.5	3.1± 0.1
	7.5	0	0	76.4±3.9	3.4± 0.4
	10	0	0	75.4±4.5	3.3± 0.2

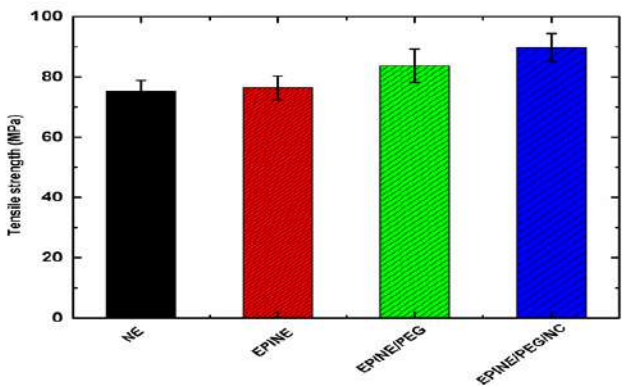
EPINE/PEG	2.5 5 7.5 10	2.5 5 7.5 10	0 0 0 0	77.4±3.2 79.4±3.9 83.7±5.5 78.4±4.5	3.2± 0.5 3.3± 0.7 3.7± 0.8 3.2± 0.4
EPINE/PEG/NC	2.5 5 7.5 10	2.5 5 7.5 10	5 5 5 5	82.4±5.5 85.6±4.0 89.7±4.7 87.4±3.5	3.4± 0.5 3.6± 0.7 4.0± 0.7 3.8± 0.8

NE= Neat Epoxy, EPINE= Epoxy-pineapple, PEG=Poly ethylene Glycol
NC= Nano Clay

The tensile strength of 83.73±5.56 MPa has been recorded at 7.5 wt.% of PEG in epoxy/pineapple/PEG system which is again enhancement of almost 11% compare to neat epoxy. Highest tensile strength of almost 18.9% enhancement compare to neat epoxy was obtained in addition of Nano clay shows 89.73±4.71 MPa with 7.5wt% of fiber, PEG and constant wt% i.e. 5% of Nano clay. These enhancements are attributed to the dispersion of Nano clay and the interfacial adhesion between the epoxy matrix and Nano clay so that the mobility of chain matrix is restricted under the loading [30].

Table III Hardness Properties

Sample Code	**Hardness of epoxy resin system modified by PEG**			
	Fiber (Wt.%)	**PEG (Wt.%)**	**Nano clay (Wt.%)**	**Micro-hardness (HV)**
NE	0	0	0	21.28±0.51
EPINE	2.5 5 7.5 10	0 0 0 0	0 0 0 0	20.07± 0.51 20.13± 0.34 22.27± 0.42 21.39± 0.53
EPINE/PEG	2.5 5 7.5 10	2.5 5 7.5 10	0 0 0 0	21.15± 0.43 22.12± 0.58 23.46± 0.61 21.46± 0.54
EPINE/PEG/NC	2.5 5 7.5 10	2.5 5 7.5 10	5 5 5 5	21.29± 0.71 22.79± 0.81 26.51± 0.46 24.73± 0.59



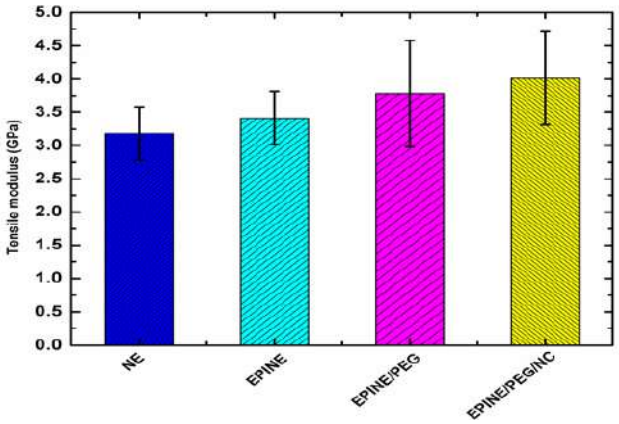


Fig.5 (a) Variation in tensile strength (b) Tensile modulus for various epoxy system.

Hardness: The differences of hardness of neat epoxy and other three systems is shown in figure. The hardness of neat epoxy has been observed 21.28±0.51 HV. It was obtained that increasing wt.% fiber and PEG gradually increases the hardness up to 7.5wt%which is 10 % of neat epoxy shown in Fig 6.

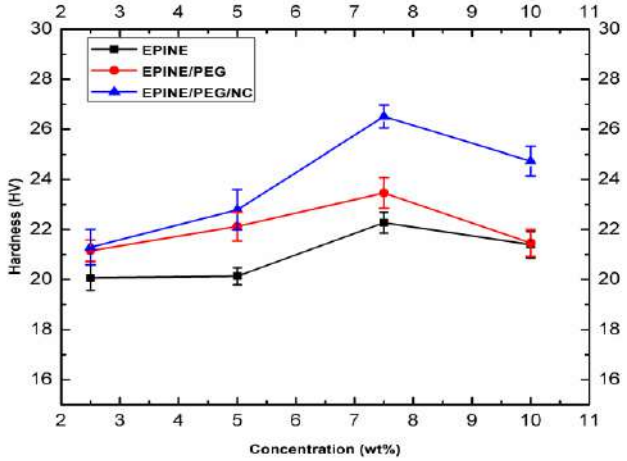


Fig.6. Hardness properties with various wt% of PEG, fiber and Nano clay in the epoxy system

This hardness value further increases with addition of Nano clay with 5wt% and shows almost 25 % of enhancement with 26.5 HV then it showed gradual decrease in trend shown in Fig 7. Addition of fiber, PEG, Nano clay enhances cross linking density due to formation of block co-polymer, which increases the hardness values of the epoxy systems. Further increase in wt.% of fiber, PEG increases total free volume in the epoxy system which decreases the hardness value.

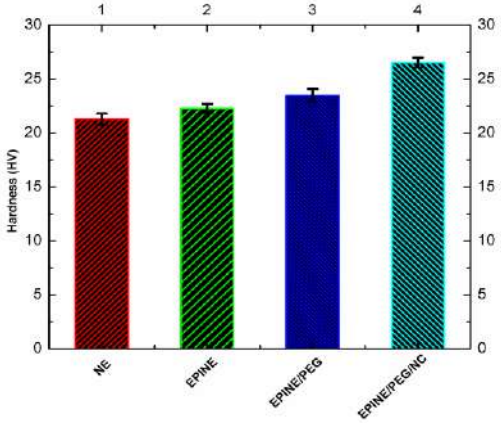


Fig.7. Variation in micro hardness(HV) for epoxy system

4 CONCLUSION

In this work, variation in mechanical properties of Nano hybrid composites modified with reactive diluents (PEG) has been studied. It is observed that addition of PEG in epoxy resin systems enhances covalent bond between the molecules by formation of cross linking chain up to 7.5wt% of PEG where further increase in PEG content reduces the cross link density. The maximum tensile strength of 89.73MPa and hardness value of 26.51HV which is almost 18.9% and 24.57% of enhancement compared to neat epoxy. Moreover, more than 7.5wt% of PEG in the system introduces more amount of free volume in the polymer network. It is found that effective addition of PEG in the composite provides better mechanical properties which can be used in high performance polymeric applications. Authors and Affiliations

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PARAMETRIC ANALYSIS OF SINGLE CELL BOX GIRDER BRIDGE

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Abstract - Box girders bridges are widely used bridge deck system because of cost effective and artistic solutions for over passage, under passage, separation structure and via-ducts found in today's modern highway systems. The behavior of box girder bridges as complex in nature due to non- uniform distribution of stresses in longitudinal and transverse directions.

In this study, analysis of three box girders (single, twin and multi cell) has been carried out using SAP2000 as per (IRC) provisions for rectangular and trapezoidal sections.

The behavior of box girder with uniform depth and varying widths has been discussed. Detailed study is conducted for various parameters like bending moments and shear force using SAP2000. The example box girder is modeled and analyzed in SAP 2000 and the responses are found to be fairly matching with the results reported in literature. For the purpose of the parametric study, the three box girder bridges are modeled in SAP2000. The span length, depth and material property remains unchanged. The only parameter that changes is the width of section. All the models are subjected to self weight and moving load of IRC class A tracked vehicle and IRC class 70R. From the responses it is found that; the parameters like bending moment, shear force and axial force for single cell box girder is small compared to twin and multi-cell box girders.

1. INTRODUCTION

The continuing expansion of highway network throughout the world is largely the result of great increase in traffic, population and extensive growth of metropolitan urban areas. This expansion has led to many changes in the use and development of various kinds of bridges. The bridge type is related to provide maximum efficiency of use of material and construction technique, for particular span, and applications. As Span increases, dead load is an important increasing factor. To reduce the dead load, unnecessary material, which is not utilized to its full capacity, is removed out of section, this Results in the shape of box girder or cellular structures, depending upon whether the shear deformations can be neglected or not. Span range is more for box bridge girder as compare to T-beam Girder Bridge resulting in comparatively lesser number of piers for the same valley width and hence results in economy.

Box girders have gained wide acceptance in freeway and bridge systems due to their structural efficiency, better stability, serviceability, economy of construction and pleasing aesthetics. Analysis and design of box-girder bridges are very complex because of its three dimensional behaviours consisting of torsion, distortion and bending inlongitudinal and transverse directions.

A box girder bridge is a bridge in which the main beams comprise girders in the shape of a hollow box. The box girder normally comprises either pre-stressed concrete, structural steel, or a composite of steel and reinforced concrete. It is typically rectangular or trapezoidal in cross section. Box girder bridges are commonly used for highway flyovers and for modern elevated structures of light rail transport. The box girder can also be part of portal frame bridges, arch bridges, cable-stayed and suspension bridges of all kinds. Box girder decks are cast-in-place units that can be constructed to follow any desired alignment in plan, so that straight, skew and curved bridges of various shapes are common in the highway system. Because of high torsional resistance, a box girder structure is particularly suited to bridges with significant curvature. Box girders can be constructed as single cell, double cell or multi-cell. It may be monolithically constructed with the deck, called closed box girder or the deck can be separately constructed afterwards called open box girder. Or box girders may be rectangular, trapezoidal and circular.

1.1 Historical development of box girder:

The first boxgrider cross section possessed deck slabs that cantilevered out only slightly from the box portion. With the pre-stressed concrete the length of cantilever could be increased. The high form work costs caused a reduction in the number of cells fig (f, g, h). In order to reduce the construction loads to minimum possible extent or to require only one longitudinal girder in working states even with multiple traffic lanes.

It was only with the development of high strength pre-stressing steel that it became possible to span longer distances. The first pre-stressed concrete bridges, most of I-cross sections were built towards the end of the 1920's.The great breakthrough was achieved only after 1945. "THE SCLAYN" bridge over the river Maas, which was built by Magnel in 1948, was the first continuous pre-stressed concrete box-girder bridge with 2 spans of 62.70m.

In following years the ratio of wages to material costs climbed sharply. This thereby shifted the emphasis of development of construction method. The box girder cross-section evolved structurally from the hollow cell-deck bridge or T-beam Bridge. The widening of the compression zone that began as a structural requirement at the central piers was in the extended throughout the entire length of bridge because of advantages transverse load-carrying characteristics.

For style of fundamental street and Railway Bridge superstructures there are a few codes utilized round the world and a large portion of the nations have their own particular code figuring on the characteristic conditions and in this way the nearby natural components, similar to the unsteady impacts, critical destruction, noteworthy snow, precipitous bundle, varying sorts of auto utilized in nation and so forth. Indian scaffold engineers elude IRC (Indian Road Congress) ordinary for the auxiliary style. amid this study 2 box-support cross-segments were planned with very surprising cross segment i)Pre focused on solid box bar with four cells, ii) Pre-focused on solid box pillar with single cell. The look parameters were unbroken same for each of the cross-sections. Moving load as per IRC6: 2000 were thought off or each the cross wise and normal moving load IRC category AA was applied. Comparison was done between the results of each the box-girder cross-sections. During this study 2 box-girder cross-sections were designed with totally different cross section-i)with four cells, ii) beam with single cell. The look parameters were unbroken same for each of the cross-sections. Moving load as per IRC-6: 2000 were thought of for each the crosswise and normal moving load IRC category AA was applied. Comparison was done between the results of each the box-girder cross sections

2. OBJECTIVE OF THE STUDY

The Analysis of Single Cell Box Girder is done for various conditions:

- For A Constant Depth and Varying Width for three type of cells.
- For Two Different Loadings as Per IRC Recommendations.
- For Two Different Shapes -Trapezoidal and Rectangular i.e., trapezoidal for single cell and rectangular for twin and multi-cell box girder

3. LOADS CONSIDERED IN ANALYSIS:

(a) Dead loads: The dead load carried by the girder or the member consists of its own weight and the portions of the weight of the superstructure and any fixed loads supported by the member. The dead load can be estimated fairly accurately during design and can be controlled during construction and service. The weight of superimposed dead load includes footpaths, earth files, wearing course, staying plus forms, waterproofing, signs, architectural ornamentation, pipes, conduits, cables and any other immovable appurtenances installed on the structure.

(b) Super imposed dead load: Wearing coat shall be 65 mm-thick comprising 25mm-mastic asphalt layer overlaid by 40mm bituminous concrete. Crash barriers shall be provided on the bridge as per details given in IRC: 5.

(c) Live loads: Live loads are those caused by vehicles which pass over the bridge and are transient in nature. These loads cannot be estimated

precisely, and the designer has very little control over them once the bridge is opened to traffic. However, hypothetical loadings which are reasonably realistic need to be evolved and specified to serve as design Criteria. There are four types of standard loadings for which road bridges are designed:

Table 1: Types of loads

Vehicle	70R		AA		A	B
Item	Track	Wheeled	Track	Wheeled	Track	Wheeled
Total load(KN)	700	1000	700	400	554	332
Total dist.(mm)	7920	15220	7200	1500	14300	14300
Minimum distance between two vehicle(mm)	30000	30000	90000	30000	18500	18500

3.1 Types of IRC Live Loads:

1)IRC Class 70R Loading:

IRC 70 R loading consists of the following three types of vehicles.

a. Tracked vehicle of total load 700 KN with two tracks each weighing 350 KN.
b. Wheeled vehicle comprising 4 wheels, each with a load of 100 KN total 400 KN.
c. Wheeled vehicle with a train of vehicles on seven axles with a total load of 1000 KN.

The tracked vehicle is somewhat similar to that of Class AA, except that the contact length of the track is 4.87 m, the nose to tail length of the vehicle is 7.92 m and the specified minimum spacing between successive vehicles is 30 m. The wheeled vehicle is 15.22 m long and has seven axles with the loads totalling to 1000 KN. The bogie axle type loading with 4 wheels totalling 400 KN is also specified.

The 700 KN tracked vehicle is common to both the classes, the only difference being the loaded length which is slightly more for the Class 70 R. Here second category is the wheeled type comprising 1000 KN train of vehicles on seven axles for the Class 70 R and a 400 KN bogie axle type vehicle for the Class AA. The Class A loading is a 554 KN train of wheeled vehicles on eight axles. Impact is to be allowed for all the loadings as per the specified formulae which are different for steel and concrete bridges. The various categories of loads are to be separately considered and the worst effect has to be considered in design. Only one lane of Class 70 R or Class AA load is considered whereas both the lanes are assumed to be occupied by Class A loading if that gives the worst effect.

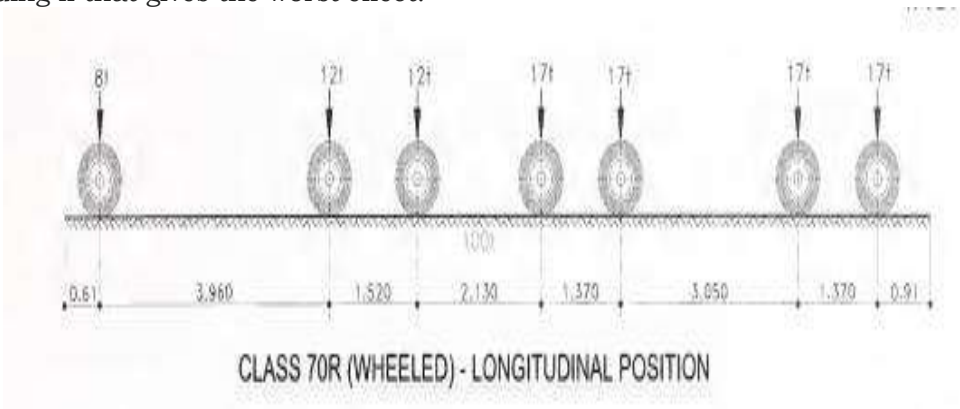

Figure: 1 Class 70R loading

2) IRC Class AA Loading:

Two different types of vehicles are specified under this category grouped as tracked and wheeled vehicles. The IRC Class AA tracked vehicle (simulating an army tank) of 200 kN and a wheeled vehicle (heavy duty army truck) of 400kN. All the bridges located on National Highways and State Highways have to he designed for this heavy loading. These loadings are also adopted for bridges located within certain specified municipal localities and along specified highways. Alternatively, another type of loading designated as Class 70 R is specified instead of Class AA loading.

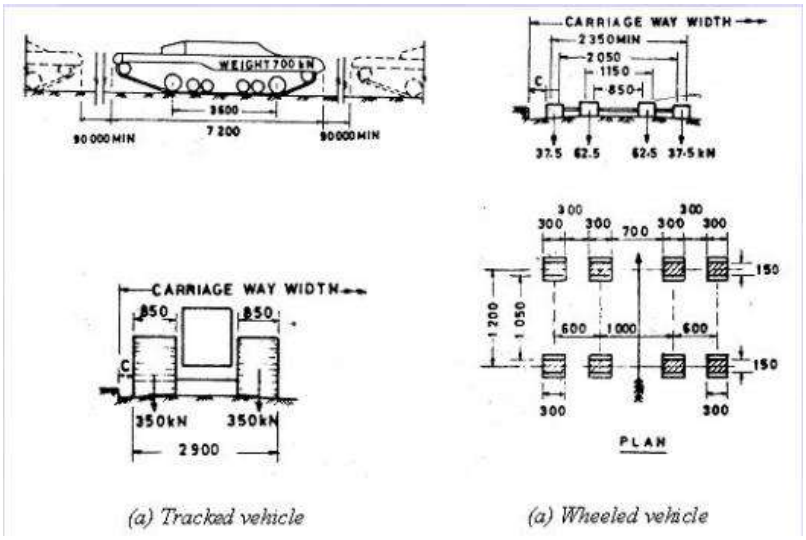

Figure: 2 Class AA loading

3) IRC CLASS A LOADING:

Class A loading consists of a wheel load train composed of a driving vehicle and two trailers of specified axle spacing. This loading is normally adopted on all roads on which permanent bridges are constructed. Class B loading is adopted for temporary structures and for bridges in specified areas. For class A and class B loadings, reader is referred to IRC: 6 - 1966 – Section II.

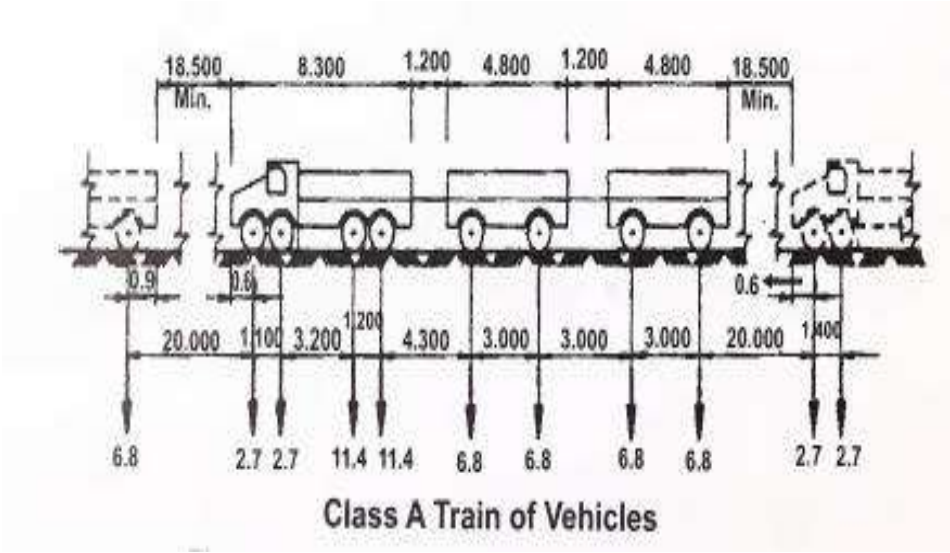

Figure: 3 Class A loading

4) IRC CLASS B LOADING:

This type of loading is used to design temporary bridges like Timber Bridge etc. It is considered as light loading. Both IRC class A and Class B are shown in below figure.

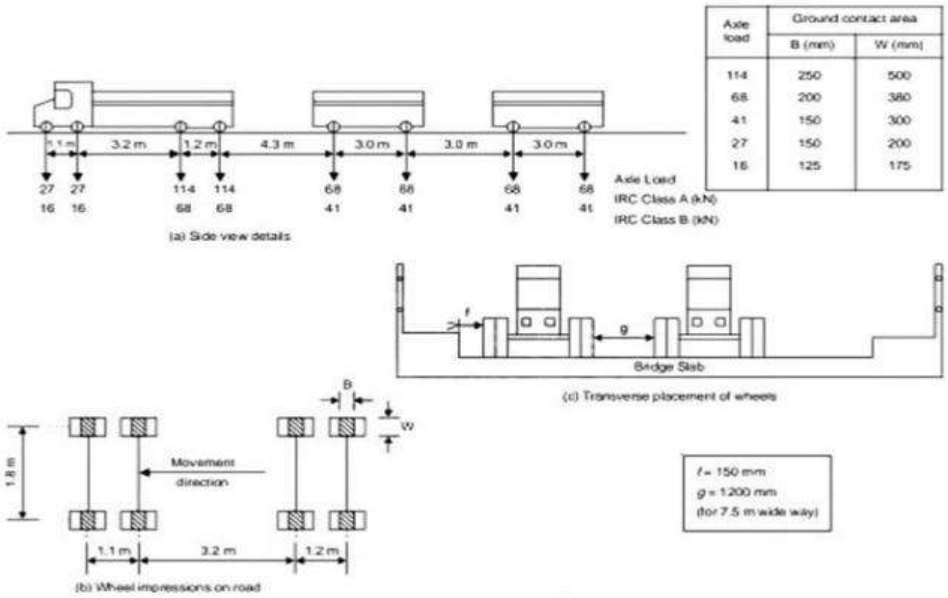

Figure: 4 Class B loading

4. Dimensional Details of Single, Twin And Multi-Cell Box Girders

I) For Class A Type of Loading

(a) Single cell box girder model:

1) Span of the bridge : 25m
2) Total width of girder : 7.5m
3) Depth of box girder : 2m
4) Type of loading considered : IRC class A(Truck)
5) Number of lanes : 2

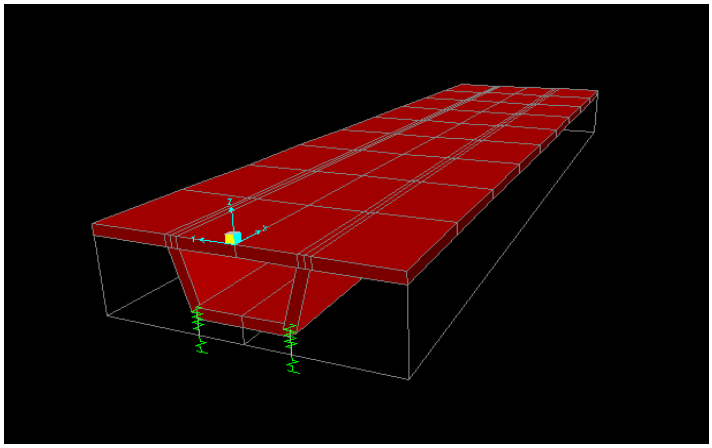

Figure: 5 Before applying the load for class A

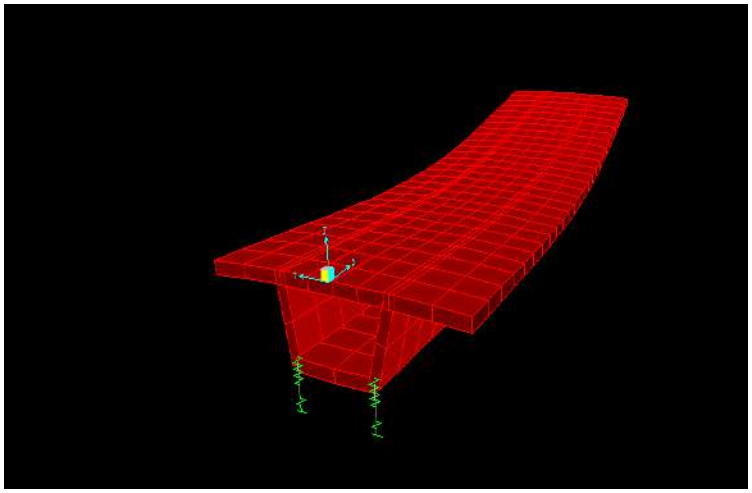

Figure: 6 After applying the load for class A (Deformed shape)

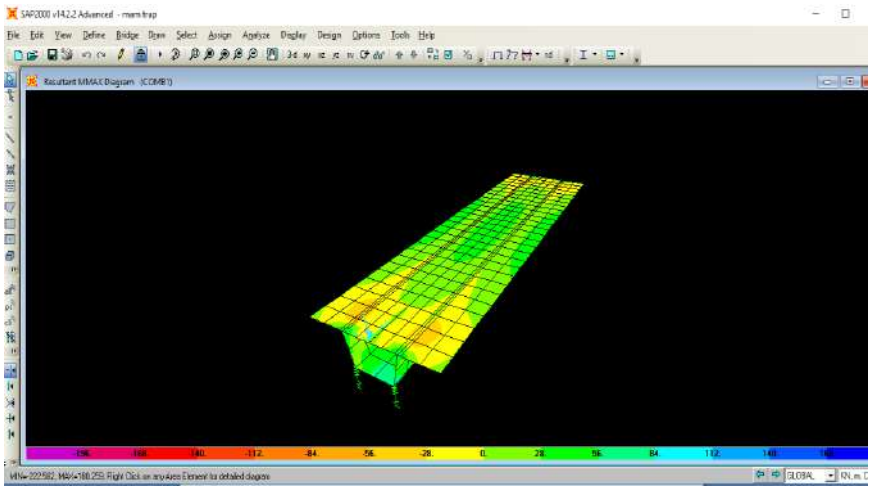

Figure: 7 Member force diagram: MMAX

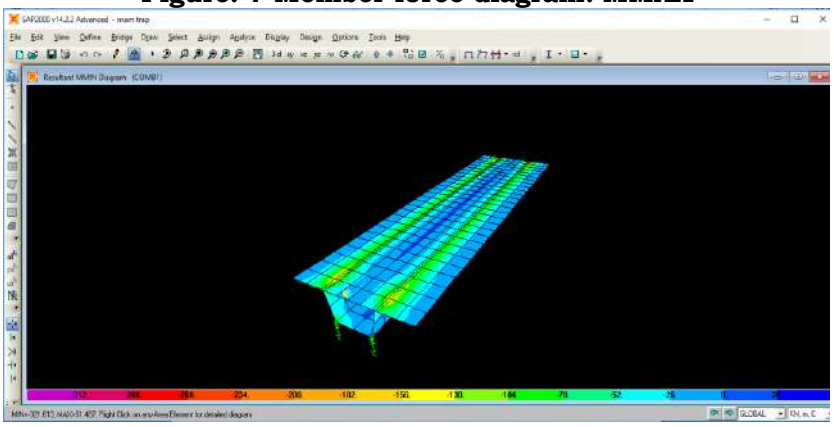

Figure: 8 Member force diagram: MMIN

(b) Twin cell box girder model:

1) Span of girder : 25m
2) Total width : 10m
3) Depth of girder : 2m
4) Type of loading considered : IRC class A(Truck)
5) Number of lanes : 03

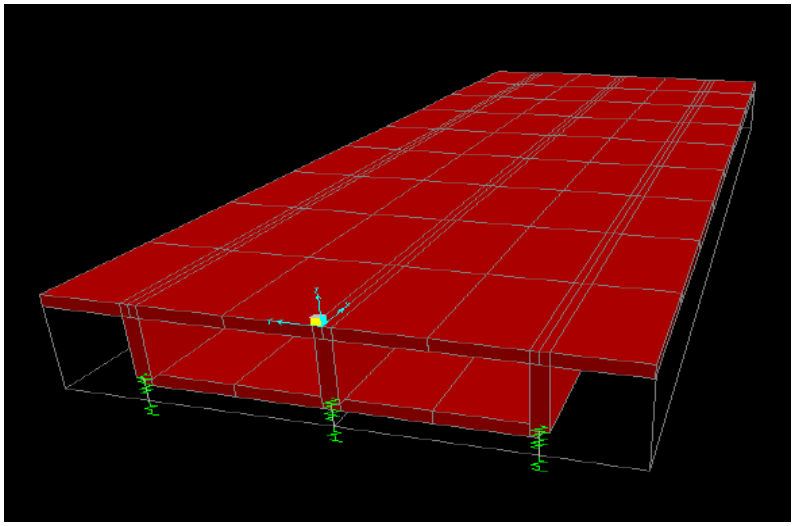

Figure: 9 Before applying the load for class A

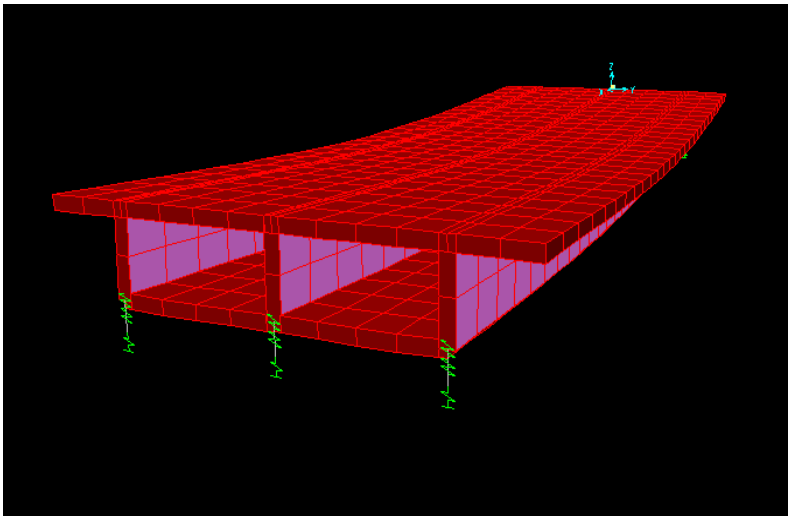

Figure: 10 After applying the load for class A(Deformed shape)

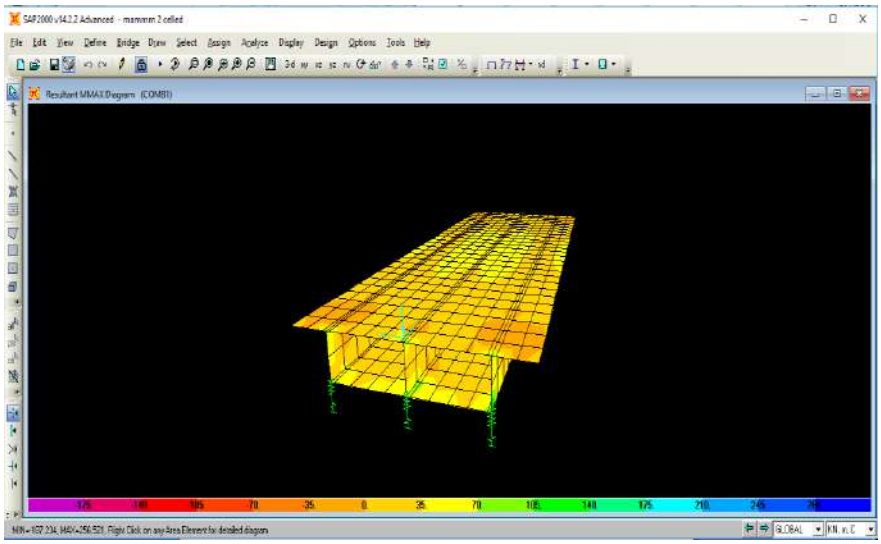

Figure: 11 Member force diagram: MMAX

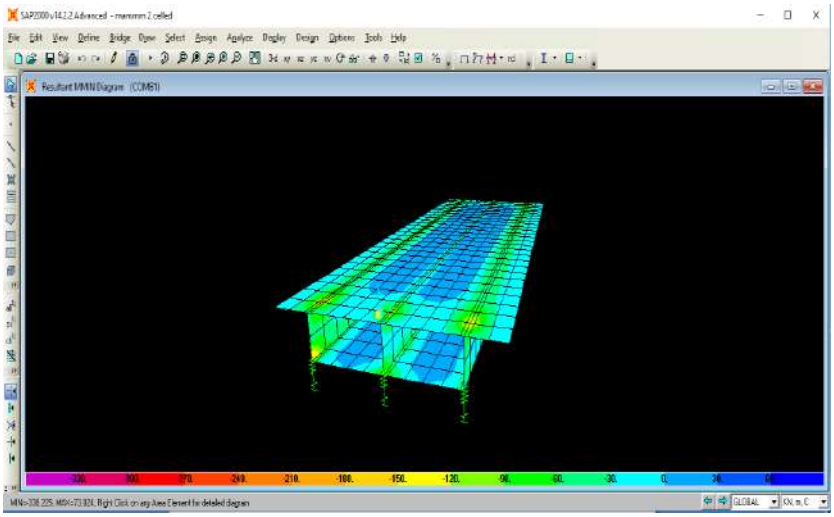

Figure: 12 Member force diagram: MMINN

(c) Multi-cell box girder model:

1) Span of girder : 25m
2) Total width : 13m
3) Depth of girder : 2m
4) Type of loading considered : IRC class A(Truck)
5) Number of lanes : 03

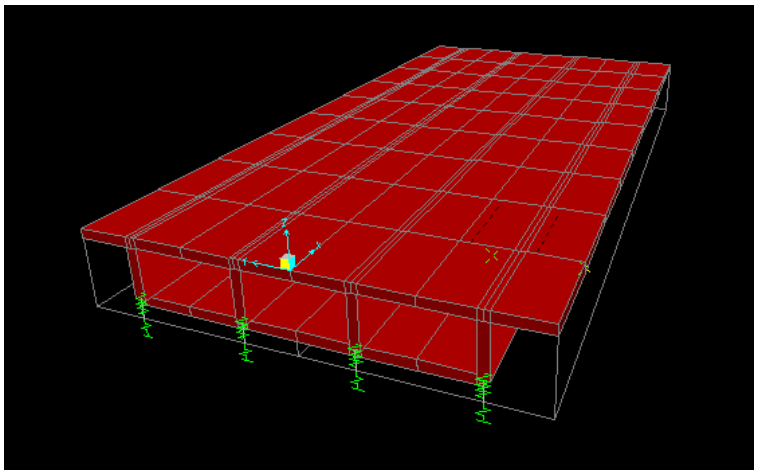

Figure: 13 Before applying the load for class A

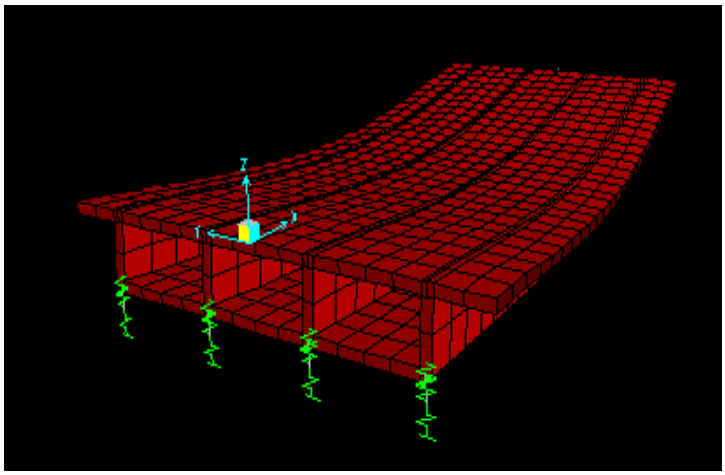

Figure: 14 After applying the load for class A(Deformed shape)

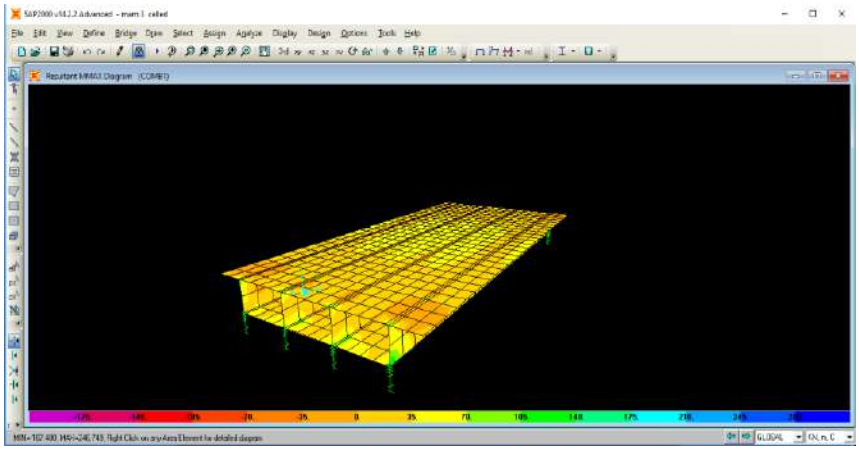

Figure: 15 Member force diagram:MMAX

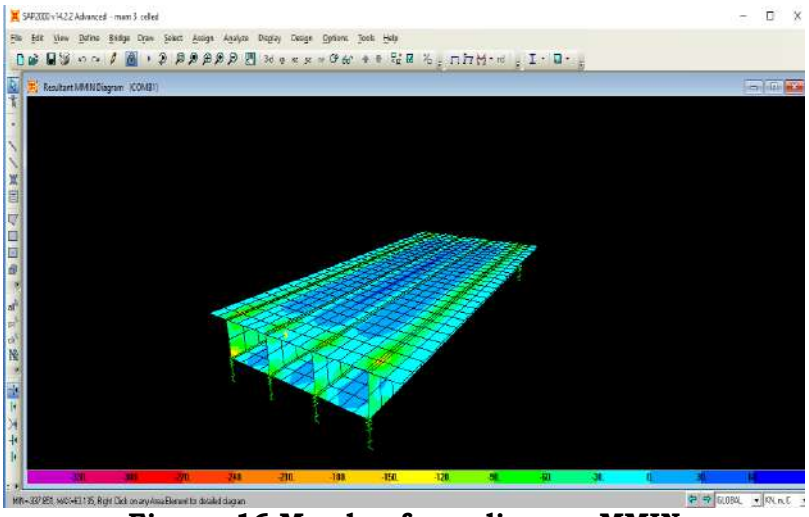

Figure: 16 Member force diagram:MMIN

I. For 70r Type of Loading:

(a) Single cell box girder model:

1) Span of girder: 25m
2) Total width: 7.5m
3) Depth of girder =2m
4) Type of loading considered: IRC class A(Truck)
5) Number of lanes =02

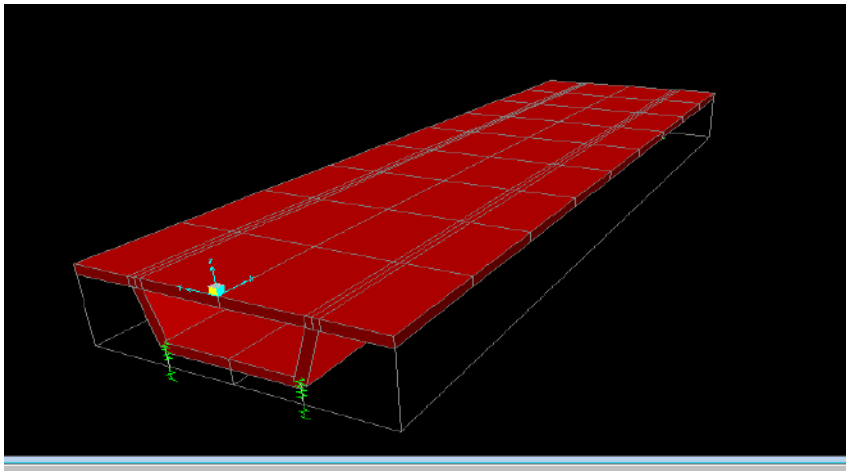

Figure: 17 Before loading

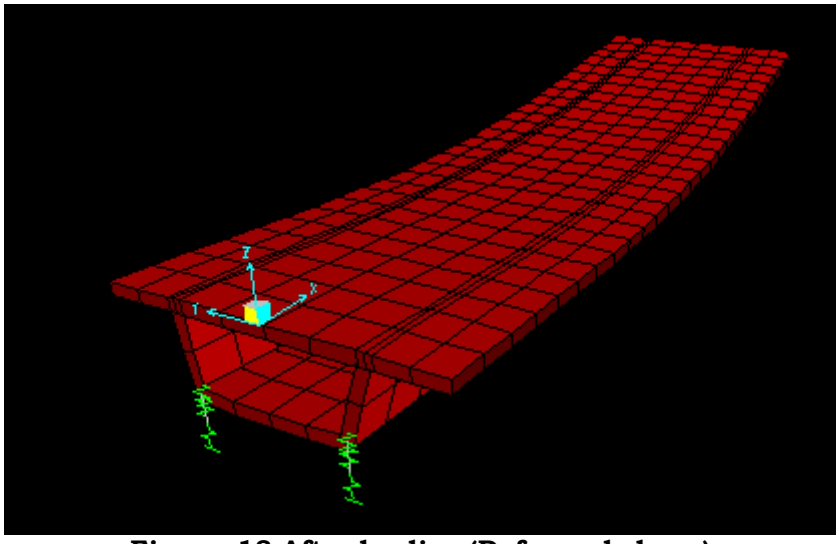

Figure: 18 After loading (Deformed shape)

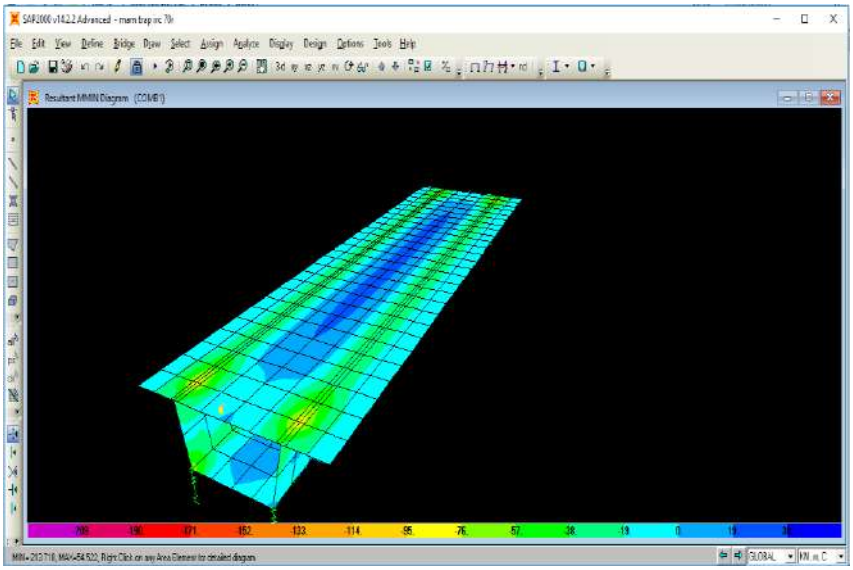

Figure: 19 Member force diagram for single cell(Trapezoidal)-Mmax

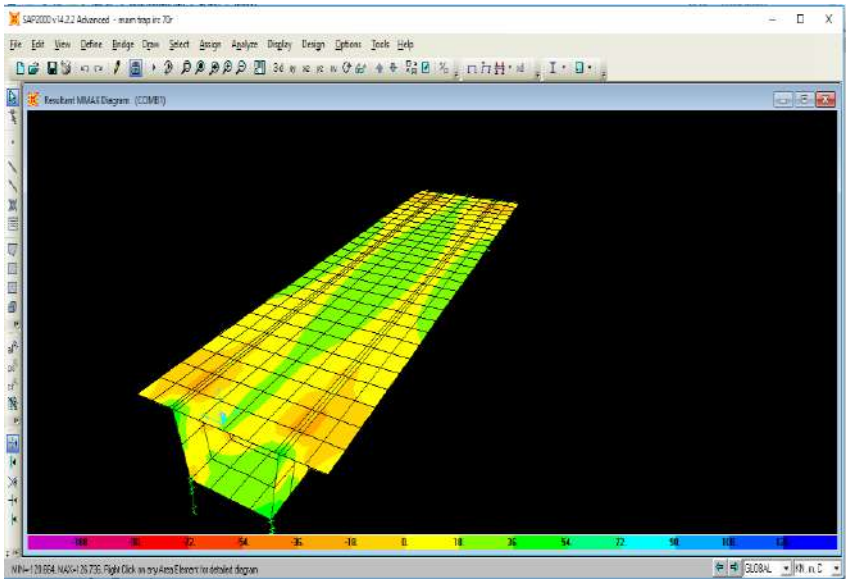

Figure: 20 Member force diagram for single cell(Trapezoidal)-Mmin

(b) Twin cell box girder model:

1) Span of girder : 25m
2) Total width : 10m
3) Depth of girder : 2m
4) Type of loading considered : IRC class 70R
5) Number of lanes : 03

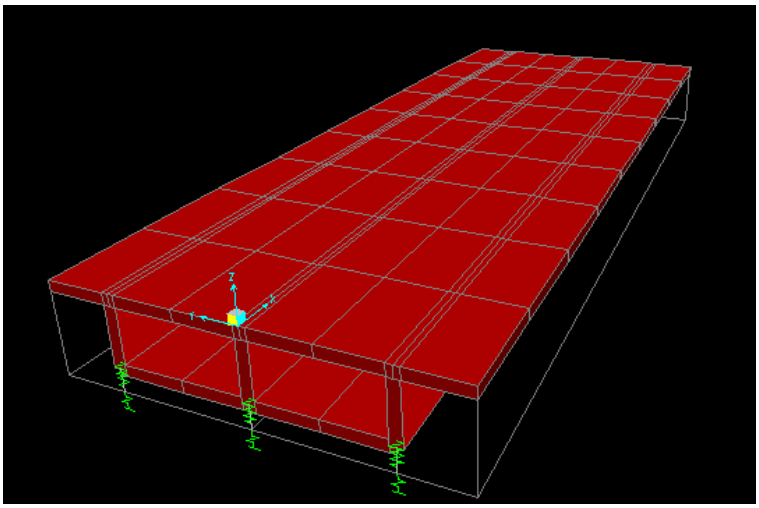

Figure: 21 Before loading

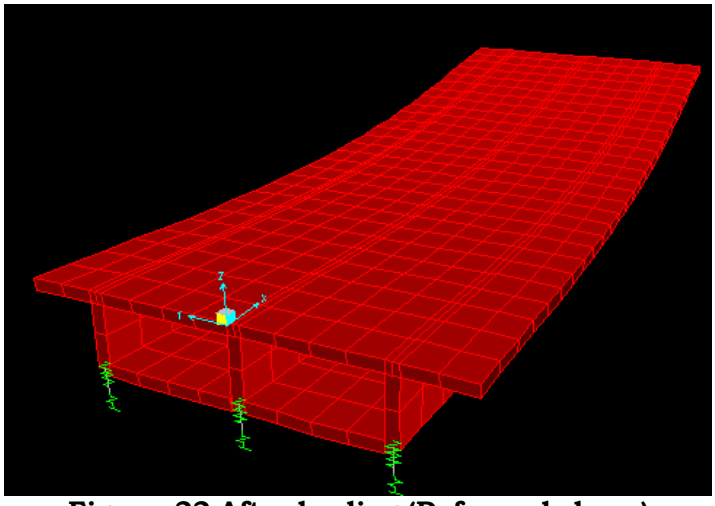

Figure: 22 After loading (Deformed shape)

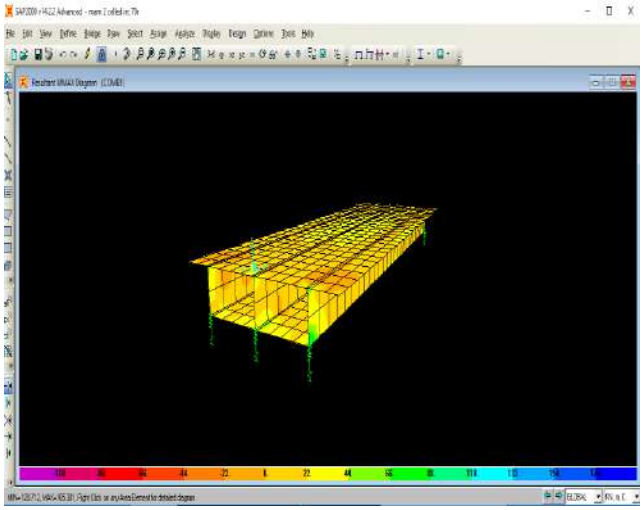

Figure: 23 Member force diagram for TWIN cell-MMIN

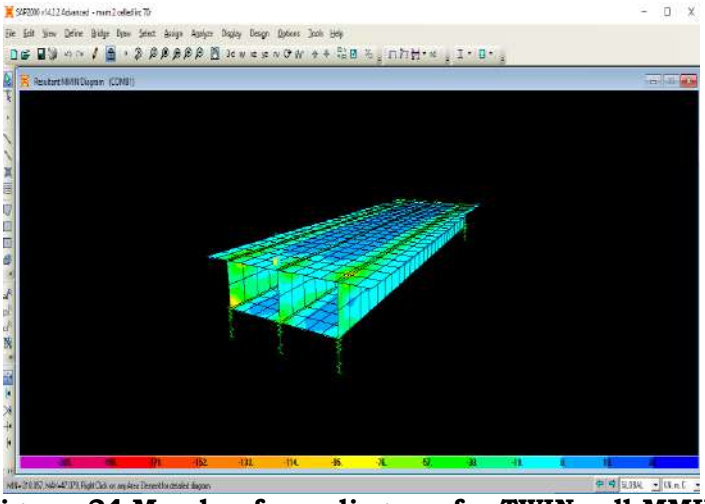

Figure: 24 Member force diagram for TWIN cell-MMIN

(d) Multi-cell box girder model:

1) Span of girder : 25m
2) Total width : 13m
3) Depth of girder : 2m
4) Type of loading considered : IRC class 70R
5) Number of lanes : 03

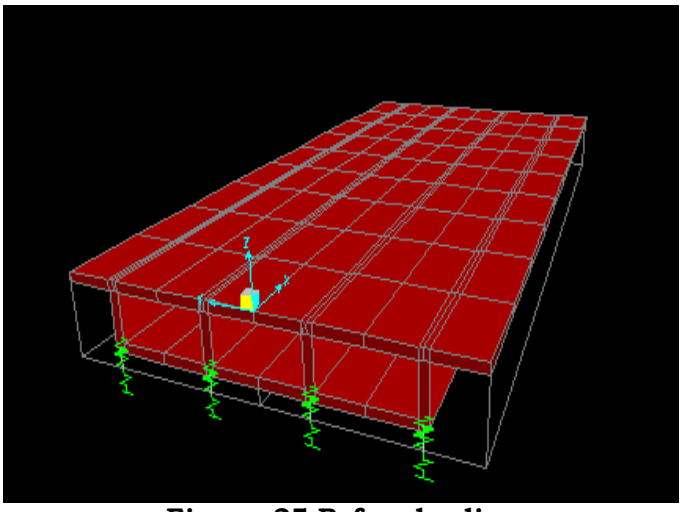

Figure: 25 Before loading

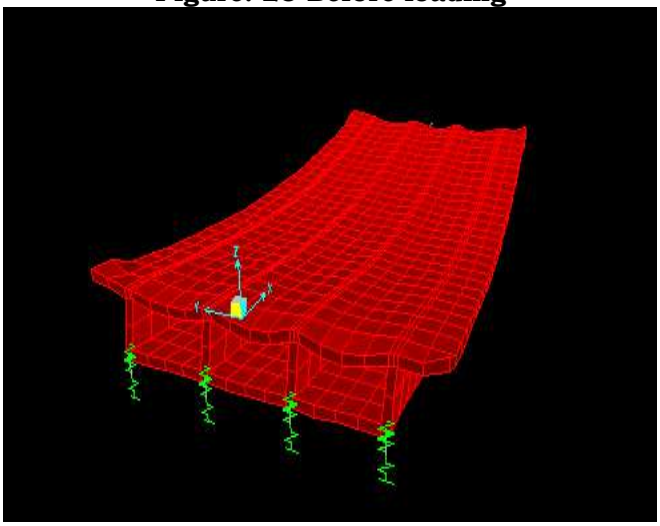

Figure: 26 After loading (Deformed shape)

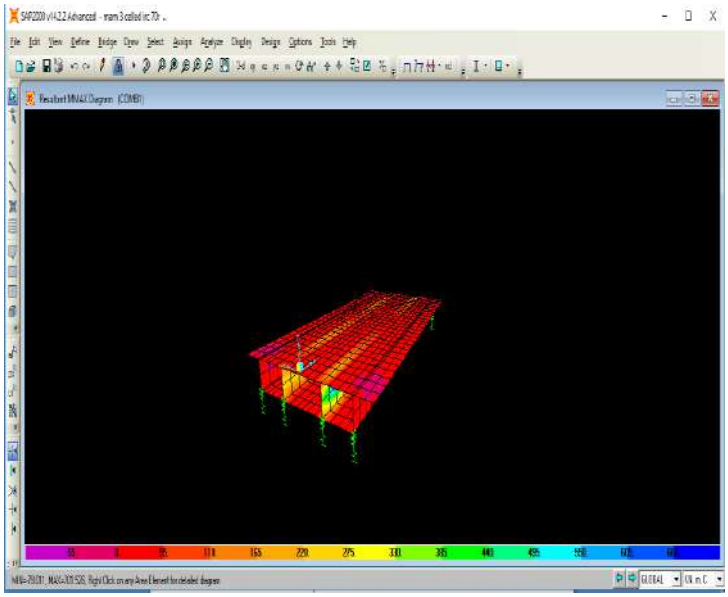

Figure: 27 Member force diagram for Multi- cell-MMAX

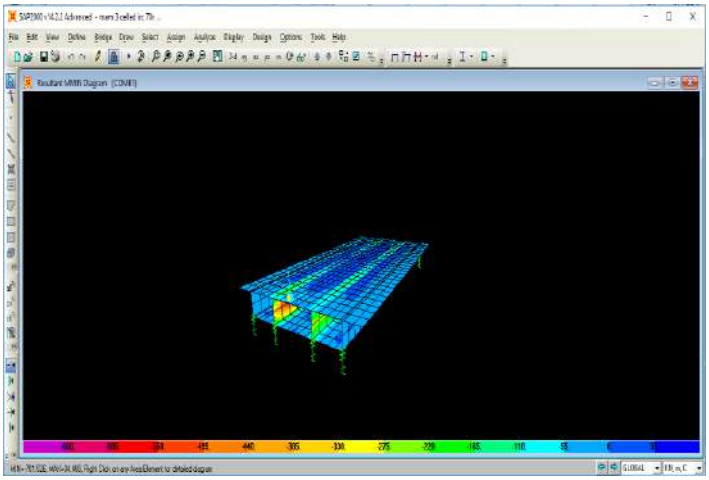

Figure: 28 Member force diagram for Multi- cell-MMIN

5. RESULTS AND DISCUSSIONS

5.1 Comparison of single, twin and multi-cell box girders for CLASS A-T:

Table: 1 Dimensional & Load Combination Details

	Single Cell	Twin Cell	Multi Cell
Span	25m	25m	25m
Width	7.5m	10m	13
Depth	2m	2m	2m
Class(as per IRC-6:2000)	A-T	A-T	A-T
Number of Lanes	2	2	3
Load Combination	1.35DL+1.75IDL+1.5VLL	1.35DL+1.75IDL+1.5VLL	1.35DL+1.75IDL+1.5VLL

Table: 2 Results for Class A-T loading

	Single Cell		Twin Cell		Multi Cell	
Results	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
Axial Force	-20865.31	-20865.31	-31205.5	-31205.5	-42195.3	-421953
Shear Force horizontal	-1.84E-10	-3.28E-10	1.87E-09	1.62E-09	1.352E-09	9.637E-10
shear force vertical	8476.38	0	13998.87	0	18943.425	0
Moment at Y- axis	-5.59E-09	-4.19E-08	-1E-07	-1.4E-07	-2.75E-07	-3.02E-07
Moment at X- axis	28436.76	-23886.57	56796.15	-29616.6	78201.05	-38733.7

5.2 Comparison of single, twin and multi-cell box girders for CLASS 70R:

Table: 3 Dimensional & Load Combination Details

	Single Cell	Twin Cell	Multi Cell
Span	25m	25m	25m
Width	7.5m	10m	13
Depth	2m	2m	2m
Class(as per IRC-6:2000)	A-T	A-T	A-T
Number of Lanes	2	2	3
Load Combination	1.35DL+1.75IDL +1.5VLL	1.35DL+1.75IDL+1.5VLL	1.35DL+1.75IDL+1.5VLL

Table: 4 Results for Class A-T loading

	Single Cell		Twin Cell		Multi Cell	
Results	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
Axial Force	-13538.53	-13538.53	-20118.5	-20118.5	-49536.9	-49536.9
Shear Force horizontal	-1.29E-10	-2.52E-10	1.2E-09	1.2E-09	-7E-10	-1.57E-09
shear force vertical	5878.8	0	9025.2	0	17579.25	0
Moment at Y- axis	-3.12E-08	-3.61E-08	-6.4E-08	-9.2E-08	5.681E-08	3.16E-08
Moment at X- axis	21919.25	-14369.66	36617	-19094.1	65109.76	-43404.1

5.3 Bending Moments at various Distances of Overall Span:

Table: 5 Trapezoidal (Single Cell) - IRC Class A

DISTANCE M	SHEAR FORCE KN	BENDING MOMENT KN-m
0	-8476.38	-23886.5722
2.77778	-6592.74	-2957.2389
2.77778	-6592.74	-2957.2389
5.55556	-4709.1	12739.7611
5.55556	-4709.1	12739.7611
8.33333	-2825.46	23204.4278
8.33333	-2825.46	23204.4278
11.11111	-941.82	28436.7611
11.11111	-941.82	28436.7611
13.88889	941.82	28436.7611
13.88889	941.82	28436.7611
16.66667	2825.46	23204.4278
16.66667	2825.46	23204.4278
19.44444	4709.1	12739.7611
19.44444	4709.1	12739.7611
22.22222	6592.74	-2957.2389
22.22222	6592.74	-2957.2389
25	8476.38	-23886.5722

Table: 6 Twin Cell- IRC Class A

Distance M	SHEAR FORCE KN	BENDING MOMENT KN-m
0	-13998.87	-29616.6316
2.77778	-10888.01	4948.4795
5.55556	-7777.15	30872.3128
8.33333	-4666.29	48154.8684
11.11111	-1555.43	56796.1462
13.88889	1555.43	56796.1462

16.66667	4666.29	48154.8684
19.44444	7777.15	30872.3128
22.22222	10888.01	4948.4795
25	13998.87	-29616.6316

Table: 7 IRC Multi- Cell - Class A

Distance	SHEAR FORCE	BENDING MOMENT
m	KN	KN-m
0	-18943.425	-38733.6693
2.77778	-14733.775	8040.2196
5.55556	-10524.125	43120.6362
8.33333	-6314.475	66507.5807
11.11111	-2104.825	78201.0529
13.88889	2104.825	78201.0529
16.66667	6314.475	66507.5807
19.44444	10524.125	43120.6362
22.22222	14733.775	8040.2196
25	18943.425	-38733.6693

5.3.1 Comparison for IRC Class 70R for Single, Twin And Multi-Cell Box Girders:

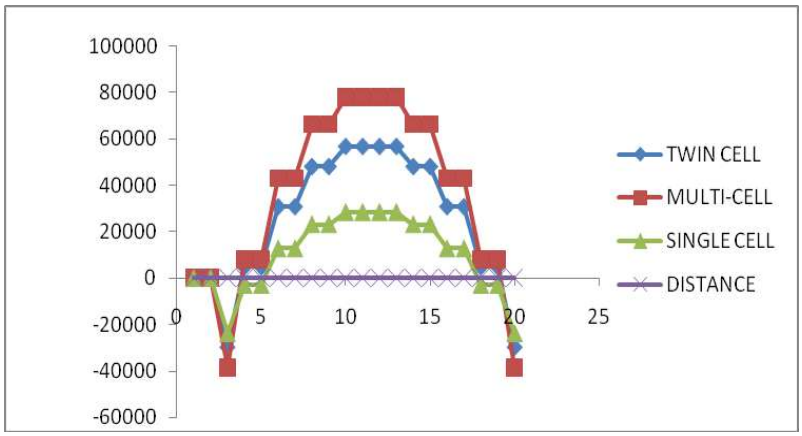

Figure: 29 Bending Moment

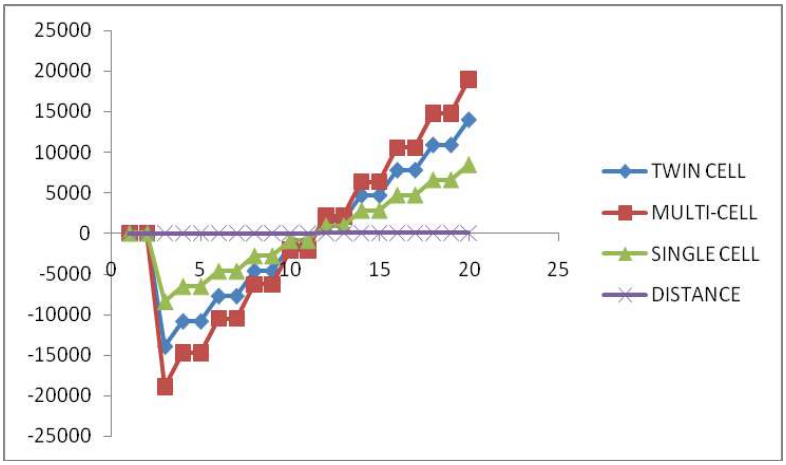

Figure: 30 Shear Force

5.3.2 Comparison for IRC Class A for Single, Twin and Multi-Cell Box Girders:

Table: 8 IRC Trapezoidal (Single Cell) -70R

Distance	SHEAR FORCE	BENDING MOMENT
m	KN	KN-m
0	-5878.8	-14369.6639
2.77778	-4572.4	145.8917
5.55556	-3266	11032.5583
8.33333	-1959.6	18290.3361
11.11111	-653.2	21919.225

13.88889	653.2	21919.225
16.66667	1959.6	18290.3361
19.44444	3266	11032.5583
22.22222	4572.4	145.8917
25	5878.8	-14369.6639

Table: 9 Twin Cell - IRC Class 70r

Distance	shear force	Bending moment
m	KN	KN-m
0	-9025.2	-19094.1143
2.77778	-7019.6	3190.3302
5.55556	-5014	19903.6635
8.33333	-3008.4	31045.8857
11.11111	-1002.8	36616.9968
13.88889	1002.8	36616.9968
16.66667	3008.4	31045.8857
19.44444	5014	19903.6635
22.22222	7019.6	3190.3302
25	9025.2	-19094.1143

Table: 10 IRC 70R 3 Cell Box

Distance	SHEAR FORCE	BENDING MOMENT
m	KN	KN-m
0	-17579.25	-43404.1281
2.77778	-13672.75	1.4274
5.55556	-9766.25	32555.5941
8.33333	-5859.75	54258.3719
11.11111	-1953.25	65109.7607
13.88889	1953.25	65109.7607
16.66667	5859.75	54258.3719
19.44444	9766.25	32555.5941
22.22222	13672.75	1.4274
25	17579.25	-43404.1281

5.3.3 Comparison for IRC Class 70r For Single, Twin And Multi-Cell Box Girders:

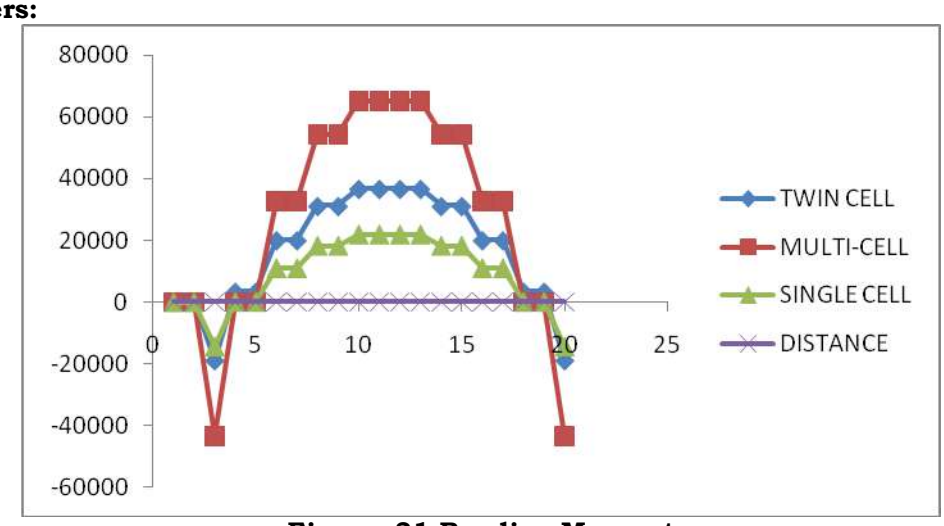

Figure: 31 Bending Moment

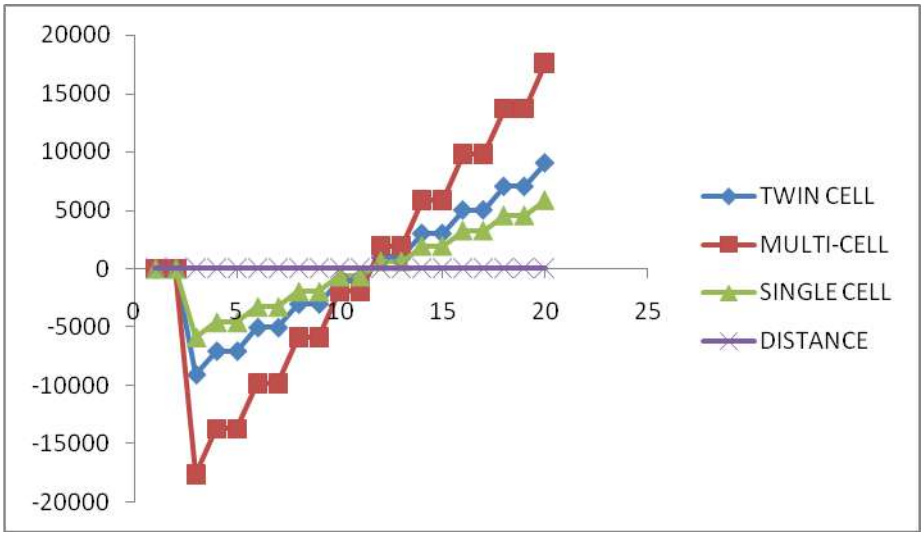

Figure: 32 Shear Force

Summary of Shear force and Bending Moment:

(1) BENDING MOMENT:

- Twin cell box girder moment is 0.55 times of the trapezoidal box girder for loading class A(T) whereas 1.67 times for the IRC loading 70R.
- Multi-cell box girder moment is 1.37 times of the twin cell box girder and is 1.77 times for the IRC loading 70R.
- Multi-cell box girder moment is 2.749 times of trapezoidal box girder and is 2.97 times for the IRC loading 70 R.

(2) SHEAR FORCE:

- Twin cell box girder shear force is 1.1042 times of the trapezoidal box girder for loading class A(T) whereas 1.53 times for the IRC loading 70R.
- Multi-cell box girder shear force is 1.35 times of the twin cell box girder and is 1.947 times for the IRC loading 70R.
- Multi-cell box girder shear force is 2.234 times of trapezoidal box girder and is 2.99 times for the IRC loading 70 R.

(3) AXIAL FORCE:

- Twin cell box girder Axial force is 1.49 times of the trapezoidal box girder for loading class A(T) whereas 1.48 times for the irc loading 70R.
- Multi-cell box girder axial force is 1.35 times of the twin cell box girder and is 2.46 times for the IRC loading 70R.
- Multi-cell box girder Axial force is 2.022 times of trapezoidal box girder and is 3.658 times for the IRC loading 70R

6. CONCLUSIONS

Single, Twin and Multi cell box girder bridges are considered for the analysis. Models are subjected under IRC class A loading and 70R conditions and corresponding bending moments and shear force values are compared.

6.1 Results are summarized as follows:

- Bending moment in the single cell box girder is smaller when compared to twin and multi-cell box girders i.e., the bending moment developed in single cell trapezoidal section is less as compared to that in two cell and three cell rectangular sections that is 49.93% less than two celled and 63.63% less than three cell rectangular sections for class A type of loading.
- Bending moment in the single cell box girder is smaller when compared to twin and multi-cell box girders i.e., the bending moment developed in single cell trapezoidal section is less as compared to that in two cell and three cell rectangular sections that is 40.13% less than two celled and 66.334% less than three cell rectangular sections for class 70R type of loading.

- Shear force in the single cell box girder is smaller when compared to twin and multi-cell box girders i.e., the bending moment developed in single cell trapezoidal section is less as compared to that in two cell and three cell rectangular sections that is 39.44% less than two celled and 55.25% less than three cell rectangular sections for class A type of loading.
- Shear force in the single cell box girder is smaller when compared to twin and multi-cell box girders i.e., the bending moment developed in single cell trapezoidal section is less as compared to that in two cell and three cell rectangular sections that is 34.86% less than two celled and 66.55% less than three cell rectangular sections for class A type of loading.
- Since the bending moment and shear force are less in Single cell Girder Bridge, therefore it is more economical and effective when compared with twin and multi-cell girder bridge.

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METHOD DEVELOPMENT AND VALIDATION OF ASPIRIN AND CLOPIDROGREL PHARMACEUTICAL DOSAGE FORMS BY DEVELOPING NEW RP HPLC METHOD

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Abstract - A simple and selective LC method is described for the determination of Aspirin and Clopidogrel in tablet dosage forms. Chromatographic separation was achieved on a c18 column mistreatment mobile phase consisting of a combination of fifty five volumes of Mixed Phosphate Buffer and forty five volumes of Acetonitrile with detection of 235 nm. Linearity was observed in the range 20-60 µg/ml for Aspirin (r2=0.998) and 10-30 µg /ml for Clopidogrel (r2 =0.998) for the amount of drugs estimated by the projected ways was in smart agreement with the label claim. The proposed methods were validated. The accuracy of the methods was assessed by recovery studies at three different levels. Recovery experiments indicated the absence of interference from commonly encountered pharmaceutical additives. The method was found to be precise as indicated by the repeatability analysis, showing %RSD but a pair of. All statistical data proves validity of the ways and may be used for routine analysis of pharmaceutical dose form.
Keywords: Dosage forms, Spectroscopy, Solubility, High Performance Liquid Chromatography, Validation, Accuracy, Precision, Linearity, Limit of Detection, Limit of Quantification, Robustness, Ruggedness, Range.

II. INTRODUCTION

Pharmaceutical examination implies examination of medications or synthetic elements. Webster' word reference depicts a pharmaceutical is a solution. Imaginative work (R&D) acknowledge a phenomenally thorough part in new medication switch and follow up exercises to guarantee that another prescription thing gets the made together gauges is resolute and keep embracing by definitive specialists, guaranteeing that all groups of arrangement thing are made to the particular models usage of affirmed fixings and creation technique changes into the dedication of pharmaceutical examiners in the quality control (QC) or quality affirmation (QA) division. The techniques are all around made in an investigative R&D division and exchanged to QC or assorted working environments as required. Once in a while they are exchanged to different divisions.

1.1 Reverse Phase High Performance Liquid Chromatography (RP-HPLC)

Pivot organize chromatography utilizes hydrophobic reinforced crushing, by and large with an octadecyl or octyl profitable get-together and a polar flexible stage, routinely a to some degree or absolutely fluid versatile stage.

Polar substances lean toward the flexible stage and elute first. As the hydrophobic character of the solutes expands, bolster increments.

By and large, the lower the farthest purpose of the versatile stage, the higher is its eluent quality. The elution request of the classes of mixes in table is rotated (subsequently the name switch organize chromatography).

Aspirin,(2-(acetyloxy)benzoic destructive) generally called acetylsalicylic destructive (ASA), is a pharmaceutical used to treat distress, fever, and inflammation. Specific provocative conditions in which it is used fuse Kawasaki disease, pericarditis, and rheumatic fever. Migraine pharmaceutical

given not long after a heart attack lessens the risk of death. ASPIRIN is moreover used whole deal to help maintain a strategic distance from heart attacks, ischaemic strokes, and blood bunches, in people at high risk. Aspirin may in like manner decrease the peril of particular sorts of tumor, particularly colorectal cancer. For torment or fever, impacts typically begin inside 30 minutes.

Clopidogrel, (methyl (2S)- 2-(2-chlorophenyl)- 2-acetate) an antiplatelet

administrator in a general sense and pharmacologically like ticlopidine, is used to limit blood bunches in a collection of conditions, for instance, periphery vascular disease, coronary conductor infection, and cerebrovascular infirmity. Clopidogrel is oversubscribed beneath the name medicine by Sanofi and Bristol-Myers Squibb. The prescription is an irreversible inhibitor of the P2Y12 adenosine diphosphate receptor found on the layers of platelet cells. Clopidogrel use is connected with a couple of real hostile pharmaceutical reactions, for instance, genuine neutropenia, distinctive sorts of release, and cardiovascular edema.

Since clopidogrel is a prodrug, it must be prepared by CYP450 chemicals to make the dynamic metabolite that controls platelet add up to. This dynamic metabolite particularly stifles adenosine diphosphate (ADP) legitimate to its platelet P2Y12 receptor and in this way the ADP-interceded activation of the glycoprotein GPIIb/IIIa complex, as needs be obstructing platelet gathering.

The main aim is to develop new RP HPLC procedure for the synchronous analysis of Aspirin And Clopidogrel pharmaceutical dosage outline. The plan of work includes - Solubility affirmation of Aspirin And Clopidogrel distinctive solvents and pads, Determine the digestion maxima of both the solutions in UV– Visible locale in different solvents/bolsters and picking the solvents for HPLC strategy progression. Optimize the adaptable stage and stream rates for true blue assurance and upkeep times. Validate the made technique as per ICH rules.

2 EXPERIMENTAL

2.1 Materials And Methods

Instruments Used

The instruments which were used for this work were, UV Visible apparatus which was manufactured by Nicolet evolution 100, UV-Visible Software that was developed by Vision Pro, HPLC software that was developed by Spin chrome (LC SOLUTIONS), HPLC and Electronic balance manufactured by Shimadzu(LC 20 AT VP), Ultra sonicator which was manufactured Citizen, Digital Ultrasonic Cleaner, pH meter manufactured by Global digital, Syringe was used for injection which was manufactured by Hamilton, HPLC Column was obtained from Inertsil ODS 3V(250x4.6mm) 5µm.

2.2 Reagents Used

Water, Methanol, Acetonitrile was used according to HPLC Grade, Triethyl amine, Orthophosphoric acid was used as per AR Grade.

2.3 Drugs Used

Aspirin and clopidogrel drugs were obtained as gift samples from Chandra Labs, Hyderabad. Aspirin – 75mg and clopidogrel -75mg (mg) (C-GREL-PLUS) were obtained from pharmacy.

2.4 Mobile Phase

A mix of Mixed phosphate pad (pH):ACN were prepared. The flexible stage was sonicated for 10min to remove gasses and isolated through 0.45µ layer channel for degassing of compact stage.

3 METHODOLOGIES

Determination of Wavelength of Aspirin and Clopidogrel using UV Visible Spectroscopy

In simultaneous estimation of two drugs isobestic wavelength is used. Isobestic purpose is that the wavelength wherever the molar physical property is that the same for 2 substances that area unit interconvertible. So this wavelength is employed in synchronous estimation to estimate each medicine accurately.

3.1 Preparation of standard stock solution of ASPIRIN

10 mg of ASPIRIN was weighed and transferred in to 100ml volumetric flask and dissolved in water and then make up to the mark with Methanol and prepare 10 µg /ml of solution by diluting 1ml to 10ml with water.

3.2 Preparation of standard stock solution of CLOPIDOGREL

10 mg of CLOPIDOGREL was weighed in to 100ml volumetric flask and dissolved in water and then dilute up to the mark with Methanol and prepare 10 µg /ml of solution by diluting 1ml to 10ml with water.

3.3 Method Development Of Aspirin And Clopidogrel

Trial - 1

The mobile phase that was selected for this trial is K2HPO4 : Methanol at ratio of 55 : 45 maintaining a pH of 6.0. weigh accurately 10 mg of ASPIRIN and 10 mg of CLOPIDOGREL in 25 ml of volumetric flask and dissolve in 10ml of mobile phase and make up the volume with mobile phase.

From above stock solution 40µg/ml of ASPIRIN and 20µg/ml of CLOPIDOGREL is prepared by diluting 1.5ml to 10ml with mobile phase. This solution is used for recording chromatogram.

Trial- 2

The mobile phase that was selected for this trial is K2HPO4 : ACN: Methanol at ratio of 30:30:40 maintaining a pH of 4.0.weigh accurately 10 mg of ASPIRIN and 10 mg of CLOPIDOGREL in 25 ml of volumetric flask and dissolve in 10ml of mobile phase and make up the volume with mobile phase. From above stock solution 40µg/ml of ASPIRIN and 20µg/ml of CLOPIDOGREL is prepared by diluting 1.5ml to 10ml with mobile phase. This solution is used for recording chromatogram.

Trial- 3

The mobile phase that was selected for this trial is Mixed Phosphate Buffer: ACN at ratio of 55 : 45 maintaining a pH of 4.0.weigh accurately 10 mg of ASPIRIN and 10 mg of CLOPIDOGREL in 25 ml of volumetric flask and dissolve in 10ml of mobile phase and make up the volume with mobile phase.

From above stock solution 40µg/ml of ASPIRIN and 20µg/ml of CLOPIDOGREL is prepared by diluting 1.5ml to 10ml with mobile phase. This solution is used for recording chromatogram.

Assay

Preparation of samples for Assay

3.4 Preparation of mixed standard solution

Weigh accurately 10 mg of ASPIRIN and 10 mg of CLOPIDOGREL in 25 ml of volumetric flask and dissolve in 10ml of mobile phase and make up the volume with mobile phase. From above stock solution 40µg/ml of ASPIRIN and 20µg/ml of CLOPIDOGREL is prepared by diluting 1.5ml to 10ml with mobile phase. This solution is used for recording chromatogram.

3.5 Tablet Sample

10 tablets (each tablet contains CLOPIDOGREL-75 mg & ASPIRIN -75 mg) were weighed and taken into a mortar and crushed to fine powder and uniformly mixed. Tablet stock solutions of CLOPIDOGREL and ASPIRIN (µg/ml) were prepared by dissolving weight equivalent to 10 mg of CLOPIDOGREL and ASPIRIN and dissolved in sufficient mobile phase. After that filtered the solution using 0.45-micron syringe filter and Sonicated for 5 min and dilute to 10ml with mobile phase. Further dilutions are prepared in 5 replicates of 20µg/ml of CLOPIDOGREL and 40µg/ml of ASPIRIN was made by adding 1.5 ml of stock solution to 10 ml of mobile phase.

3.6 Validation

Specificity by Direct comparison method

There is no interference of mobile part, solvent and placebo with the analyte peak and conjointly the height purity of analyte peak that indicate that the tactic is particular for the analysis of analytes in their dosage form.

Standard Sample: weigh accurately 10 mg of ASPIRIN and 10 mg of CLOPIDOGREL in 25 ml of volumetric flask and dissolve in 10ml of mobile phase

and make up the volume with mobile phase. From above stock solution 40µg/ml of ASPIRIN and 20µg/ml of CLOPIDOGREL is prepared by diluting 1.5ml to 10ml with mobile phase. This solution is used for recording chromatogram

3.7 Tablet sample

10 tablets (each tablet contains CLOPIDOGREL-75 mg & ASPIRIN -75 mg) were weighed and taken into a mortar and crushed to fine powder and uniformly mixed. Tablet stock solutions of CLOPIDOGREL and ASPIRIN (µg/ml) were prepared by dissolving weight equivalent to 10 mg of CLOPIDOGREL and ASPIRIN and dissolved in sufficient mobile phase. After that filtered the solution using 0.45-micron syringe filter and Sonicated for 5 min and dilute to 10ml with mobile phase. Further dilutions are prepared in 5 replicates of 20µg/ml of CLOPIDOGREL and 40µg/ml of ASPIRIN was made by adding 1.5 ml of stock solution to 10 ml of mobile phase.

3.8 Linearity and range

Preparation of standard stock solution

Standard stock solutions of ASPIRIN and CLOPIDOGREL (microgram/ml) were prepared by dissolving 10 mg of ASPIRIN and CLOPIDOGREL dissolved in sufficient mobile phase and dilute to 100 ml with mobile phase. The relationship between the concentration of ASPIRIN and CLOPIDOGREL and area of ASPIRIN and CLOPIDOGREL should be linear in the specified range and the correlation should not be less than 0.99.

3.9 Tablet Sample

10 tablets (each tablet contains CLOPIDOGREL-75 mg & ASPIRIN -75 mg) were weighed and taken into a mortar and crushed to fine powder and uniformly mixed. Tablet stock solutions of CLOPIDOGREL and ASPIRIN (µg/ml) were prepared by dissolving weight equivalent to 10 mg of CLOPIDOGREL and ASPIRIN and dissolved in sufficient mobile phase. After that filtered the solution using 0.45-micron syringe filter and Sonicated for 5 min and dilute to 10ml with mobile phase. Further dilutions are prepared in 5 replicates of 20µg/ml of CLOPIDOGREL and 40µg/ml of ASPIRIN was made by adding 1.5 ml of stock solution to 10 ml of mobile phase.

3.10 Accuracy

Accuracy of the tactic determined by Recovery studies. To the formulation (pre analyzed sample), the reference standards of the drugs were added at the level of 100%, 120%, 140%. The recovery studies were dole out thrice and also the share recovery and share mean recovery were calculated for drug is shown in table. To check the accuracy of the maneuver, recovery studies were disbursed by addition of ordinary drug resolution to pre- analyzed sample resolution at 3 totally different levels five hundredth, 100%, 150%.

3.11 Precision

Prepared sample preparations of CLOPIDOGREL and ASPIRIN as per test method and injected 6 times in to the column. The % Relative standard deviation of Assay preparations of CLOPIDOGREL and ASPIRIN should be not more than 2.0%.

3.12 Limit of Detection (LOD)

The detection limit of a private analytical procedure is that the lowest quantity of analyte in a very sample which may be detected however not essentially quantitated as a precise worth. It is a limit check that specifies whether or not or not associate analyte is on top of or below an exact worth. The standard deviation of the response can be determined based on the standard deviation of the blank, on the residual standard deviation of the regression line, or the standard deviation of y-intercepts of regression lines.

3.13 Limit of Quantitation (LOQ)

The limit of quantitation is outlined because the lowest concentration of associate analyte in a very sample which will be determined with acceptable preciseness and

accuracy underneath the explicit operational conditions of the method. Again, the standard deviation of the response can be determined based on the standard deviation of the blank, on the residual standard deviation of the regression line, or the standard deviation of y-intercepts of regression lines.

3.14 Robustness

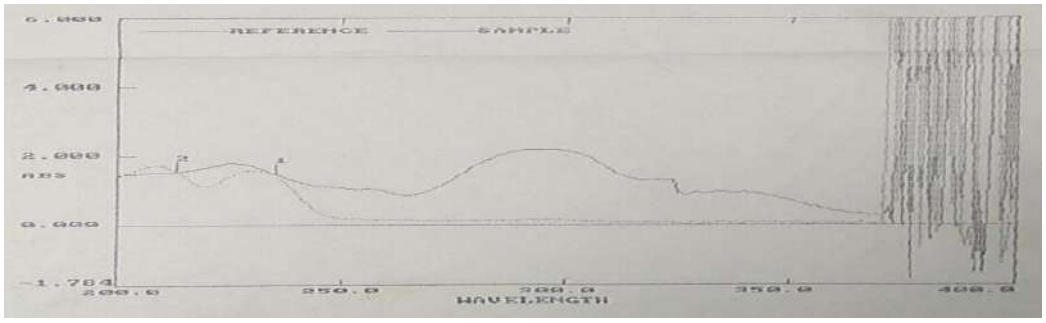
To demonstrate the strength of the tactic, prepared solution as per test method and injected at different variable conditions like using different conditions like flow rate and wavelength. System suitableness parameters were compared therewith of technique preciseness. The system suitableness ought to pass as per the check technique at variable conditions.

3.15 Ruggedness

The ruggedness of the method was studied by the determining the analyst to analyst variation byperforming the Assay by two different analysts. The % Relative standard deviation of Assay values between two analysts should be not more than 2.0%.

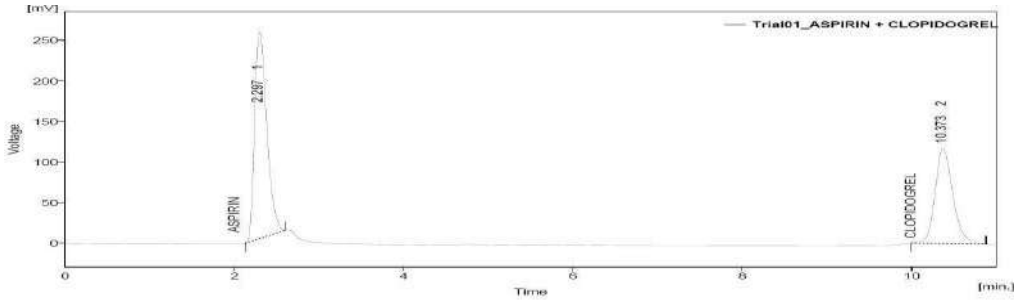
4 RESULTS AND DISCUSSION

Determination of Wavelength of Aspirin and Clopidogrel using UV Visible Spectroscopy



The Isobestic point was found to be 235 nm for ASPIRIN and CLOPIDOGREL in combination

4.1 Method Development Of Aspirin And Clopidogrel – Trial – 01.



Result Table (Uncal - Trial01_ASPIRIN + CLOPIDOGREL

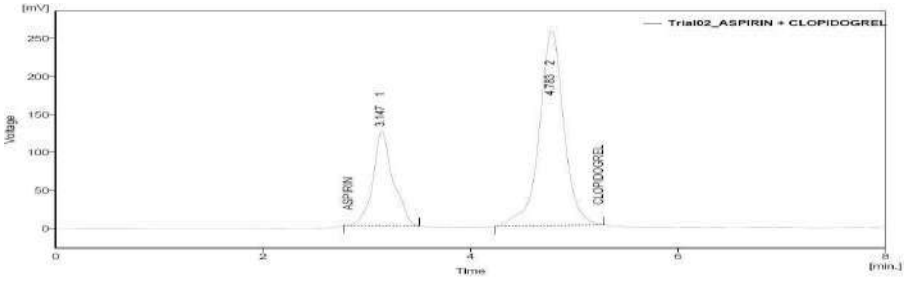
	Reten. Time [min]	Area [mV.s]	Height [mV]	Area [%]	Height [%]	W05 [min]
1	2.297	2546.935	253.669	60.0	68.3	0.16
2	10.373	1699.517	117.670	40.0	31.7	0.22
	Total	4246.452	371.340	100.0	100.0	

Column Performance Table (From 50% - Trial01_ASPIRIN + CLOPIDOGREL

	Reten. Time	W05 [min]	Asymmetry [-]	Capacity [-]	Efficiency [th.pl]	Eff/l [t.p./m]	Resolution [-]
1	2.297	0.160	1.781	0.00	1141	11415	-
2	10.373	0.220	1.327	0.00	12317	123169	25.013

Although the Efficiency was not satisfactory for aspirin and The peak response of clopidogrel was very less. The Retention time is more. Hence it was not taken for optimization.

4.2 Method Development Of Aspirin And Clopidogrel – Trial – 02.



Result Table (Uncal - Trial02_ASPIRIN + CLOPIDOGREL

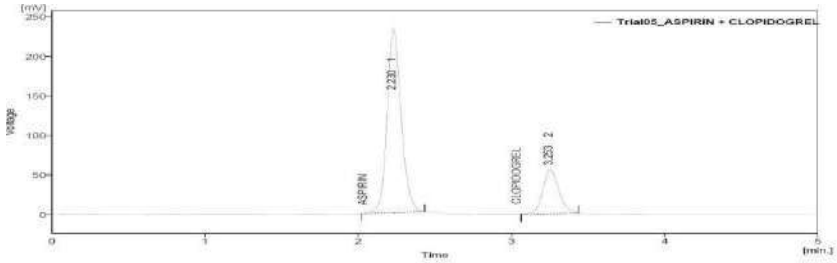
	Reten. Time [min]	Area [mV.s]	Height [mV]	Area [%]	Height [%]	W05 [min]
1	3.147	1667.607	121.641	28.5	32.7	0.18
2	4.783	4242.123	256.761	71.5	67.3	0.24
	Total	5929.730	381.402	100.0	100.0	

Column Performance Table (From 50% - Trial02_ASPIRIN + CLOPIDOGREL

	Reten. Time	W05 [min]	Asymmetry [-]	Capacity [-]	Efficiency [th.pl]	Eff. [t.p./m]	Resolution [-]
1	3.147	0.183	1.271	0.00	1632	16320	-
2	4.783	0.243	1.014	0.00	2141	21408	4.514

The efficiency of Aspirin was not satisfactory. Hence it was not taken for optimization.

4.3 Method Development Of Aspirin And Clopidogrel – Trial – 03.



Result Table (Uncal - Trial05_ASPIRIN + CLOPIDOGREL

	Reten. Time [min]	Area [mV.s]	Height [mV]	Area [%]	Height [%]	W05 [min]
1	2.230	1490.503	231.052	78.6	80.5	0.10
2	3.253	407.001	56.002	21.4	19.5	0.11
	Total	1897.504	287.055	100.0	100.0	

Column Performance Table (From 50% - Trial05_ASPIRIN + CLOPIDOGREL

	Reten. Time	W05 [min]	Asymmetry [-]	Capacity [-]	Efficiency [th.pl]	Eff. [t.p./m]	Resolution [-]
1	2.230	0.097	1.320	0.00	2048	20483	-
2	3.253	0.113	1.278	0.00	4565	45651	6.736

All the system suitability requirements were met. The peak Asymmetry factor was less than 2 for both clopidogrel and aspirin .The efficiency was more than 2000 CLOPIDOGREL and aspirin .Resolution between two peaks >1.5. hence this method was for optimized.

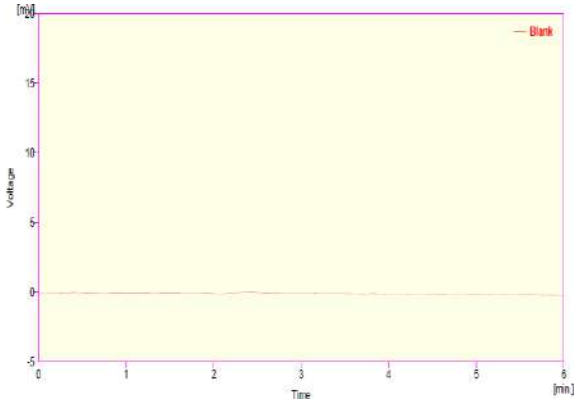
4.4 Assay Results

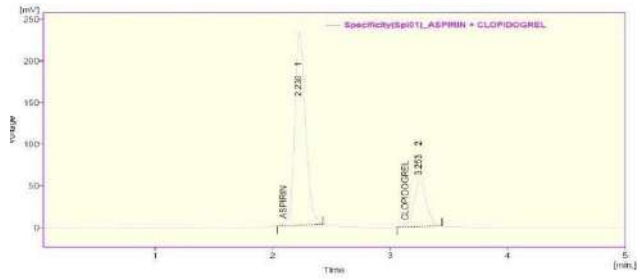
	ASPIRIN		CLOPIDOGREL	
	Standard Area	**Sample Area**	**Standard Area**	**Sample Area**
Injection-1	1487.1	1487.447	410.632	409.505
Injection-2	1483.265	1488.48	404.609	409.228
Injection-3	1488.429	1483.804	409.3	408.099
Injection-4	1489.131	1488.429	411.211	409.31
Injection-5	1483.538	1487.1	407.001	405.125
Average Area	1486.293	1487.052	408.5526	408.2534
Assay(%purity)	100.051094		99.92676 59	

The amount of Aspirin And Clopidogrel present in the taken dosage form was found to be 100.05 % and 99.92 % respectively.

VALIDATION

Specificity by Direct comparison method



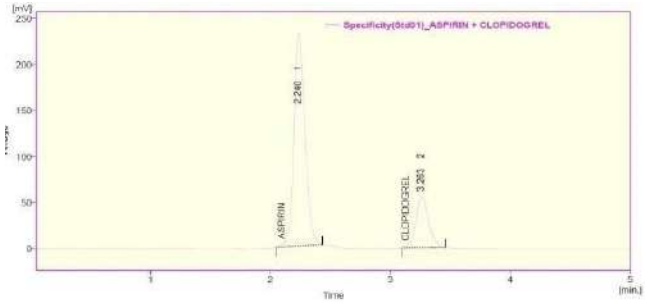


Result Table (Uncal -
Specificity(Spi01)_ASPIRIN + CLOPIDOGREL

	Reten. Time [min]	Area [mV s]	Height [mV]	Area [%]
1	2.230	1493.538	251.350	78.47
2	3.253	407.001	66.002	21.53
	Total	1900.538	297.352	100.00

Column Performance Table (From 50% -
Specificity(Spi01)_ASPIRIN + CLOPIDOGREL

	Reten. Time	W05 [min]	Asymmetry [-]	Efficiency [th.pl]	Eff/l [t.p./m]	Resolution [-]
1	2.230	0.097	1.328	2948	29483	-
2	3.253	0.113	1.276	4665	46651	6.736



Result Table (Uncal -
Specificity(Std01)_ASPIRIN + CLOPIDOGREL

	Reten. Time [min]	Area [mV s]	Height [mV]	Area [%]
1	2.240	1487.970	230.909	78.51
2	3.263	407.236	65.717	21.49
	Total	1895.206	296.626	100.00

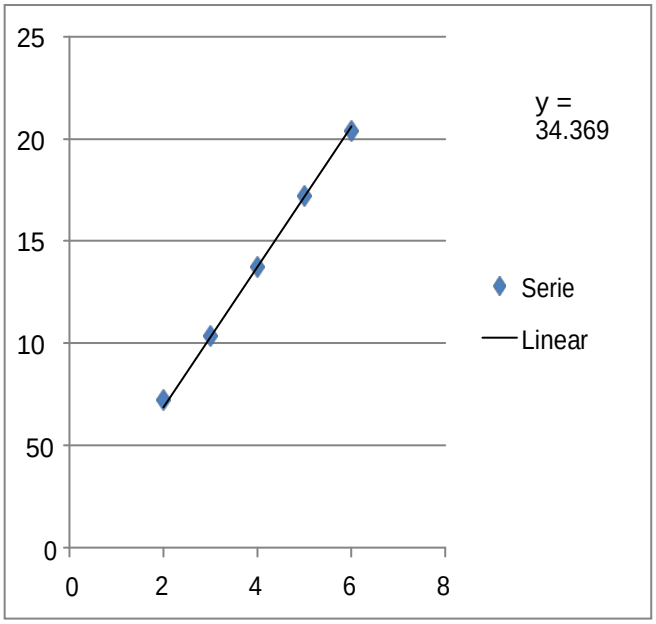
Column Performance Table (From 50% -
Specificity(Std01)_ASPIRIN + CLOPIDOGREL

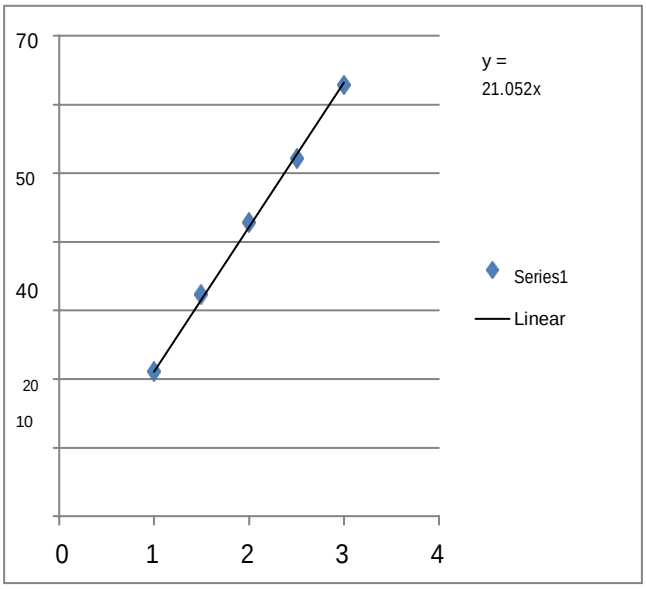
	Reten. Time	W05 [min]	Asymmetry [-]	Efficiency [th.pl]	Eff/l [t.p./m]	Resolution [-]
1	2.240	0.100	1.201	2780	27796	-
2	3.263	0.113	1.276	4693	46932	6.846

It is observed from the above data, diluent or excipient peaks are not interfering with the aspirin and clopidogrel peaks.

LINEARITY OF ASPIRIN AND CLOPIDOGREL

S.No.	Conc.(µg/ml)	Area	S.No.	Conc.(µg/ml)	Area
1	20	727.341	1	10	211.784
2	30	1035.752	2	15	322.204
3	40	1377.14	3	20	428.317
4	50	1722.958	4	25	520.564
5	60	2041.082	5	30	627.846





The correlation coefficient for linear curve obtained between concentration vs. Area for standard preparations of Aspirin And Clopidogrel is 0.998 and 0.998. The relationship between the concentration of Aspirin And Clopidogrel and area of Aspirin And Clopidogrel is linear in the range examined since all points lie in a straight line and the correlation coefficient is well within limits.

ACCURACY RESULTS OF ASPIRIN

Recovery level	Accuracy ASPIRIN			Average % Recovery
	Amount taken(mcg/ml)	Area	%Recovery	
50	20	410.811	197.6411668	
	20	411.371	197.9105828	
	20	411.224	197.8398611	
100	40	522.084	125.5873028	102.83
	40	527.341	126.8518741	
	40	529.651	127.4075446	
150	60	621.351	89.67958741	99.36
	60	621.351	89.67958741	99.103
	60	615.264	88.80105072	

Accuracy Results of Clopidogrel

Recovery level	Accuracy CLOPIDOGREL			Average % Recovery
	Amount taken(mcg/ml)	Area	%Recovery	
50	10	410.811	197.6411668	102.83
	10	411.371	197.9105828	
	10	411.224	197.8398611	
100	20	522.084	125.5873028	
	20	527.341	126.8518741	
	20	529.651	127.4075446	99.36
150	30	621.351	89.67958741	99.103
	30	621.351	89.67958741	
	30	615.264	88.80105072	

The percentage mean recovery of aspirin and clopidogrel is 99.19 and 99.89 % respectively.

Results For Method Precision Of Aspirin And Clopidogrel

ASPIRIN		
S.No.	**Rt**	**Area**
1	3.145	978370.000
2	3.165	962064.000
3	3.151	967422.000
4	3.148	955774.000
5	3.126	951906.000
6	3.116	962532.000
avg	3.1418	963011.333
stdev	0.0178	9297.067
%RSD	**0.57**	**0.97**

CLOPIDOGREL		
S.No.	**Rt**	**Area**
1	6.211	340457
2	6.224	341907
3	6.212	339323.000
4	6.194	339473.000
5	6.168	339074
6	6.170	340503.000
avg	6.197	340122.833
stdev	0.023	1058.443
%RSD	**0.38**	**0.31**

Test results for Clopidogrel And Aspirin are showing that the %RSD of Assay results are within limits.

Result of Robustness study

Parameter	ASPIRIN		CLOPIDOGREL	
	Retention time(min)	Tailing factor	Retention time(min)	Tailing factor
Flow Rate				
0.8 ml/min	2.562	1.679	5.059	1.263
1.2 ml/min	2.148	1.678	4.235	1.264
Wavelength				
233nm	2.566	1.687	5.052	1.262
237nm	2.570	1.686	5.065	1.265

From the observation it was found that the system suitability parameters were within limit at all variable conditions.

Results for Ruggedness

ASPIRIN	%Assay	CLOPIDOGREL	%Assay
Analyst 01	100.5	**Analyst 01**	98.9
Anaylst 02	99.5	**Anaylst 02**	100.6

From the observation the between two analysts Assay values not greater than 2.0%, hence the method was rugged.

5 CONCLUSION

From the above experimental results and parameters it was concluded that, this newly developed method for the simultaneous estimation Aspirin and Clopidogrel was found to be simple, precise, accurate and high resolution and shorter retention time makes this method more acceptable and cost effective and it can be effectively applied for routine analysis in research institutions, quality control department in meant in industries, approved testing laboratories studies in near future.

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PERFORMANCE OF INHUME SATELLITE OPTICAL COMMUNICATION USING DISTINCT MODULATION FORMATS

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Abstract - Optical networks are efficient in bandwidth which are very useful for wide area communication which is used to provide an efficient data transfer. In order to provide high speed data transmission between different satellites inter satellite optical wireless communication (ISOWC) is used. In this paper we performed in depth analysis of free space optical networks and evaluated the performance of ISOWC to provide high speed data transmission using different modulation formats.
Keywords: ISOWC, Free Space Optical communication, RZ, NRZ, CSRZ, DRZ, MDRZ, Qfactor.

1 INTRODUCTION

Optical communication is playing an important role in backbone networks for long haul communication. As the multimedia applications are increasing day by day that require high speed data transfer from sender to receiver. This everincreasing traffic demand is being accommodated using several advancements in optical network technologies. The dwdm system [1][2], the improved ROF optical communication networks [3][4][5]and the evolving field of EONS [6][7] are being used to accommodate hugeheterogeneous trafficin existing networks. The ISOWC is used for point to point communication at a high data rate. With the increasing demand of real time digital multimedia services, the demand for efficient and economical communication networks that provides high speed wired and wireless access in indoor and outdoor environments [8]. The ISOWC supports high data rate capability, unregulated bandwidth, low power, high efficiency, lesser antenna sizes and low cost but it also have several disadvantages includes the tracking problem and misalignment of transmitter and receiver apertures and the changes due to atmospheric conditions. The tracking problem causes various noise sources such as laser relative noise intensity, Johnson noise, dark currentnoise.

Vibration noise is the most degrading factor in ISOWC communication system. These noises cause errors in the system and made itmore susceptible towards the pointing errors. The main aim is to reduce the power dissipation and to reduce the ber. this result in high transmitter power andlesser receiver noise to obtain desired signal. Optical Wireless Communications (OWC) is a form of opticalcommunication in which unguided visible, Infrared (IR), or Ultraviolet (UV) light is used to carry a signal. OWC systems operating in the visibleband (390–750 nm) are commonly referred to as visible light communication (VLC). VLC systems take advantage of light emitting diodes (LEDS) which can be pulsed at very high speeds without noticeable effect on the lighting output and humaneye.

VLC can be possibly used in a wide rangeof applications including wireless local area networks, wireless personal area networks and vehicular networks among others.[1on the other hand, terrestrial point-to-point OWC systems, also known as the free space optical (FSO) systems,[2operate at the near IR frequencies (750–1600 nm). These systems typically use laser transmitters and offer a cost-effective protocol-transparent link with high data rates, i.e.,10 gbit/s per wave length, and provide apotential solution for the backhaul bottleneck. There has also been a growing interest on ultraviolet communication (UVC) as a result of recent progress in solid state optical sources/detectors operating within solar-blind UV spectrum (200–280 nm). In this so-called deep UV band, solar radiation is negligible at the ground level and this makes possible the design of photon- counting detectors with wide field-of-view receivers that increase the received energy with little additional background noise. Such designs are particularly useful for outdoor non-line-of-sight

configurations to support low power short-range UVC such as in wireless sensor and ad-hoc networks.

The system include a laser beam modulated with data and is transmitted through free space with less attenuation in comparison of microwave and RF links as light travels faster in vacuum and can travel a long distance in thousands of kilometers with minimumbit error rate the system is creditable until the atmospheric disturbances are not present and effect of atmospheric turbulences is heterogeneous for different modulation formats the data ratecan be varied from 5gbps to20gbps with a tolerable quality factor. Transmission properties affected due to other parameters include transmission aperture diameter, receiver aperture diameter and power of the operating laser source. thesystem requires more power when operated at large distances. To avoid the tracking problems the satellites should be in line-of-sight links so that transmitter and receiver pointing angles must be precisely confirmed. Signalreception can be intricate or impossible with a small deviation in beamangles.

2 ANALYSISOFINTERSATELLITEOPTICAL COMMUNICATIONS

Free space optical communication provides aunique method for the satellites orbiting around the earth to communication with each other. inter-satellite optical wireless communication systems (ISOWC), one of the important applications of free space optical communication technology, will be deployed in space in the near future as such systems provide a high bandwidth, small size, light weight, low power and low cost alternative to present microwave satellite systems. in this paper, optical inter-satellite link (ISL) is modeled using optical system and then investigation is carried outtostudy the effect of varying the wavelength between two satellites estranged by a distance of 1300 km at data rate 3gbps.

In our proposed system, the first subsystem is the transmitter part which consists of PRBS generator. It generates the data which is to be transmitted i.e. data source. The second subsystem represents the different modulation formats which get its output from the previous block. This subsystem encodes the data from PRBS output by (CSRZ, DRZ and DPSK) techniques. The third subsystem is DML i.e. directly modulate laser which operates on wavelength of 1552 nm because of low attenuation characteristics inoptical communicationin this wavelength region. The free space between transmitter and receiver is considered as OWC channel which is the propagating medium for the transmitted optical signal. The optical receiver comprises of a photo detector followed by a low pass bessel filter. In this section of system, the optical signal is converted back into electrical signal.apd (avalanche photo-diode) is used because of its high gain property. The last subsystem is BER tester which gives the quality factor and BER measurement.

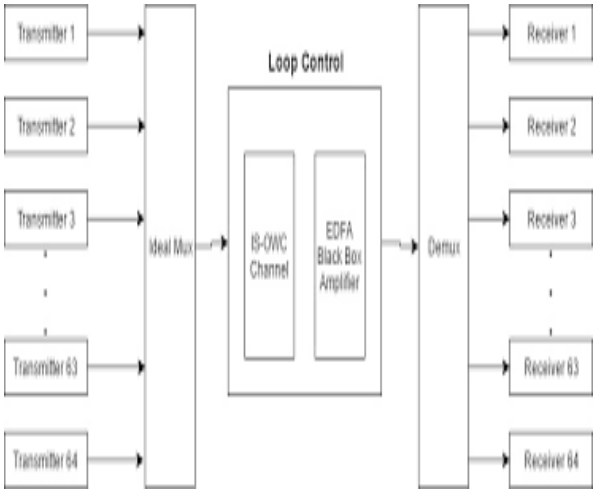

Figure 1 : Analysis of ISOWC

In order to analyze the performance of the inter-satellite link, BER and the quality factor are used as a key metric. This research presented the enhancement of the system performance with the help of advanced modulation techniquesand several antennas. The author analyzed the optical link performance between the satellites by varying the parameters which affect the performance of the system. The results indicated that the proposed system could support the 10gbps of data rate and can employ the 4 x 4 transceiver system over the distance of 6000km.in this research, 40 gbpsof higher data rate is accomplished in an inter-satellite optical wireless communication system with the help of QPSKmodulation.

3 MODULATIONFORMATS

The first step in the design of an optical communication systems is to decide how the electrical signal should be converted into an bit stream. There are two typical choices for the modulation format of the signal:

1. Return to Zero(RZ)
2. Non-return to Zero(NRZ)

Examples of modulation formats are shown in Figure 2:

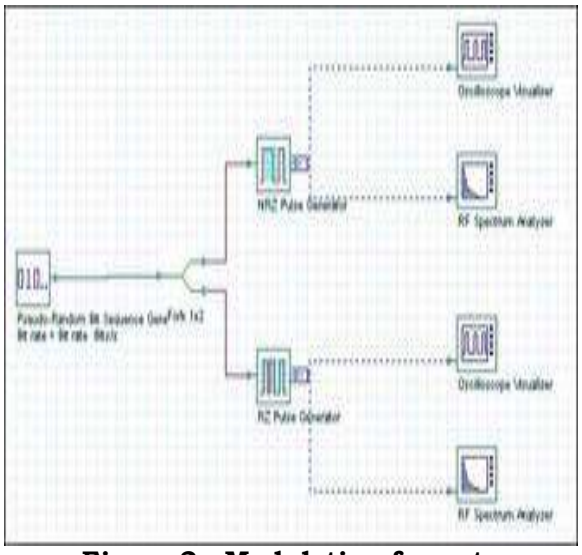

Figure 2 : Modulation formats

In the RZ formats, each pulse representing bit 1 is shorter than the bit slot, and its amplitude returns to zero before the bit duration is over (see figure 3). inthe NRZ format, the pulse remains on throughout the bit slot and its amplitude does not drop to zero between two or more successive 1 bits (see figure 3). asa result, pulse width varies depending on the bit pattern, whereas it remains the same in the case of RZformat.

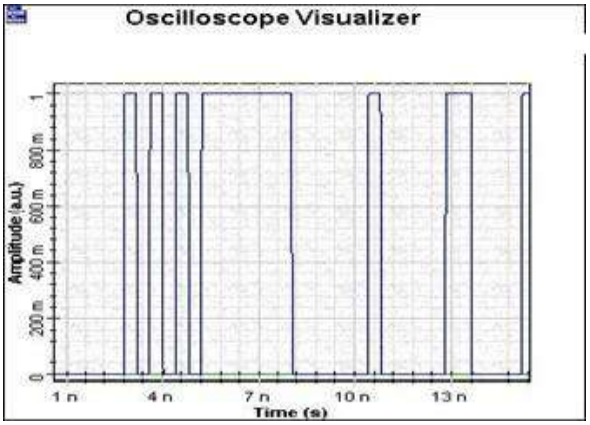

Figure 3: NRZ – time

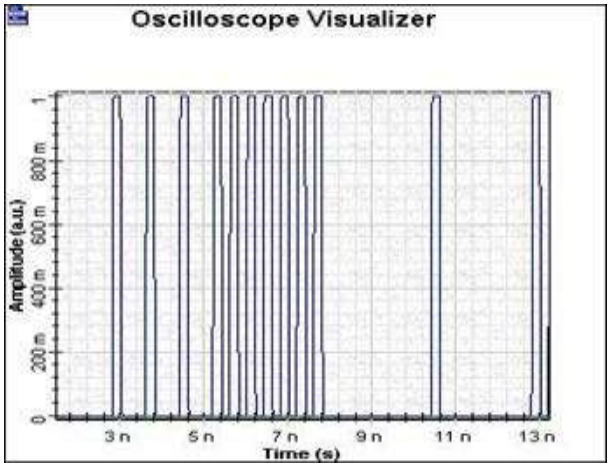

Figure 4: RZ – time

An advantage of the NRZ format is that the bandwidth associated with the bit stream is smaller than that of the RZ format by about a factor of 2, because on-off transitions occur fewer times (see figure 5 and figure 6).

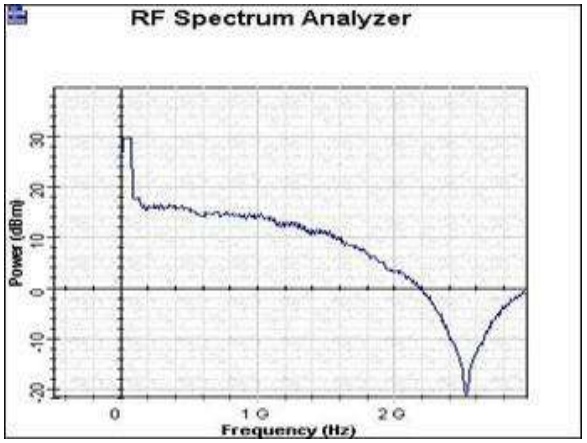

Figure 5 : NRZ – frequency

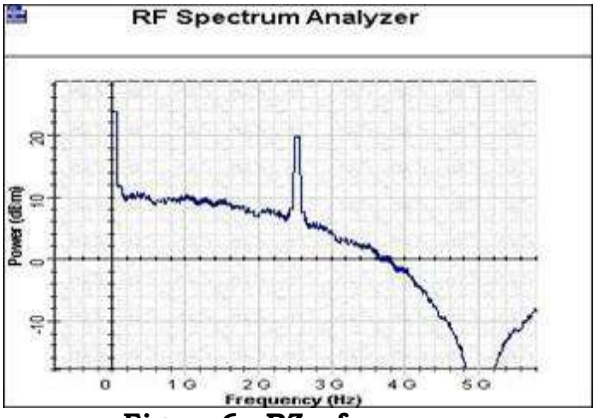

Figure 6 : RZ – frequency

4 CONCLUSION

In this paper we have analyzed ISOWC for inter satellite communication which can provide communication at higher speed and up to a larger distance compared to ordinary RF links. The performance of Inter-satellite optical communications is efficiently measured and analyzed. We also measured the high speed data transmission in ISOWC using different modulation formats.

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NASAL DRUG DELIVERY SYSTEM-A NOVEL OUTLOOK

Priyanka Kondampalli, Neha Fathima, Ayushi Kapadia

Abstract - Nasal Drug Delivery System is a combination of advance technique and new dosage forms which are far better than conventional dosage forms. The nasal route serves as an alternative for systemic availability of drugs which are affected by first pass metabolism and other conventional routes. They also have the potential for the treatment of indications which require a fast onset of effect or for drugs with low oral bioavailability. Recent research groups have demonstrated that low absorption of drugs can be countered by using absorption enhancers or increasing the drug residence time in the nasal cavity, and that some mucoadhesive polymers e.g.; carbopol, chitosan can serve both functions. Nasal route can be applied for delivery of various drugs such as peptides e.g.; vasopressin, non-peptides e.g.; insulin, vaccines and CNS drugs. Various physicochemical factors and formulation related parameters affect Nasal drug delivery systems. Applications of nasal mucoadhesive for the delivery of small organic molecules, antibiotics, proteins, vaccines through various dosage forms as yet have been found out. Drugs such as diazepam, oxytocin and nafarelin are available in the market in the form of sprays and solutions. Nanoparticulate dosage forms for vaccines such as Human influenza vaccine, Human Streptococcus A vaccine are still in preclinical studies and need to be introduced as nasal drug delivery systems.

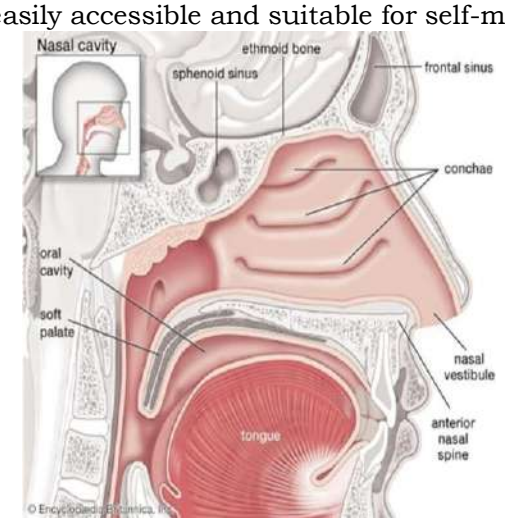
1 INTRODUCTION

Nasal mucosa has been considered as a potential administration route to achieve faster and higher level of drug absorption because it is permeable to more compounds than the gastrointestinal tract (GIT) due to lack of pancreatic and gastric enzymatic activity, neutral pH of the nasal mucus and less dilution by gastrointestinal contents.

Nasal therapy, has been recognized form of treatment in the Ayurvedic systems of Indian medicine, it is also called “NASAYA KARMA”.

It is a useful delivery method for drugs that are active in low doses and show no minimal oral bioavailability such as proteins and peptides.

The nasal route circumvents hepatic first pass elimination associated with the oral delivery: it is easily accessible and suitable for self-medication.



2 ANATOMY AND PHYSIOLOGY OF NASAL CAVITY

The nasal cavity is divided into two halves by the nasal septum and extends posterior to the nasopharynx, while the most anterior part of the nasal cavity, the nasal vestibule, opens to the face through the nostril.

The nasal cavity consists three main regions are nasal vestibule, olfactory region and respiratory region. The nasal cavity is covered with a mucous membrane which can be divided into two areas; non-olfactory and olfactory epithelium, in this

non-olfactory area includes the nasal vestibule which is covered with skin-like stratified squamous epithelium cells, where as respiratory region, which has a typical airways epithelium covered with numerous microvilli.

The goblet cells are present in the mucus membrane which covers the nasal turbinate and the atrium; it secretes the mucus as mucus granules which are swelling in the nasal fluid to contribute to the mucus layer.

The mucus secretion is composed of about 95% water, 2 % mucin, 1% salts, 1% of other proteins such as albumin, immunoglobulin s, lysozyme and lactoferrin, and b 1% lipids. The mucus secretion gives immune protection against inhaled bacteria and viruses.

3 NASAL DRUG DELIVERY SYSTEM DOSAGE FORMS

The selection of dosage form depends upon the drug being used, proposed indication, patient population and last but not least, marketing preferences. Four basic formulations must be considered, i.e. solution, suspension, emulsion and dry powder systems.

3.1 Liquid Nasal Formulations

Liquid preparations are the most widely used dosage forms for nasal administration of drugs. They are mainly based on aqueous state formulations.

1. Instillation and rhinyle catheter
2. Compressed air nebulizers
3. Squeezed bottle
4. Metered-dose pump sprays

3.2 Powder Dosage Forms

Dry powders are less frequently used in nasal drug delivery. Major advantages of this dosage form are the lack of preservatives and the improved stability of the formulation.

1. Insufflators
2. Dry powder inhaler

3.3 Pressurized MDIs

A metered-dose inhaler (MDI) is a device that delivers a specific amount of medication to the lungs, in the form of a short burst of aerosolized medicine that is inhaled by the patient. It is the most commonly used delivery system for treating asthma, chronic obstructive pulmonary disease (COPD) and other respiratory diseases.

3.4 Nasal Gels

Nasal gels are high-viscosity thickened solutions or suspensions. The ad- vantages of a nasal gel include the reduction of post-nasal drip due to high viscosity, reduction of taste impact due to reduced swallowing, reduction of anterior leakage of the formulation, reduction of irritation by using soothing/emollient excipients and target delivery to mucosa for better absorption.

4 MECHANISM OF NASAL ABSORPTION

The absorbed drugs from the nasal cavity must pass through the mucus layer; it is the first step in absorption.

Small, uncharged drugs easily pass through this layer but large, charged drugs are difficult to cross it.

The principle protein of the mucus is mucin, it has the tendency to bind to the solutes, hindering diffusion.

Additionally, structural changes in the mucus layer are possible as a result of environmental changes (i.e. pH, temperature, etc.). So many absorption mechanisms were established earlier but only two mechanisms have been predominantly used, such as: First mechanism and Second mechanism

a) **First mechanism-** It involves an aqueous route of transport, which is also known as the paracellular route but slow and passive. There is an inverse log-log correlation between intranasal absorption and the molecular weight of

water-soluble compounds. The molecular weight greater than 1000 Daltons having drugs shows poor bioavailability.

b) **Second mechanism-** It involves transport through a lipoidal route and it is also known as the transcellular process. It is responsible for the transport of lipophilic drugs that show a rate dependency on their lipophilicity. Drug also cross cell membranes by an active transport route via carrier-mediated means or transport through the opening of tight junctions.

For examples: Chitosan, a natural biopolymer from shellfish, opens tight junctions between epithelial cells to facilitate drug transport.

5 NASAL DRUG DELIVERY ROUTE ADVANTAGES AND LIMITATIONS

While comparing other routes such as parental, oral nasal has high potential, it directly delivers the drug to brain (through olfactory nerve), so the nasal route is much attractive when compared to other [30]. Brain is a delicate and highly perfused organ it has a lot of functions (sensory and collection processing and integrity finally motor actions). It is protected from the environmental factors, tight junctions surrounding the brain is called blood–brain barrier (BBB). It has a great transendothelial resistance which also blocks drug transport the delivery to brain by nose has many drug transport system such as (1) paracellular and (2) transcellular and/or neuronal pathway .

The presence of olfactory pathway it efficiently bypasses the BBB (32). Nasal route is better alternative route for drug absorption and also in patient with problems such as GIT infections and GI route (or) parental route is inconvenient Example: Patient with Zollinger-Ellison syndrome, vomiting patient unable to swallow (achalasia), difficulties in children and old aged persons [33]. The important limitation of the nasal route is not applicable for all drugs. To increase the drug half-life, we must know about the physiochemical properties such as acid base disassociation constant (pk), partition coefficient, molecular weight, and drug solubility [34].

Many drugs formulations are solution type. They are very difficult to absorb due to polar and low solubility as these cause poor membrane permeability, instant clearance, and enzymatic degradation within nasal canal. Drug or fillers which cause the local irritation to the nasal mucosa [35].

Formulation factors also have a great impact and type of formulation such as solid, liquid, gel, powder, and pH also included

6 CONCLUSIONS

- Nasal drug delivery system is a promising alternative route of administration for several systemically acting drugs having poor bioavailability compared to parenteral administration of drugs.
- In a nut shell, the advantages of intranasal delivery are numerous and very importantly it is rapid and non-invasive.
- Further research needs to be conducted in delivery of peptide and protein and vaccines through nasal delivery and delivery of drug from nose to brain.
- Various nasal products are yet to be manufactured for disorders such as migraine, nausea, heart attack, Parkinson's disease, Alzheimer's disease, diabetes, growth deficiency, osteoporosis and fertility treatment.

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PORTFOLIO RISK RETURN DYNAMICS AMONG INDIAN COMPANIES

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Abstract - Portfolio management is the act of building and maintaining an appropriate investment mix for a given risk tolerance. A combination of securities held together will give a beneficial result if they are grouped in a manner to secure higher returns with less risk. Data collected for the study is secondary in nature. Monthly data for NIFTY and 10 other companies has been selected for 1 year i.e., from 1st April 2018 to 31st march 2019. Data is collected from YAHOO finance and NSE websites. Portfolio consists of 5 companies, each from different industry selected from the list of NSE NIFTY 50. The current study focusses on the calculation of risk and returns of the portfolio constructed. Initially equal weightage is given to all the companies in the portfolio. Then with the help of Excel tool "solver", new weights are generated keeping in mind to achieve a higher return than that of the equally weighted portfolio constructed before. There are certain conditions given in the solver tools like Reduce the variance of the portfolio and Sum of weights equals 1. This study is relatable to **Modern Portfolio Theory** as it focusses on increasing the returns by reducing the risk in portfolio. Hence Risk and Returns calculations are the base criteria for this study to construct an optimum portfolio.

Keywords: Risk, Returns, Portfolio Management, Optimum Portfolio.

1 INTRODUCTION

The term portfolio refers to any collection of financial assets such as stocks, bonds and cash. Portfolios maybe held by individual investors or managed by financial professionals, hedge funds, banks and other financial institutions. Portfolio Analysis is the process of looking at each and every investment held within a portfolio and evaluating how it affects the overall performance. Portfolio analysis seeks to determine the variance of each security, beta of the portfolio, diversification and asset allocation of the portfolio. The analysis is done to understand the risks associated to the current portfolio and mitigate the identified risks.

A portfolio is a grouping of financial assets such as stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds. A portfolio can also consist of non-publicly tradable securities, like real estate, art, and private investments. The idea of an "optimal portfolio" comes from the modern portfolio theory. Among other things, this theory assumes that investors focus their efforts on minimizing risk while also striving to attain the highest possible return. According to this theory, investors will act rationally within these parameters, and that they will always make decisions with the goal of maximizing return for a given acceptable level of risk. Harry Markowitz introduced the idea of the optimal portfolio in 1952. This model shows that it is possible for different portfolios to have different levels of risk and return. This means that individual investors should determine how much risk they are willing to take on, and then they can allocate or diversify their portfolios according to the results of that decision

Modern Portfolio Theory (MPT), a hypothesis put forth by Harry Markowitz in his paper "Portfolio Selection," (published in 1952 by the *Journal of Finance)* is an investment theory based on the idea that risk-averse investors can construct portfolios to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward. It is one of the most important and influential economic theories dealing with finance and investment. Also called "portfolio theory" or "portfolio management theory," MPT suggests that it is possible to construct an "efficient frontier" of optimal portfolios, offering the maximum possible expected return for a given level of risk.

Risk in investment analysis means that future returns from an investment are unpredictable and the concept of risk may be defined as the possibility that the

actual return may not be same as expected. In other words, risk refers to the chance that the actual outcome (return) from an investment will differ from an expected outcome. With reference to a firm, risk may define as the possibility that the actual outcome of a financial decision may not be same estimated. The risk may be considered as a chance of variation in returns. **Raghavan. R. S (2000)** commented on the risk perceptions and the risk measure parameters. He opined that risk measures are related to the return measurements. While risks can only be contained and cannot be eliminated altogether, there is no doubt that some risks have to be taken to get adequate returns. Returns will be inflated or created faster by taking additional monetary and operative risks.

Vijay Soodd (2000) revealed the risks faced by banks and financial institutions and the degree of risk faced by them. According to him, risk management is gathering momentum at a time when there is increasing pressure on banks and financial institutions to better manage their assets and improve their balance sheet. He opined that the greater the volatility of expected returns, the higher is the risk. The essence of risk management is to reduce the volatility. **Nerlov (1968)**, found the factors influencing return of the scrip by taking 800 companies from the Standard and Poor index with the span of 15 years. The factors were identified by the study such as sales, retained earnings and growth in earnings. **Ben and Shalit (1975)** made an attempt to find out the relationship between the firm risk and its leverage, size and payout ratio. The study analyzed 1000 large companies listed in the fortune directory in the year of 1970.

Harrison and Zhang (1999) found positive risk and return relation at longer holding period. **Isakov (1999)** showed no arbitrage opportunities in Swiss stock market during the study period of 1983-1991. **Hodoshima et al. (2000)** reported that positive and negative excess returns produce the significant sconditional relationship between beta and return.

Chawla (2001) has examined the stability of beta in the Indian stock market. The study tested the stability of beta in the Indian stock market by using incorporating time variable in the regression and by using dummy variables for the slope coefficient. The study concluded instability of beta over the time period. **Irala and Patil (2007)** also studied the concept of portfolio size and diversification by using a monthly data during the study period of January 1999 to January 2005. The study suggested that a very high degree of diversification was possible in India and also concluded that a portfolio size of 10-15 stocks was found to be appropriate as the reduction in risk was only marginal thereafter.

Manjunatha et al. (2006) found that intercept is significantly differing from risk-free rate of return and slope is not equal to the difference between the market return and risk-free rates of return. This study was based on intercept and slope test and on the basis of this found that CAPM did not hold in Indian context. This study also showed an inverse relationship between the portfolio returns and their betas.

1 NEED FOR THE STUDY

The study is conducted to analyze risk and returns of portfolio management schemes or portfolio constructed. Risk and Return are the two correlated variables which determine almost every investment decision and to analyze and calculate the risk and returns of the portfolio constructed and to find measures to reduce the variability/risks in the portfolio and increase returns of the portfolio.

2 OBJECTIVES OF THE STUDY

- To Calculate the Risk and Return of selected companies.
- To Determine the Correlation and Covariance between the stocks.
- Calculation of Portfolio Returns and Portfolio Risk for select companies.
- Construct an Optimal Portfolio with less Risk and Higher Returns.

3 METHODOLOGY

This is quantitative in nature. The main purpose of the study is to calculate the risk and return of the stocks with the help of various statistical tools like

Correlation, Standard deviation, Variance etc. Secondary data has been collected to perform the analysis using Annual reports of the companies, Internet websites (YAHOO FINANCE) and Stock exchanges (NSE).

Among the NIFTY 50 companies, to construct a portfolio 5 different industries have been selected Consumer goods, Automobile, Financial services, IT, and Energy Sector Industries. Among all the above industries, one company is selected from each industry to construct the portfolio. Initially the portfolio is given equal weights i.e., 20% or 0.20. various statistical measures are calculated for each company (i.e) Average return, Standard deviation, Variance, Portfolio returns, Portfolio standard deviation, Portfolio variance, Variance/covariance matrix, and Correlation matrix. Once all the values are derived for the initial portfolio, excel tool SOLVER has been used to generate optimum weights to the portfolio so as to reduce the variance of initial portfolio and increase the returns of the initial portfolio. There are certain conditions given to the Solver tool to perform the calculations such as Changing the values of weights, Minimize the value of Initial Portfolio variance, Sum of Weights is equal to 1. Satisfying these conditions, the Solver tool spits out a combination of weights with which the variance of the portfolio is reduced and returns are increased, thus constructing a Optimum portfolio. The following statistical calculations have been performed on the data collected in excel sheets:

Portfolio returns are calculated by using the formula:
Where, **Rp =** Returns of portfolio, **Wi =** Weights of investment, **Ri=**Returns on investment.

Portfolio risk is also known as portfolio standard deviation. We calculate the standard deviation of all the portfolio investments. It is the measure to calculate the total risk of portfolio. Standard deviation of the investments made in the portfolio should be less than weighted average of the standard deviations of the individual investments.

Portfolio standard deviation for a two-asset investment:

$$\sigma_P = (w_A^2\sigma_A^2 + w_B^2\,\sigma_B^2 + 2w_Aw_B\sigma_A\sigma_B\rho_{AB})^{1/2}$$

Where,
σA: Standard deviation of asset A.
σB : Standard deviation of asset B.
σP : Standard deviation of portfolio.
ρAB : Correlation coefficient between assets A and B.
WA: Weight of asset A in the portfolio.
WB : Weight of asset B in the portfolio.

Portfolio variance means the dispersion of the returns of the portfolio from the mean returns estimated. It also tells about the total risk of the portfolio. Portfolio variance depends on the correlation coefficients and covariance of the securities in the portfolio. A lower correlation between the securities of portfolio results in a lower portfolio variance. Portfolio beta is the measure of overall systematic risk of a portfolio investment. It equals the weighted average of the beta coefficient of all the individual stocks in the portfolio.

Portfolio beta equals the sum of products of weights of individual investments and beta coefficients of those investments. It is the measure of systematic risk of the portfolio.

$$\beta p = WA \times \beta A + WB \times \beta B + \ldots + WN \times \beta N$$

Where,
βP: Beta of the portfolio.
βA :Beta of asset A.
βB :Beta of asset B.
βN :Beta of asset N.
WA: Weight of asset A in the portfolio.
WB : Weight of asset B in the portfolio.
WN : Weight of asset N in the portfolio

Portfolio Rebalancing is the best practice followed by many investors to review their portfolio at the end of each year and make adjustments so as to continue meeting their investment objectives.
Rebalancing is the process of realigning the weights of the portfolio assets. Rebalancing involves periodically buying and selling the assets in the portfolio to maintain an original desired asset allocation or risk.

- Rebalancing safeguards investor from over exposure to undesired risks.
- Rebalancing ensures that the portfolio exposures are within manager's area of expertise.

4 DATA ANALYSIS

It involves critical analysis and interpretation of figures and numbers, and attempts to find a set of reasons or logics for the occurrence of findings.Portfolios have been constructed on the criterion that each company must belong to different industry. From the list of NIFTY50, industries with highest number of companies are first selected and then one company is selected from each industry. An initial portfolio is constructed with equal weights, its portfolio returns, variance, standard deviation and beta are calculated. These values are compared to the optimum portfolio constructed through Solver tool.

Table No. 1
Portfolio 1

S.No.	Company	Industry
1	ITC	Consumer Goods
2	Tata Motors	Automobile
3	Yes Bank	Financial Services
4	Wipro	IT
5	Reliance	Energy

The above table 1 represents the portfolio 1 constructed.

Portfolio 1
Table No. 2
Monthly Closing Prices of the Companies

DATE	NIFTY	ITC	TATA MOT	YES BANK	WIPRO	RELIANCE
Mar-18	10113.7	255.500	326.85	304.85	210.86	882.7
Apr-18	10739.35	281.450	340.400	362.000	209.062	963.300
May-18	10736.15	271.650	282.500	346.200	196.425	921.350
Jun-18	10714.3	266.200	269.300	339.650	196.125	972.450
Jul-18	11356.5	297.700	264.100	367.950	207.300	1186.000
Aug-18	11680.5	319.850	267.500	343.500	225.938	1241.650
Sep-18	10930.45	297.750	223.700	183.650	243.000	1257.950
Oct-18	10386.6	280.100	179.100	188.100	248.400	1061.250
Nov-18	10876.75	285.800	171.950	169.800	243.488	1167.550
Dec-18	10862.55	281.650	172.700	181.800	248.137	1121.250
Jan-19	10830.95	278.650	181.200	194.100	276.900	1227.150
Feb-19	10792.5	276.050	177.450	231.150	276.675	1231.050
Mar-19	11623.9	297.250	174.250	275.100	254.800	1363.250

The above table contains the monthly closing prices of NIFTY and 5 companies of the first portfolio for the year 1st April 2018 to 31st march 2019.

Table No. 3
Monthly Returns of the Companies Returns

DATE	NIFTY	ITC	TATA MOT	YES BANK	WIPRO	RELIANCE
Mar-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Apr-18	6.19%	10.16%	4.15%	18.75%	-0.85%	9.13%
May-18	-0.03%	-3.48%	-17.01%	-4.36%	-6.04%	-4.35%
Jun-18	-0.20%	-2.01%	-4.67%	-1.89%	-0.15%	5.55%
Jul-18	5.99%	11.83%	-1.93%	8.33%	5.70%	21.96%
Aug-18	2.85%	7.44%	1.29%	-6.64%	8.99%	4.69%
Sep-18	-6.42%	-6.91%	-16.37%	-46.54%	7.55%	1.31%
Oct-18	-4.98%	-5.93%	-19.94%	2.42%	2.22%	-15.64%
Nov-18	4.72%	2.03%	-3.99%	-9.73%	-1.98%	10.02%
Dec-18	-0.13%	-1.45%	0.44%	7.07%	1.91%	-3.97%
Jan-19	-0.29%	-1.07%	4.92%	6.77%	11.59%	9.44%
Feb-19	-0.36%	-0.93%	-2.07%	19.09%	-0.08%	0.32%
Mar-19	7.70%	7.68%	-1.80%	19.01%	-7.91%	10.74%

The above table represents the monthly returns of NIFTY and 5 companies of portfolio 1.

The covariance matrix, the off diagonal elements contain the covariances of each pair of variables. The diagonal elements of the matrix contain the variances of each variables. The variance measures how much the data is scattered about the mean.

Table No. 4
Variance/Covariance Matrix

	VAR/COVAR MATRIX				
	ITC	TATA MOT	YES BANK	WIPRO	RELIANCE
ITC	0.00339689	0.00291532	0.0049252	-0.00020087	0.003905248
TATA MOT	0.00291532	0.00613314	0.00696186	0.00080511	0.004156788
YES BANK	0.0049252	0.00696186	0.02741351	-0.00313934	0.002574934
WIPRO	-0.00020087	0.00080511	-0.00313934	0.00294797	0.000600407
RELIANCE	0.00390525	0.00415679	0.00257493	0.00060041	0.007831081

Interpretation

The above table represents the Variance-Covariance matrix of the companies in the portfolio. Highlighted cells are the variance for each individual company. Remaining cells are the covariances for one company to another. A correlation matrix is a table showing correlation coefficients between variables. Each cell in the table shows the correlation between two variables. A correlation matrix is used as a way to summarize data, as an input into a more advanced analysis, and as a diagnostic for advanced analyses.

Table No. 5

		CORRELATION MATRIX			
	ITC	TATA MOT	YES BANK	WIPRO	RELIANCE
ITC	1				
TATA MOT	0.6387	1			
YES BANK	0.5104	0.5369	1		
WIPRO	-0.0635	0.1893	-0.3492	1	
RELIANCE	0.7572	0.5998	0.1757	0.125	1

Interpretation

The above table is the correlation matrix of the companies. It represents the relativity or similarities in one company to other. Lesser the correlation, higher will be the returns of the portfolio.

Initial Portfolio

Table No. 6 Initial Portfolio and its Results

ITC	0.2
TATA MOT	0.2
YES BANK	0.2
WIPRO	0.2
RELIANCE	0.2

PORTFOLIO RETURNS	0.66 %
PORTFOLIO VARIANCE	0.3789 %
PORTFOLIO STANDARD DEVIATION	0.00144 %
PORTFOLIO BETA	120.636 %

INTERPRETATION

The above table is the initial portfolio constructed where the weights are divided equally among all the companies. Then the weights are used to calculate all the portfolio returns, variance, standard deviation, and beta. Portfolio returns are 0.66% and portfolio variance is 0.3789%. Portfolio standard deviation is at 0.00144%. Beta of the portfolio is 120.636%.

Optimum Portfolio

Table No. 7

ITC	38.79%
TATA MOT	0.00%
YES BANK	4.74%
WIPRO	56.47%
RELIANCE	0.00%

PORTFOLIO RETURNS	1.47 %
PORTFOLIO VARIANCE	0.14 %
PORTFOLIO STANDARD DEVIATION	0.000207 %
PORTFOLIO BETA	34.92 %

Interpretation

The above table represents the optimum portfolio where the weights are distributed by the excel tool solver so as to decrease the variance of the portfolio and thereby increasing the returns. The new weights are again used to calculate the portfolio returns, variance, standard deviation, and beta of the portfolio. When compared to initial portfolio, we can find that the portfolio returns have increased to 1.47%. Portfolio variance is decreased to 0.14% and standard deviation to 0.000207%. Portfolio beta is reduced to 34.92%.

5 FINDINGS

Equal distribution of weights in the portfolio doesn't always gives the highest returns. Optimum weights generated by the solver tool are highly positive in giving highest results to that portfolio. The limitations of the study are that only one Portfolios have been Constructed for this study.

Data collection is restricted to only 1 financial year. No measures like Jensen, Sharpe's and Treynor's were used in this study. Traditional methods such as Variance and Standard deviation are used for Portfolio Optimization.

6 CONCLUSION

Portfolio management means selecting the right investment tools in the right proportion to generate optimum returns from the investments made. A portfolio is built based on investor's investment budget, and risk appetite keeping expected rate of return in mind. The objective of this study is to make an attempt to prepare an optimal portfolio.

Oneportfolios has been constructed initially and later optimum portfolio has been constructed for the same by rebalancing the weights of the portfolios. Rebalancing the weights have given positive results by an increase in the portfolio returns and a reduce in the portfolio variance.

Risk and return of the portfolio are hence two correlated factors which need to be taken into consideration while doing any investment. Risk and return analysis of the investments in portfolio can show us whether the investments give us the desired returns or not.

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FORMULATION AND EVALUATION OF SUSTAINED RELEASE MATRIX TABLETS OF ANTI HYPERTENSIVE AGENT

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Abstract - The main aim of proposed work was to develop Nifedipine matrix tablets, sustained release dosage form, Nifedipine has been formulated as both a long- and short-acting 1,4-dihydropyridine calcium channel blocker. Designing of sustained release formulation has to prolonged therapeutic effect by continuously releasing medication over an extended period of time after administration of single dose. The sustained release tablets were prepared by direct compression method using Hydroxy propylmethyl cellulose (HPMC K4M, K15M), Dicalcium phosphate, Metalose (60SH-50) and, carbopol 971p in varying ratios. Blended powder for tablets were evaluated for loose bulk density, tapped bulk density, compressibility index and angle of repose, and shown satisfactory results. The compressed tablets were then evaluated for various physical tests like diameter, thickness, uniformity of weight, hardness, friability, and drug content. The granules exhibited satisfactory rheological demeanor. The results of all these tests were found to be satisfactory. By using paddle method for in-vitro dissolution study was carried out for 12 hours in phosphate buffer (pH 6.8) as dissolution media. Formulation F1 to F16 direct compression method, sustain release and among all the formulation, F14 formulation was compared with the marketed product for drug release pattern and was matched using similarity factor 70.11(f2) which showed that formulation F14 performed similar to the marketed product therapeutically. This finding reveals that above a particular concentration of dicalcium phosphate, HPMC K4M, K15M and Carbopol 971p, Magnesium stearate are capable of providing sustained drug release.
Keywords: HPMC K4M, HPMC K-15M, Di calcium phosphate, Metalose 60SH-50 carbopol 971P, Magnesium Stearate matrix tablets.

1. INTRODUCTION

For many decades onwards sustained release drug delivery system is existed in the medical and pharmaceutical literature. Different of names are associated with sustained release products such as continuous release, controlled release, delayed release, delayed action, depot, extended action, gradual release, long acting, long lasting, long-term release, prolonged release, slowly acting, slow release, time coat, sustained release, sustained action, time disintegration, time release etc.

Sustained release drug delivery system [7,8,9]:

Predetermined fraction of the total dose released into GI tract by using designed sustained release oral dosage form. The loading dose will produce desired pharmacological response as promptly as possible and remaining dose is an maintenance dose released in controlled rate manner. The rate of drug absorption into the body from the entire maintenance dose should equal to the rate of the drug removal from the body by all the processes to achieve desired intensity of pharmacological response is required.

Controlled release drug delivery system [7,8,9]:

Drug delivery systems from which therapeutic agents may be automatically delivered at predefined rates over a long period of time are called as controlled drug delivery systems.
Oral controlled release drug delivery systems are classifies as:

1. Dissolution controlled release system: a) Encapsulation dissolution control b) Matrix dissolution
2. Diffusion controlled release a) Reservoir devices b). Matrix devices
3. Diffusion and dissolution controlled systems.
4. Ion Exchange Resins
5. pH Dependent formulations
6. Altered density formulations
7. Osmatically Controlled systems

Matrix diffusion controlled drug delivery system [10,11,12]: In this type of controlled drug delivery system, the drug reservoir results from the homogeneous dispersion of the drug particles in either a lipophilic or a hydrophilic polymer matrix.
Zone 1: Undissolved drug, glassy polymer layer.
Zone 2, 3: Undissolved drug, gel layer.
Gel layer thickness = Difference between erosion and swelling front position.

The rare of drug release from these systems is time dependent and is given by, $dQ/dt = (AC_rD_p/2t)^{1/2}$

Where, dQ/dt is rate of drug release, A is loading dose, C_r is the drug solubility in polymer, T is time, D_p is drug diffusivity in the polymer.

Mode of action of hydrophilic matrix dosage form [12,13] : Hydrophilic matrix dosage forms essentially consist of a compressed blend of hydrophilic polymer and drug. Drug release occurs immediately from the surface (burst effect) followed by diffusion through, and / or erosion of, the hydrated layer. The relative proportions of drug released by diffusion and erosion are determined by the drug's solubility properties and by the physical and chemical nature of the hydrated polymer.

2. MATERIALS AND METHODS

Nifedipine, HPMC K4M, HPMC K15M, Carbopol 971p,Metalose 60 SH50, Di calcium Phosphate, Aerosil, and magenesium stearate.

Methods: Formulation of sustained release matrix tablets of Nifedipine tablets were prepared by direct compression method. All the mentioned ingredients were passed through 60 mesh sieve separately. The small quantity of drug added to the diluents and was mixed by small portion. This total blend was mixed uniformly get a uniform mixture and finally kept aside. Then all the required ingredients were weighed and mixed in an order and tablets were compressed using 16 station tablet punching machine.

Preparation and Evaluation of Blend of Drug and Excipients: Preparation of powder blend: All the required ingredients were passed through sieve no. 40.

Preparation of powder blend: All the required ingredients were passed through sieve no. 60. Excipients and blends were mixed and were subjected to preformulation studies of repose, bulk density, tapped density, % compressibility and flowability.

Organoleptic evaluation: The color, odor and taste of the model drug were evaluated and tabulated using descriptive terminology.

Particle size distribution: 10.35 grams of sample was taken and added to an assembly of sieves consisting ASTM sieve numbers # 30, 40, 60, 80,100,120 base plate and sieve shaker was closed and kept on sieve shaker and started analysis. Weights retained were checked for every 5 minutes and process was continued until variation in weights retained was not more than 5% or 0.1 gram. 20 minutes was set as end point based on the observation. Calculations were made to obtain cumulative percentage of retained weight and tabulated.

Bulk density: Bulk density was determined by pouring 15gram of drug (previously passed through 18# sieve to remove any lumps) into a graduated cylinder inclined at 45^0 to horizontal surface. The cylinder was then brought to standing position and measured the volume occupied by material to the nearest possible and calculated BD using following formula.

Bulk density = Weight / Bulk volume.

Tapped density: Tapped density is determined by using Electrolab Td Tester according to USP method I. A 50 ml measuring cylinder was taken and the weight of the cylinder was noted. 15 g of drug was weighed and added to the cylinder and weight and volume of the cylinder was noted. The measuring cylinder was subjected to 500 taps in TD apparatus, then Volume was noted, then again subjected to 750 taps and volume (V_a)was noted, then the tapping was continued for 1250 taps and volume(V_b)was noted, the difference between V_a and V_b was less than 1 % so V_a was selected as final tapped volume. Tapped density was calculated using following formula.

Tapped density = Weight / Tapped volume

Carr's Index: Carr's index was calculated using the following equation:

CI = (Tapped density-Bulk density) / Tapped density x100

Hausner's Ratio: The Hausner's ratio is another index of the flow-ability of the pharmaceutical powders. It was calculated using following equation:

Hausner's Ratio = Tapped density/Bulk density.

Angle of Repose: Angle of repose was measured by passing Drug through a funnel on graph paper until the pile touches the tip of the funnel. The funnel was kept at a fixed height of 2cm, from the horizontal surface to the tip of funnel. The radius 'r' of the cone base formed was determined. The angle of repose (θ) was calculated as follows:

$\theta = \tan^{-1}(h/r)$ Where h = height of heap the pile, r = radius of base of the pile, and θ = angle of repose.

Drug-Excipients compatibility study: Physical observation: Physical mixtures of drug and excipients were prepared by grinding specific ratios of drug and excipients in a mortar. Sample of 3-4 grams was taken and loaded in a glass vial, covered with rubber stopper, sealed with aluminum cap and labeled properly. Samples were observed and color was recorded for initial evaluation and loaded into stability chamber 40^0 c temperature and 75 % relative humidity for 4 week Compatibility study. Samples were removed at 1 week interval for four weeks and observed for any color change.

UV method development for estimation of drug: Preparation of different buffer media: pH 1.2 buffer**:** 85 ml of 0.2 M HCl was added to 50 ml of 0.2 M potassium chloride solution and volume was made up to 200 ml.

Phosphate Buffer pH **6.8:** Place 6.8g of potassium dihydrogen phosphate and 0.896g of sodium hydroxide in a 1000ml volumetric flask, and then add water to volume and mix.

Standard Stock: 100 mg of model drug was taken and added to respective media in a 100 ml volumetric flask and volume was made up to 100 ml, resulting in a standard stock solution of 1 mg/ml.

Working Stock: From the above standard stock solution 10 ml was taken and added to respective buffer media in a 100 ml volumetric flask and volume was made up to 100 ml to obtain 100 mcg/ml solution. From the working stock dilutions were prepared using respective media.

Determination of absorption maxima: 10 µg/ml solution was taken to determine absorption maxima. Initially blank buffer solution was kept and scanned in the

region of 200-400 nm. Then sample was kept for analysis and scanned in the same region. Absorption maxima were found to be 235 nm. Hence all further analysis was carried out at 235 nm for P^H 1.2, P^H 6.8 buffers.

Determination of Beer's law range and plotting of calibration curve: From the working stock solution 1,2,3,4,5,6,7,8,9,10 ml of sample was taken and diluted up to 10 ml using respective buffer media in a 10 ml volumetric flask resulting in concentrations of 10,20,30,40,50,60,70,80,90 and 100 µg/ml solutions. These were analyzed at 235 nm and calibration curve was plotted taking concentration in µg/ml on X-axis and absorbance units on Y-axis.

Table 1: Composition of model drug formulations for direct compression

Ingredients (mg)	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16
Drug(Nifedipine)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
DCP	77	72	67	62	77	72	67	62	77	72	67	62	77	72	67	62
Hpmck4M	10	15	20	25	--	--	--	---	---	--	--	--	--	--	--	---
Hpmck15M					10	15	20	25	--	----	--	---	---	--	---	---
Metolose60SH50	--	---	---	----	---	---	---	---	10	15	20	25	--	---	---	--
Carbopol 971p	---	---	---	---	---	---	---	---	--	---	---	--	10	15	20	25
Aerosil	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mag.stearate	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total(mg)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

3. RESULTS

Particle size distribution of model drug:

Sieve Mesh Number	Sieve Size (µm)	Mass of Sample Retained	Percentage of Sample Retained	Cumulative Percentage Of Sample (%)
30	841	0.08	0.77	0.8
40	425	0.06	0.57	1.4
60	250	0.05	0.48	1.9
80	180	0.41	3.96	5.9
100	150	1.55	14.97	20.9
120	130	2.62	25.31	46.2
Pan	-	5.55	53.62	99.8

Pre Compression parameters

Formulation Codee11eee	Derived properties		Flow properties		
	Bulk density (mean±SD)	Tappd Density (mean±SD)	Angle of repose (mean±SD)	Carrs index (mean±SD)	Hausners ratio (mean±SD)
F1	0.436±0.01	0.492±0.015	26.48±0.30	11.47±1.97	1.128±0.02
F2	0.449±0.015	0.505±0.02	27.24±0.39	11.21±1.96	1.129±0.03
F3	0.491±0.015	0.58±0.01	24.98±0.68	11.88±3.97	1.137±0.05
F4	0.478±0.015	0.527±0.015	23.23±0.96	9.46±1.81	1.108±0.02
F5	0.432±0.02	0.499±0.03	25.97±0.73	12.68±2.25	1.148±0.03
F6	0.44±0.01	0.467±0.006	24.27±0.36	9.34±3.16	1.105±0.04
F7	0.451±0.025	0.538±0.025	28.23±0.29	15.53±1.19	1.186±0.02
F8	0.43±0.01	0.53±0.017	23.89±0.40	11.67±3.61	1.128±0.05
F9	0.42±0.01	0.459±0.025	25.19±0.34	10.86±2.84	1.115±0.04
F10	0.444±0.015	0.518±0.032	26.76±0.63	14.22±1.11	1.167±0.01
F11	0.408±0.02	0.49±0.01	23.95±0.46	13.49±2.48	1.158±0.03
F12	0.415±0.02	0.475±0.015	28.23±0.27	14.21±3.22	1.152±0.02
F13	0.451±0.015	0.518±0.02	22.85±0.39	12.23±1.75	1.141±0.02
F14	0.43±0.017	0.484±0.02	26.96±0.54	13.04±4.32	1.159±0.08
F15	0.456±0.015	0.6±0.02	25.83±0.28	9.27±2.71	1.104±0.03
F16	0.435±0.01	0.491±0.015	26.47±0.30	11.46±1.97	1.127±0.02

Inference: Hardness of the tablet was acceptable and uniform from batch to batch variation, which was found to be 3-4 kg/cm2. All the formulations passed the weight variation test as the % weight variation was within the pharmacopoeial limits of the tablet weight.
Friability values were found to be less than 1% in all formulations F1-F16 and considered to be satisfactory ensuring that all the formulations are mechanically stable.

The angle of repose of different formulations was ≤ 28.24 which indicates that material had good flow property. So it was confirmed that the flow property of blends were free flowing. The bulk density of blend was found between 0.408g/cm^3 to 0.492 g/cm^3.Tapped density was found between 0.465g/cm^3 to 0.6 g/cm^3.These values indicate that the blends had good flow property. Carr's index for all the formulations was performed.

FTIR for Pure Drug: Drug-Excipients compatibility study: FTIR Studies
Physical mixtures of drug and excipients were prepared by grinding specific ratios of drug and excipients in a mortar. Sample of 3-4 grams was taken and loaded in a glass vial, covered with rubber stopper, sealed with aluminum cap and labeled properly. Samples were observed and color was recorded for initial evaluation and loaded into stability chamber 40^0 c temperature and 75 % relative humidity for 4 week Compatibility study. Samples were removed at 1 week interval for four weeks and observed for any color change. The in-vitro dissolution data for best formulation F14 were fitted in different kinetic models i.e. zero order, first order, Higuchi and Korsemeyer-peppas equation. Optimized formulation F14 shows r2 value 0.995. As its value nearer to the "1" it is conformed as it follows the First order release. The mechanism of drug release is further confirmed by the korsmeyer and peppas plot, if n=0.45 it is called Case I or Fickian diffusion, 0.45<n<0.89 is for anomalous behavior or non-Fickian transport, n-0.89 for case II transport and n>0.89 for SupercaseII transport.

4 POST COMPRESSION PARAMETERS

Table:1 Characterization of tablets

Formulation	Weight	Thickness (mm)	Hardness (kg/cm^2)	Friability
F1	100±1.55	2.04±0.03	3.2±0.15	0.17±0.03
F2	99±0.94	2.08±0.02	3.2±0.25	0.14±0.02
F3	101±0.59	2.03±0.03	3.1±0.31	0.15±0.01
F4	100±1.81	2.06±0.05	3.8±0.21	0.31±0.02
F5	100±1.41	2.09±0.03	3.1±0.2	0.13±0.01
F6	101±1.57	2.07±0.04	3.3±0.26	0.24±0.02
F7	100±0.49	2.05±0.07	3.1±0.31	0.16±0.05
F8	100±1.46	2.08±0.02	3.3±0.25	0.14±0.03
F9	100±0.84	2.02±0.02	3.1±0.45	0.19±0.08
F10	99±1.65	2.04±0.02	3.1±0.41	0.23±0.02
F11	100±0.43	2.10±0.03	3.3±0.21	0.14±0.02
F12	100±1.23	2.06±0.03	3.2±0.15	0.26±0.01
F13	100±0.76	2.09±0.02	3.3±0.31	0.27±0.03
F14	101±0.52	2.06±0.01	3.1±0.41	0.19±0.01
F15	100±0.40	2.08±0.02	3.9±0.15	0.2±0.01
F16	100±0.71	2.09±0.03	3.8±0.21	0.18±0.005

Table: 2 Invivo Dissolution Studies:

Time(hr)	% Drug release														
	F1	F2	F3	F4	F5	F6	F7	F8	F10	F11	F12	F13	F14	F15	F16
1	28.15±0.6	28.28 ±0.8	25.32±0.2	22.25 ±0.5	28.16 ±0.6	24.29 ±0.8	24.39 ±0.2	20.34 ±0.5	35.26± 0.24	31.44± 0.48	31.26 ±0.32	27.12 ±0.6	19.23± 0.8	16.35± 0.2	14.28 ±0.5
2	44.33±0.4	41.55 ±0.5	33.71±0.4	31.89 ±0.6	42.36 ±0.4	38.58 ±0.5	32.76 ±0.4	26.26 ±0.6	56.65± 0.46	53.86± 0.56	49.39 ±0.12	41.38 ±0.4	29.2±0 .5	25.74± 0.4	23.36 ±0.6
4	61.21±0.5	58.33 ±0.5	52.65±0.9	46.48 ±0.5	60.25 ±0.5	57.37 ±0.5	48.68 ±0.9	42.6± 0.5	86.29± 0.61	73.74± 1.20	61.89 ±1.1	56.25 ±0.5	44.6±0 .5	35.64± 0.9	29.24 ±0.5
6	78.82±0.8	78.28 ±0.5	67.28±0.5	58.57 ±0.4	78.87 ±0.8	73.29 ±0.5	67.25 ±0.5	58.26 ±0.4	97.55± 0.17	85.29± 0.51	74.54 ±0.7	68.86 ±0.8	55.32± 0.5	39.2±0 .5	32.47 ±0.4
8	98.18±0.4	89.69 ±0.6	83.126± 0.5	69.36 ±0.2	96.28 ±0.4	87.68 ±0.6	77.126±0.5	66.64 ±0.2	_	92.36± 0.65	87.26 ±0.4	84.19 ±0.4	66.8±0 .6	48.15 ±0.5	38.26 ±0.2
10	_	100.39±0.2	98.23±0.2	83.66 ±0.6	_	99.34 ±0.2	91.26 ±0.2	78.34 ±0.6	_	97.48± 0.23	94.65 ±0.2	96.39 ±0.6	78.98± 0.2	58.27± 0.2	44.98 ±0.6
12	_	_	_	100.23±0.2	_	_	100.82±0.4	97.75 ±0.2	_	_	100.04±0.9	101.25±1.3	99.6±0 .4	70.57± 0.6	48.26 ±0.2

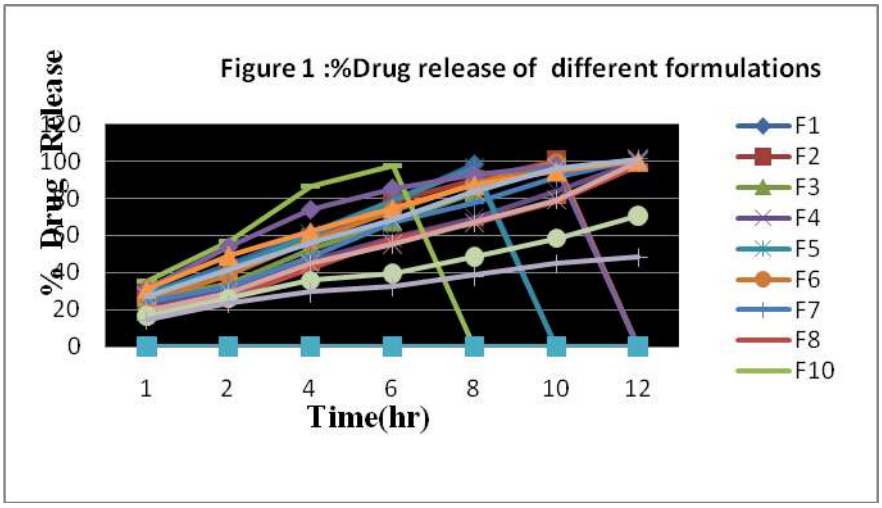
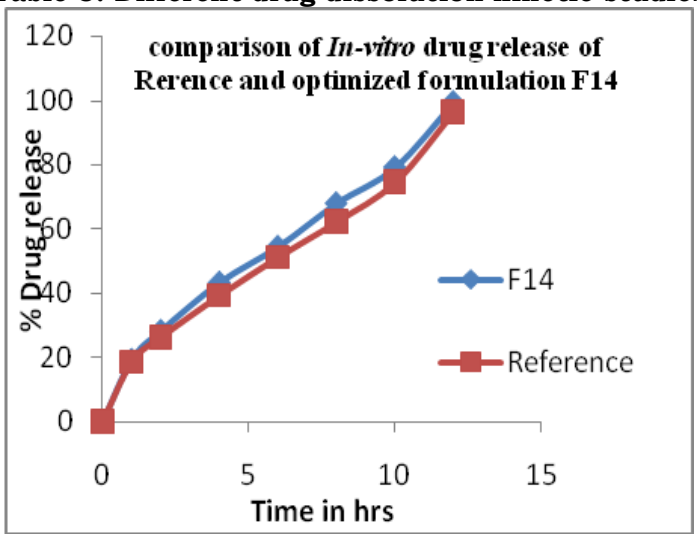
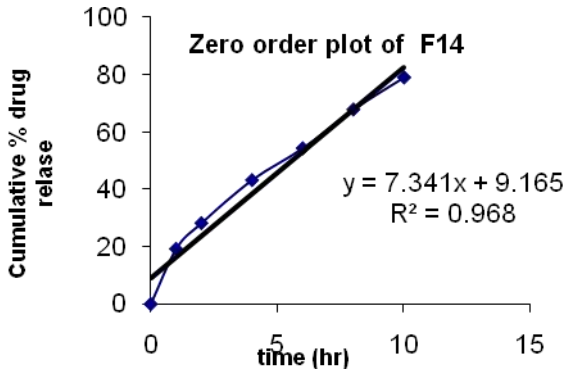
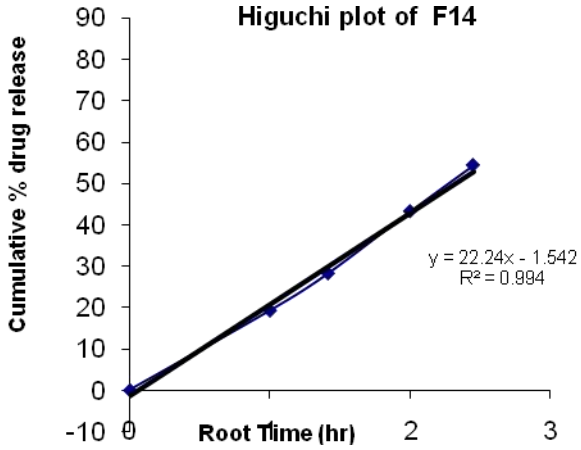


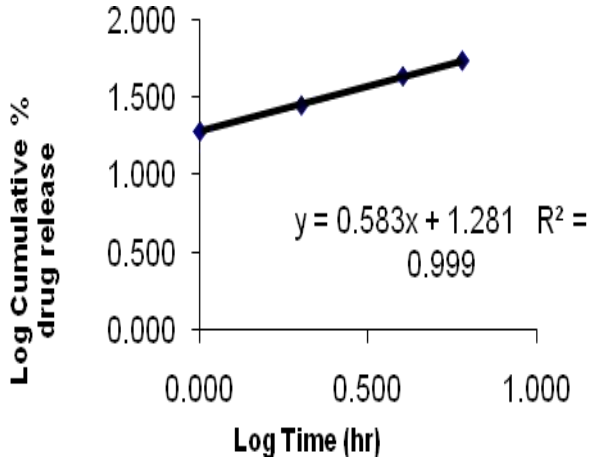
Table 3: Different drug dissolution kinetic studies

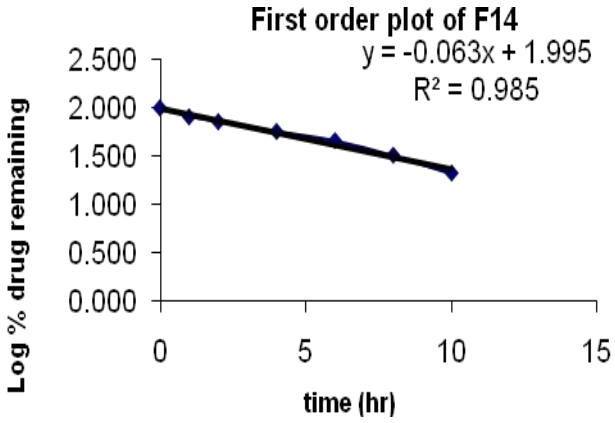




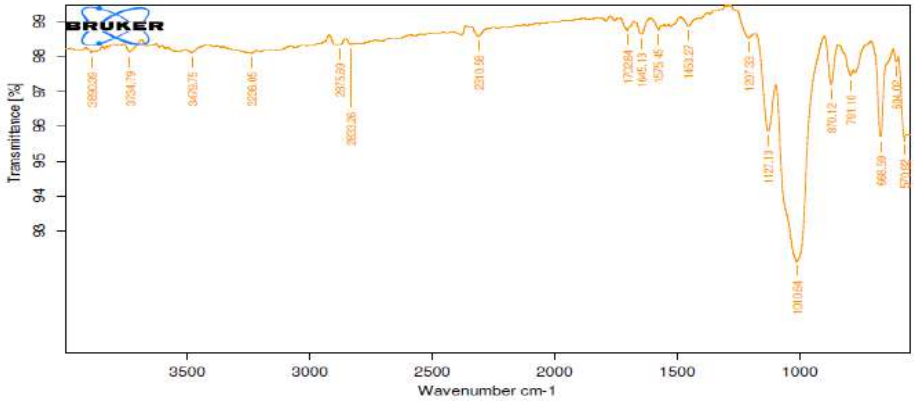
R2 value					n values
formulation	Zero order	First order	Higuchi	Korsmeyer -Peppas	Korsmeyer-peppas(n)
Reference	0.9702	0.9852	0.9847	0.9964	0.579
F-14	0.9686	0.9858	0.9947	0.9995	0.583







FTIR: Drug-excipient Studies:



5. CONCLUSION

The study involves preformulation studies, formulation, evaluation and stability studies of prepared matrix tablets. The physical evaluation of API along with excipients has shown compatibility supporting the choice of excipients. FTIR studies reveal no incompatibility between drug, polymer and various excipients used in the formulations.

Sustained release tablets of a model drug were formulated and evaluated with different polymers. Formulations with HPMC K4M and HPMC K15M polymers has successfully sustained the model drug release up to 12 hours and they were formulated (F4&F8) in (25%concentration) 0.75:1 ratio with drug by using direct compression.

Formulation prepared by using direct compression with Carbopol971P NF as the polymer has sustained the model drug release up to 12hours in 0.45:1 ratio (15% concentration) with drug. The optimized F14 formulation was compared with the marketed product for drug release pattern and was matched using similarity factor 70.11(f2) which showed that formulation F14 performed similar to the marketed product therapeutically.

The dissolution profiles and kinetic studies (zero-order, first-order, Higuchi's equation and Korsmeyer-peppas equation) indicate that the release of Nifedipine can be effectively controlled by use of hydrophilic matrix systems.

Different kinetic models were applied to the formulation optimized and observed that formulation (F14) followed first order kinetic model and it was complied with (Reference sample).The best linearity was found in Korsmeyer-peppas model (where n=0.583 is the release exponent). Applicability of data indicating Non Fickian diffusion (or) Anomalous Transport has mechanism of drug release. Non Fickian diffusional release occurs by the usual molecular diffusion of the drug due to a chemical potential gradient. (Peppas model indicates the mechanism of drug release i.e, release of drug from the formulation is by diffusion, erosion, swelling and may by the combination of diffusion and swelling).

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DESIGN OF A CLOCK DISTRIBUTION NETWORK USING LOW POWER PRESCALER AND FUSED P & S COUNTERS

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Abstract:- In this paper we have shown the design of clock distribution network using 2/3 prescaler. In wireless communication applications like WLAN, ZIGBEE, Bluetooth etc. frequency synthesizer is the major component. The speed of the frequency synthesizer depends on the pre-scaler and the voltage-controlled oscillator. 2/3 the pre-scaler must be implemented using either TSPC (true single-phase clock) or ETSPC (extended true single-phase clock) and triggers. Instead of using an AND gate and an OR gate, this article recommends embedding two NOR gates in two stages of the pre-scaler design. The two designs are compared in terms of power consumption. Using the recommended pre-range meter, we designed a clock distribution network that divides the clock distribution network by 2,3,4,5,32,33, 47, 48, and up to 5Ghz. The system is also centrally used for combining programmable design counters and swallowing counters. Clock allocation network system code is written in validation and modeled using Xilinx and Modelsim.
Keywords: TSPC, ETSPC, Frequency Synthesizer, Prescaler, clock distribution.

1. INTRODUCTION

In synchronous circuits, clock signals are important for synchronizing input data signals arriving from different sources of digital integrated circuits. There are a number of factors that affect the synchronization of signals such as noise and delay, and the same clock causes phase noise when it reaches the memory register (called clock jitter). The pre-scaler concept was introduced in the clock distribution network.

Typically, the pre-scaler generates an output signal at a fractional rate for a given input signal, the .2. The pre-scaler is a synchronization, which is built by a d trigger using a different logical gate. The frequency synthesizer pre-range rafter strains perform the key components of the cross-frequency operation. In vlsi technology, three optimizations are mainly studied. It is power, area and delay. The total component of the frequency synthesizer pre-scaler circuit is a medium-large power consumption. In a pre-scaled circuit, the clock signal consumes almost half of the total power consumption because the clock signal has more switches. The pre-scaler has two main division ratios, "n" and "n" and "n" . Frequency synthesizers use phased loops (plls), which use pre-scalers as critical components.

The pre-standardizer was designed by many researchers. The e-tspc 2/3 pre-scaler is reported to consume a significant short-circuit power and contains more expensive operating frequencies than 2/3 pre-scalers.

The E-TSPC concept was introduced in [10] and is further developed in [3]. The E-TSPC-based Prescaler is proposed in various techniques to avoid unnecessary power consumption in [1] as Method 2. In this technique 2 and ports are used instead of one or port and one and port to achieve a 2/3 prescaler with minimal power consumption. When the MC is logically high it regulates the NMOS and when MC logically low is the control of the PMOS. When MC is high, the DFF1 is blocked that the nodes in the DFF1 are blocked and only the first stage has the contact path and therefore the remaining phases have no change activity or contact, while DFF2 divide by 2 operation is Run. In addition, during the division by the 3 operation, the

energy consumption is reduced by the complementary logic type and also because of the less contact capacity in DFF1.

In [4] improved TSPC 2/3 prescaler as Design-I with 2 D flip-flops and 2 or Gates instead of one and port and one or port between the flip flops. In addition, it has been improved and displayed as Design II. An additional PMOS transistor is connected between the power supply and The DFF1. DFF1 does not participate in the division of 2 operations that only participate in DFF2. Mc is a control logic signal given as an input to an additional PMOS transistor. When this MC is logically high in divide 2 mode, PMOS is turned off and DFF1 is disconnected from the power supply.

This DFF1 is completely closed during the division by 2 mode of 4. The broadband single-phase clock 2/3 pre-scaler is projected to. In this design, it consists of 2 D triggers and 2 or Gates embedded in the slippers. The main or tin is not embedded in the final stage of DFF1, and the second NOR crucified in the first phase of DFF2. The design focuses primarily on low power consumption.

Figure 1 shows a full-clock distribution network with a pre-scaler. This article is organized as section II discussing about the proposed design, section III illustrates multi-modulous prescaler, section IV describes about merged programmable and Slik counters, section V shows simulations of the design and section VI Close the paper.

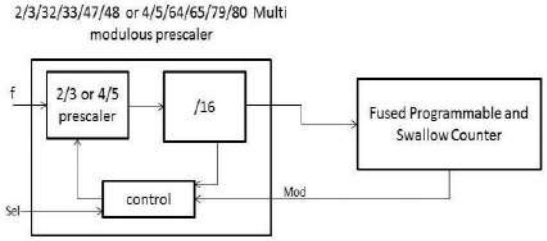

Fig .1 Clock distribution network

2. PROPOSED DESIGN

In digital circuits lag and power consumption are the main parameters. Maximum operating frequency of a digital circuit can be calculated as [2] [4]

Fmax = 1/(tpHL + tpLH)

tpHL, tpLH are the Gate delays. The combination of switching and short circuit forces determines the total power consumption of the digital circuitry. Switching power depends mainly on the operating frequency, the loading capacity and the power on each output node as [2] [4]

PSW = fclkClVdd2

VDD is the supply voltage, CL is the loading capacity and FCLK is the clock frequency. When there are direct paths to the ground from the feed causes to short circuit current occur as

PSC = ISC * VDD
ISC is the short-circuit current.

The data rate can be relatively low, in the range of 1 to 100kbit/s, half duplex, because each node should usually receive data request and send the measurement of some slowly varying physical quantities. For some applications, like computer interfaces, the availability of different channels (2-4) is desirable.

The recommended divide by 2/3 of the pre-scaler unit is shown in Figure 2. The recommended Prescaler uses a simple architecture with e-TSPC to form two D triggers and two or Gates. When the logical signal MC switches from "one" to "zero", the logical value at the DFF1 input is transferred from the input embedded in the

NOR gate embedded in DFF1 to the input of the DFF2 collection, so the band works the pre-scaler in divided by 3 mode. In the entire 2-by-1 operation, only DFF2 was actively involved and contributed to all energy consumption because all change activities were blocked in DFF1.

As a result, the advantage with a 2/3 pre-scaler saves a considerable five percent of power during divided by 2 operations. Once the modulus management signal MC is logically low, it performs except 3 functions. If the result of DFF2 is logically low, the S1 node of DFF2 is disabled, so the nodes S2 and S3 of DFF2 have no switching activity, so there is no switching current dissipation. DFF1 works all the time, and DFF2 only works when the output of DFF2 is logically high. Once the MC is logically high, the output of DFF1 is disabled to implement the except 2 function. However, DFF1 nodes S1 and S2 still have switching activity because the DFF2 output continues to return to DFF1. Therefore, although DFF1 is not in the Divide 2 function, each DfF switches to half of the input frequency. Therefore, even if a switching DFF is required, a large amount of power is lost by the unit divided by 2. This topology results in unnecessary power consumption, which can be an important part of the overall energy consumption. In addition, short-circuited power supplies remain in DFF1 during 1/4 of the cycle. For divided by 2/3 units, the tricky side of a low-power style is to reduce power consumption. During the divided by 2 operations, each dff does not have to be controlled at full speed because only one toggled DFF can be performed divided by 2 operations.

If only one DFF is active during a secondary operation, the power consumption on the paper is reduced by five percent.

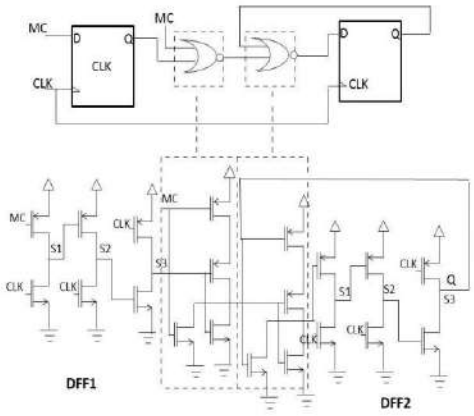

Fig. 2 Proposed single-phase clock 2/3 Prescaler

Since wave propagation in buildings can vary greatly according to the configuration, the maximum distance between two network nodes can be specified in the free range (i.e. without obstructions) and is usually between 10 and 100m. For most detection applications, nodes spend much more time than broadcasting, even though the required power level in the overtransmitting mode is an order of magnitude higher, the power consumption of the receiver is most critical. In our case, the target was not higher than 1 µW ' (l mA, 1.5 V supply) to obtain a sufficient battery life. Fig. 3 shows the power consumption characteristics with frequency. Fig. 3 shows the power consumption characteristics with frequency. This high power consumption is mainly due to the first stages of the frequency divider that often transports half the entire power [5-11].

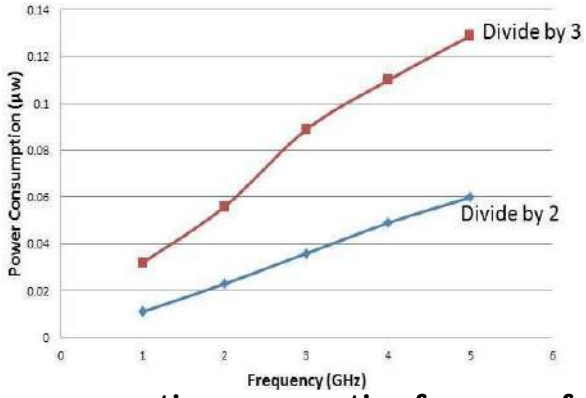

Fig. 3 Power consumption vs. operating frequency for divide by 2

The projected broadband Multimodulus Prescaler, which divides the input frequency with 32, 33, 47 and 48 etc., is shown in Fig. 4. It's kind of like the 32/33 Prescaler used in, however with an extra multiplexer and a transistor. The projected Prescaler performs additional divisions (divide-by-47 and divide-by-48) with no additional flip-flop, saving a significant amount of power and also reducing the quality of multiband.

The Multimodulus Prescaler consists of the broadband 2/3 (N1/(N + 1)) Prescaler [3], 4 asynchronous TSPC divide-by-2 circuits ((AD) = 16) and combinatory logic circuits to achieve multiple division ratios. In addition to the same old MOD signal for dominant N (N + 1) Divisions, the additional Management signal SCL is used to change the prescaler between 32/33 and 47/48 modes.

Case 1: sel = ' 0'

When sel = 0, the result of the NAND2 port is transferred directly to the input of 2/3 Prescaler and the Multimodulus Prescaler works as the normal 32/33 Prescaler, where the division quantitative relationship is controlled by the Logic Signal MOD. If MC = 1, the 2/3 Prescaler operates within the divide-by-2 mode and once MC, the 2/3 prescaler works in the Divide-by-3 mode.

If MOD = 1, the NAND2 Gate result switches to the logic "1" (MC = 1) and the broadband Prescaler works within the divide by 2 mode for full operation. The division magnitude ratio N performed by the Multimodulus Prescaler is [2]

$$N = (AD * N1) + (0 * (N1 + 1)) = 32$$

Where N = 2 and AD = 16 is mounted for the entire style. If MOD = 0, for thirty input cycles MC remains on logic "1 ", where broadband prescaler works in divide by 2 mode and, for 3 input clock cycles, MC remains at Logic "0 " where the broadband Prescaler operates within the divide-by-3 mode. The division ratio N + 1 performed by the Multimodulus Prescaler is

$$N + 1 = ((AD - 1) * N1) + (1 * (N1 + 1)) = 33$$

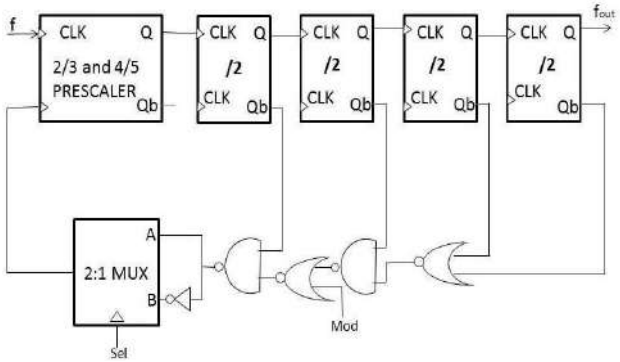

Fig. 4 Proposed Multimodulus 32/33/47/48 or 64/65/79/80

Situation 2: SEL = 1
When SEL = 1, the inverted output of the NAND2 port is transferred directly to the input of 2/3 prescaler and therefore the Multimodulus works prescaler as a 47/48 prescaler, where the ratio of the division magnitude is controlled by the Logic Signal MOD . If MC = 1, the 2/3 Prescaler works in the sharing mode by 3 and once MC = 0, the 2/3 prescaler works in parts by 2 mode which is kind of opposite of the operation that is performed once SEL = 0.

If MOD = 1, the division quantitative relation N + 1 performed by the Multimodulus Prescaler is the same as except that the broadband Prescaler functions within the divide-by-3 mode for the whole operation given by

$$N + 1 = ((AD * (N1 + 1)) + (0 * N1)) = 48$$

If MOD = 1, the division ratio N is performed by the Multimodulus Prescaler

$$N = ((AD-1) * (N1 + 1)) + (1 * N1) = 47$$

The Prescaler acts as 4/5 Prescaler by adding an additional multiplexer selection line is one,
$N = (AD * N1) + (0 * (N1 + 1)) = 64$
Where N1 = 4 and AD = 16.
$N + 1 = ((AD – 1) * N1) + (1 * (N1 + 1)) = 65$
When SEL = 1:
$N + 1 = ((AD * (N1 + 1)) + (0 * N1) = 80$
Where N1 = 4 and AD = 16.
$N = ((AD-1) * (N1 + 1)) + (1 * N1) = 79$

3. FUSED P&S COUNTERS
Figure 5 is illustrated as a block diagram of the consolidated P&S counter. Obviously, this counter consists of a division of 128 (P Counter) that is created from seven Divisions 2. The digital circuit consists of the XNOR (X0 – X5) Gates and Gates (a1, A2) and RESETSET Flip Flop (RSFF). This digital section replaced the counter S in the typical and has the obligation to drive a modular small piece of double modulus. Gate A1 is controlled by the gates of XNOR (X0 – X5). When XNOR inputs are the same (both are 0 or 1), the XNOR gateway output is logical. So, once the P Counter (P6P5P4P3P2P1P0) is a sufficient predefined C (C1C5C4C3C2C1C0), the output of the A1 gate becomes logical once (the C5-C0 bits are outlined by the transmitter system that changes the PLL frequency channel). At this time, since P6 is also 1, RSFF was set up using A2 and the dual module prescaler divide input frequency N. As soon as P6 changes to zero, the RSFF is reset and the double modulus Prescaler returns to the divide state after (N + 1). For more details, assume that the counter P has a condition of zero. Because P6 is sufficient to zero, the RSFF is reset, and the double module divides the input frequency by (N + 1). Therefore, to configure the PLL in the sixth frequency channel and that we are retrieving the number VI on C5-C0.

The input signal is used and the P value increases until the counter P reaches the predefined C. (example: P6P5P4P3P2P1P0 = 1000110). With this P-value, the output of the XNOR and P6 blocks is logical, which causes the RSFF to be set using Gates A1 and A2. Now, Prescaler divides the input frequency N until the value of P reaches the maximum value (1111111) and the next value is 0000000. If the RSFF is reset using P6, the Prescaler function returns to the divide-by (N + 1) scenario, and the cycle repeats again. During this cycle the events appeared almost as a typical pulse splitter swallow. For a number of predefined C (C1C5C4C3C2C1C0 = C), the input frequency of division (N + 1) and for the remainder of the number (128 – C) divides the input frequency N [14].

Case 1: SEL = 0
The ratio of the frequency division (FD) of the Multipband separator in this mode is given by

$$FD = (N + 1) * S + N * (P – S) = NP + S$$

Substitution P = 128, S = C in the above equation, we get:
FD = N * 128 + C

Case 2: SEL = 1
The ratio of the frequency division (FD) of the Multipband separator in this mode is given by

$$FD = (N * S) + (N + 1) * (P - S) = (N + 1) P - S$$

Substitution P = 128, S = C in the above equation, we get
FD = (N + 1) * 128 – C [14] [2]

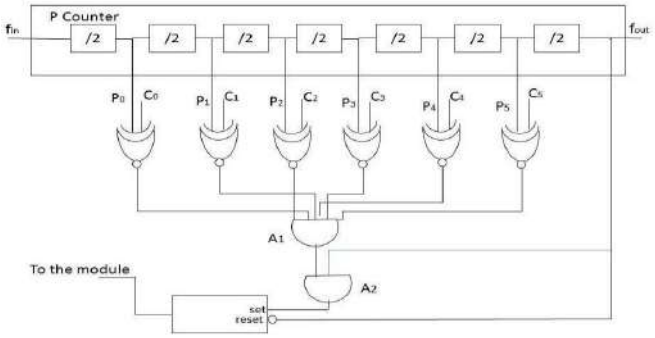

Fig. 5 Integrated P and S counters

4. SIMULATIONS

Design simulations are performed using Microwind for the 0.18 µM CMOS process. The results of the simulation show that the wide frequency range 2/3 Prescaler has a maximum operating frequency of 5 GHz with power consumption of 0.129 µW during division-by-2 modes and split by 3. The projected wide bandwidth has a maximum operational frequency of 5Ghz. The planned wide frequency multi-module module has the highest frequency of operation of the 7.2 Giga cycle per second (simulation) with lower power consumption throughout the divide by 32, divide by 33, divide by 47 and divide B48, respectively. Fig. 6 illustrates the characteristics of the slowing of propagation in terms of width of the pMOS transistor.

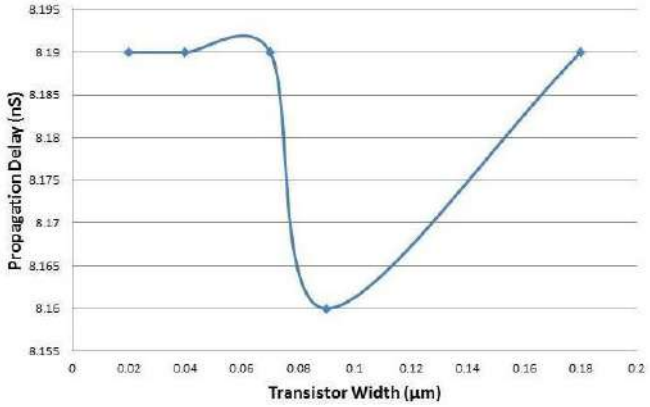

Fig. 6 Characteristics of Propagation delay

Table I Comparision with Other Techniques

Design Parameters	**[3]**	**[4]**	**This work**
Process (µM)	0.18	0.18	0.18
Supply Voltage(V)	1.5	1.8	1.5
Maximum Frequency (GHz)	6.7	5.5	5
Power divide by 2 mode	1.433 (mW)	0.252 (mW)	0.060(µW)
Power divide by 3 mode	1.554 (mW)	0.387 (mW)	0.129(µW)

The performance of the multi-purpose dividing partition is measured by frequency bands by programming the counters. Fig. 7 shows the measured format of the multifunction separator output on an associated input frequency of 2.47 GHz, in which Fig. 8 Displays the multi-mode layout at a frequency of 5 GHz. The projected separator consumes the average power of 0.129 µW. The comparison of the proposed system with other prescalers is shown in table I.

Wireless local Area network (WLAN) within multi gigahertz bands, such as hyper local networks II and IEEE 802.11 a/b/g, are recognized as the leading standards for high data transfer rates, and standards such as IEEE 802.15.4 are recognized for low-rate data transfers. Demand for lower prices, lower energy and multi-band RF circuits multiplied in combination with the need of the upper level of integration. The frequency synthesized, usually carried out phase-locked loop (PLL), is one of all the starving power blocks inside the RF front-end and also the first phase frequency separator consumes a huge portion of the power in the frequency syntheser. Battery life for mobile applications is reciprocally proportional to the energy consumption of mobile devices. Thus, it is crucial to mitigate the energy consumption by minimizing each active Duty-cycle and also active power consumption of the wireless terminal at the same time. The active deadline for ZigBee wireless node depends on the time of the sinking of the PLL frequency, since clearing time can be the dominant part of the total active period. The time of tone of the PLL frequency decreases as the width of the loop will increase. Since Fractional-N PLL with higher reference frequency can make a broader loop bandwidth, it is favored for a little active Duty-cycle.

Since the size of the MOSFETs is still decreasing, it is necessary to reduce the reduction within the supply voltage in order to ensure the maintenance of the door oxidation however, when thinking about the leakage of the sub threshold, and also the margins of noise that are required by digital Integrated circuits, the scaling rate of the threshold voltage is relatively slow compared to the supply voltage. Consequently, the voltage transistor is decreasing more and more because the technology is progressing. It has become an inevitable working trend of MOS devices in moderate or weak investment for certain mixed signals and integrated RF circuits, motivating the development of low voltage design techniques exclusively for technology Deep Sub-micrometric CMOS. In the RF headphone, the low-noise amplifier (LNA) and also mixing-the conversion is considered to be the most vital construction key blocks. Typically, these circuits suffer from vital degradation within the properties of RF, especially for the gain, figure of noise, and linearity, as the transistor act in bad investment. In order to override the supply voltage constraints and also the Semiconwater units, the complementary current topology is projected for RF energy circuits. Using a normal CMOS 0.18 µmmethod, ultra-low voltage LNA and a mixer suitable for microwatt energy consumption operations were achieved in the 5 GHz frequency band. The behaviour of MOSFETs biased against Overdrive voltage and its impact on performance Circuit RF front are being investigated. Fig 9 and Fig. 10 shows the types of output wave voltage vs. time and voltage versus current.

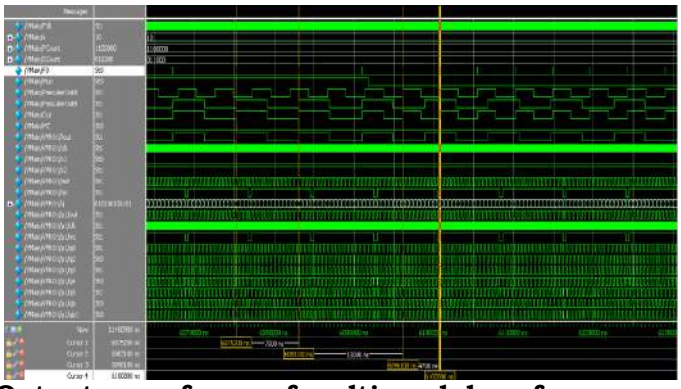

Fig. 7 Output wave forms of multi modulous frequency divider

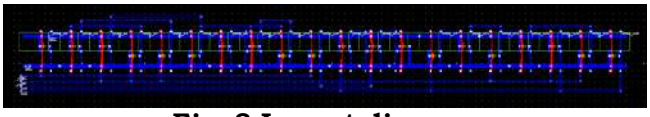

Fig. 8 Layout diagram

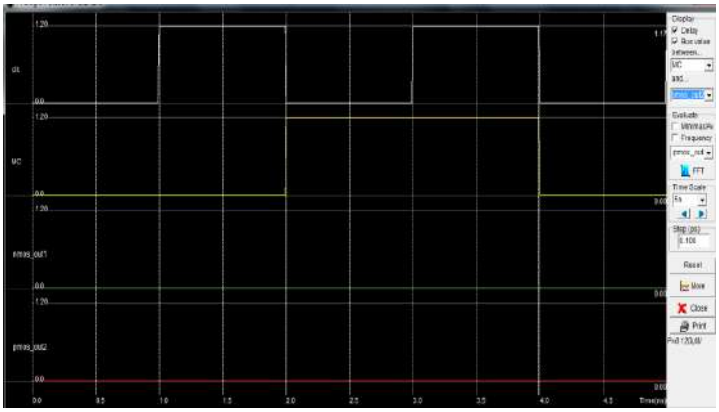

Fig. 9 Voltage vs. time waveform

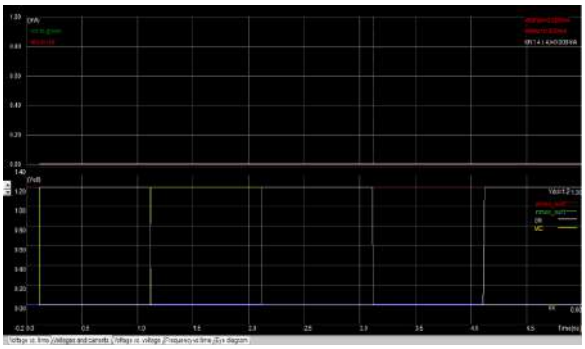

Fig. 10 Voltage vs. current wave form

5. CONCLUSION

In this paper is checked "Ultra-broadband 2/3" or 4/5 over within the design of the planned wide Multimodule module 32/33/47/48 or 64/65/79/80. The multi-modal Precoler is designed with an additional multiplexer to select 2/3 or 4/5 a precoler. The planned system is checked using the 0.18 µm CMOS technology. Since the Multimodule 32/33/47/48 overload has a maximum operating frequency of 5 gigahertz, the values of the integrated counter will actually be programmed to divide the total range of frequencies from one to five gigahertz with a fine resolution From 50 MHz. This method will provide a response to low-power PLL synthesizers for Bluetooth, Zigzag, IEEE 802.15.4 and IEEE 802.11 a/b/G LAN applications.

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GENETIC ALGORITHMS: A SOLUTION FOR DATA PREPROCESSING IN WEB MINING

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Abstract - Despite the full range of applications in various fields, global application factors such as Internet search speed or data recovery rate have found their immense contribution from the concept of evolutionar algorithms. Web server stores every activity of users in the form of logs, which contain very useful patterns. Henceforth web server log analysis is a vital research area. Web log data analysis has a primary step is preprocessing, which is meant for dimensionality reduction because web log data are hefty in size and need to normalize the data for further cognitive analysis or other data analysis. Bulky data size degrades the performance of data analytic algorithm, so there is a necessity of an efficient algorithm for preprocessing over web server log data. In this paper, we emphasize data preprocessing. We have proposed the use of genetic algorithms for the reduction of dimensions and the normalization of the registration data of the incoming web server. Experimental results show that preprocessed data produces a high precision value, with the Matlab 2016 classification learning tool accrately calculated.
Keywords: Genetic, ROC, TPR, FNR, Confusion Matrix, WM, URL.

1. INTRODUCTION

According to the International Telecommunication Union [ITU, 2018], the number of internet users is increasing day by day, the number of internet users is more than 40% of the world's population. Web usage mining in technology that can identify exciting patterns from web server logs.

Business intelligence can be generated from this log, assuming website owners want to know which URLs are less visited and which URLs can be used by applying web visit mining algorithms, this interesting pattern Can be identified, then the website owner can decide accordingly. These motivate us towards this re-discovery in the form of cognitive analysis on web server logs.

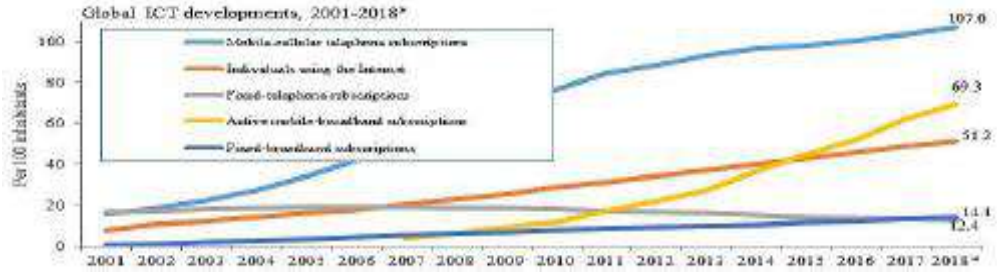

Fig.1 Internet Users Statistics [ITU, 2018]

Web usage mining encompasses different phases as shown in fig.-3.

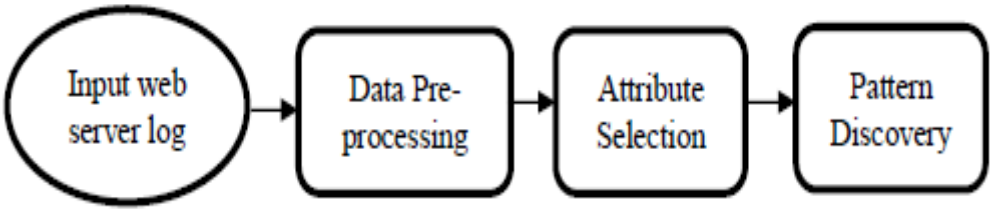

Fig. 2 WM Phases

In this paper, we have proposed a method for reducing the amplitude of input weblogs using genetic algorithms. Later in Section 2 we will discuss some of the research that has been done in this file and we will discuss this research and the remarkable contribution to our research objective, in Section 3 on our proposed

methodology, in Section 4 Experimental and Joint Results of Data. This is briefly discussed, and finally in Section 5 we will conclude how genetics improves accuracy.

2. LITERATURE SURVEY AND RESEARCH OBJECTIVE

Numerous researches has been carried out in the field of web usage mining. Rashmi Jayathirtha Rao et. al. in 2018 proposed cognitive bias for learning assessment, author has used smart classroom web log data, constructed numerous model from data mouse click and movement. Author has used statistical and data mining techniques for finding learning behaviour [1].

Vishwa Vinay, Ingemar J. Cox et. al. in 2005 made comparison among four different dimensionality reduction techniques and assessed their performance and concluded PCA, ICA has lesser precision if applied over large dataset [2].

Jayanti Mehra in 2018 proposed an algorithm for sever web log statistics preprocessing in web usage mining. Author elaborated each phase of data pre-processing and counted page access frequency [3].

After going to different literature we got following states as [1][2][3][4][5]:

Precision of different dimension reduction technique					
Database	**PCA**	**ICA**	**RM**	**NR**	**Genetic**
CRAN	0.186	0.186	0.111	0.131	0.27
MED	0.253	0.253	0.174	0.197	0.31

Table-1 Comparison of Precision from Literature

The objective of our research in this document is to obtain low-dimension web registration data with a high precision value, so that if we apply cognitive analysis to a small set, we obtain consistent sets of elements for cognitive analysis.

3. PROPOSED METHODOLOGY

In this paper, we have proposed the use of genetic algorithms for preprocessing in the incoming web server logs. Genetic algorithms develop the generation using operators: selection operator, cross operator and mutation operator.

The reduction of dimensions can be done in two ways: intelligent reduction in the first row, that is, if dataset has a noise value, the intelligent reduction in the second column is also called selection of attributes that eliminates the columns that affect cognitive analysis It won't do. To understand how Genetic has been applied to the data set, let's take our piece of the data set:

```
64.242.88.10 - - [07/Mar/2004:16:06:51 -0800]
"GET/twiki/bin/rdiff/TWiki/NewUserTemplate?rev1=1.3&rev2=1.2 HTTP/1.1"
2004523
64.242.88.10 - - [07/Mar/2004:16:10:02 -0800] "GET
/mailman/listinfo/hsdivision HTTP/1.1" 200 6291
64.242.88.10 - - [07/Mar/2004:16:11:58 -0800] "GET / HTTP/1.1" 200 7352
64.242.88.10 - - [07/Mar/2004:16:20:55 -0800] "
/twiki/bin/view/Main/DCCAndPostFix HTTP/1.1" 200 5253
```

The previous data set fragment row-3 is missing a URL, so this line must be removed from the form's data set because it cannot be used for cognitive analysis. Similarly, the "Form Method" is missing in row 4. Similarly, the reduction in columns, that is, we have seen that there are seven columns in the data set or we can say seven characteristics, in this investigation we want to do a cognitive analysis, so we eliminate those characteristics that are not for cognitive analysis. Here we wanted any user to know how many URLs have gone to any URL, that is, URL with their own frequency.

3.1 Row wise dimension reduction:

Here we wanted to get URL from web log data. We get following string separated by "\n" (line feed), the fitness function will be D:

$$D = \sum_{i-1}^{n} S_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

n= Total number of lines in web log file. Si= String in each line i= Line number Need to get URL from Si. Characters \\, A to Z, a to z are considered as genes. And string generated (URL) from Si are deliberated as solution or chromosome. Fitness function will be:

$$D1 = \text{Si}\in[\text{"}\backslash\backslash]\backslash\backslash[\text{-}] \dots\dots\dots\dots\dots\dots (2)$$

$$D2 = \text{Si}\in[\text{-}] \dots\dots\dots\dots\dots\dots\dots\dots (3)$$

If D2 contains null value then it should be removed. If output string is Os then

$$O_s = [D2] \forall D2 \neq \phi \dots\dots\dots\dots\dots\dots\dots (4)$$

3.2 Column wise dimension reduction:

Here we want to make cognitive analyzes from web logs, so we must calculate the URLs with their frequency, how much time the user spent on that URL and the response code. Therefore, other features must be removed from the data set.

Input Dataset after Getting Tokens:

IP Ad-dress	Login Time	Form method	URL visited	Protocol Used	Server Re-sponse Code	Times-tamp
64.242.88.10	07/Mar/2004:16:23:12	GET	/twiki/bin/oops/TWiki/AppendixFileSys-tem?template=oopsmore&param1=1.12&param2=1.12	HTTP	200	11382
64.242.88.10	07/Mar/2004:16:24:16	GET	/twiki/bin/view/Main/PeterThoeny	HTTP	200	4924

Size= 2X7

Dataset after Dimension Reduction:

Login Time	URL visited	Server Re-sponse Code
07/Mar/2004:16:23:12	/twiki/bin/oops/TWiki/AppendixFileSystem?template=oopsmore&param1=1.12&param2=1.12	200
07/Mar/2004:16:24:16	/twiki/bin/view/Main/PeterThoeny	200

Size= 2X 3

Further after preprocessing we will get reduced item set (URL). Fig.- 4 depicts the overall mechanism of proposed model.

4. EXPERIMENTAL RESULT

We use JAVA 1.8 for the implementation of our proposed algorithm to obtain low level web logs, and to verify the accuracy of the algorithm, we set a low level in the MATLAB 2016b learning application. Reduced set in SVM classifier that causes confusion.

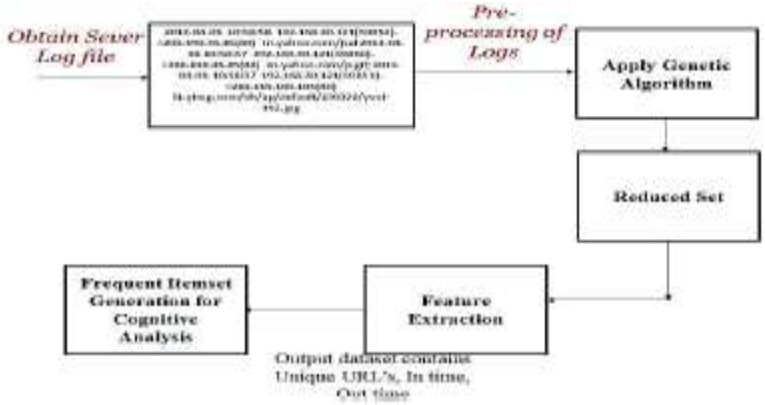

Fig.3 Proposed Model

Fig. -4 shows the main user interface of our proposed model, which takes the input as a web log text file as input. Fig. -5 gives us the result after the row dimension reduction, Fig. 6 shows the column dimension reduction data stored in Macecle for further processing.

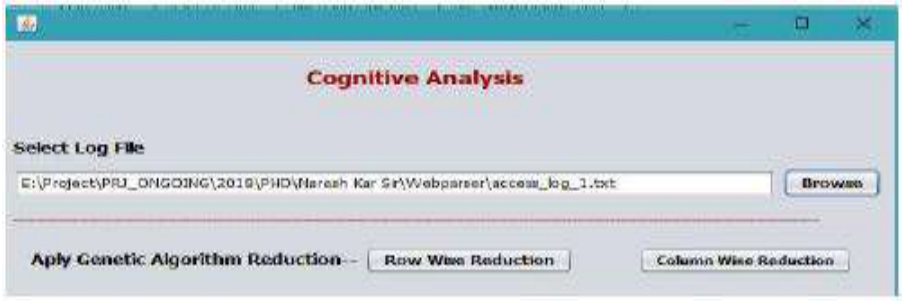

Fig.– 4 Main UI of Proposed Model

Fig. 5 Row Wise Reduced Dimension dataset

url	size	count
/twiki/bin/view/TWiki/WebTopicEditTemplate	3732	1
/mailman/listinfo/business	6379	1
/twiki/bin/view/Sandbox/WebHome?rev=1.6	8545	1
/twiki/bin/view/Main/DCCAndPostFix	5253	1
/twiki/bin/rdiff/Know/ReadmeFirst?rev1=1.5&rev2=1....	5724	1
/twiki/bin/rdiff/Main/ConfigurationVariables	59679	1

Fig. 6 Column wise Reduced Dimension

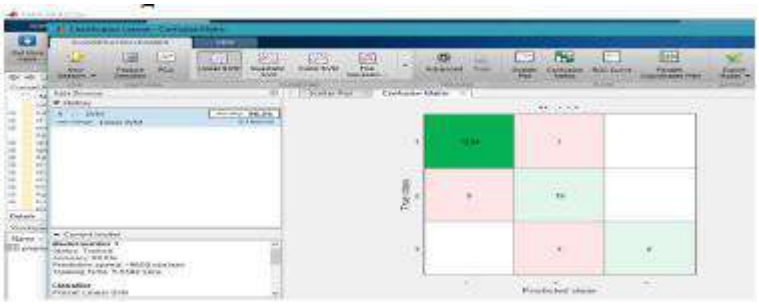

Fig. 7 Classification Leaner Outcome (Precision)

Fig.-7 shows the classification learner matlab tool reduced dimension dataset passed to Linear SVM classifier, output which generates confusion matrix in which are achieved precision details in table below.

S. No.	File Name	Precision
1.	access_log.txt	96.5%
2.	access_log_1.txt	98.3%

Table 2 Precision value of web log files

5. CONCLUSION

Due to the great popularity of the Internet, we are moving towards this. As we explain in our web record data set in Section-3, very useful data can be extracted from there, which will be very beneficial for policy makers. As the web server log data is very noisy, which will affect the classification performance of machine learning, therefore, it is necessary to remove or clean that noisy or missing data. In our proposed algorithm, we apply the genetic algorithm for amplitude degradation, pass the data to the SVM coating and achieve an average accuracy of 97%, another conclusion is that the size of the training data increases in the same way.

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BIOMETRIC TECHNOLOGY IMPLENTED IN IRIS RECOGNITION SYSTEMS ON ATM MACHINE

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Abstract - This paper explores a new biometric-based Iris Feature extraction system, for person identification in the development of leading-edge biometrics verification techniques, to satisfy the need to perform reliably and with high accuracy in ATM banking machines; which associates the concepts of pattern identification & analysis, computer visioning, statistical dependencies and elements of optics and photonics. It is a real time process. This system automatically acquires the biometric data in numerical format (Iris Images) by using a set of properly located sensors. Here considering camera as a high quality sensor. Iris Images are typically color images that are processed to gray scale images. Then the Feature extraction algorithm is used to detect and then extract features from that are numerical characterization of the underlying biometrics with the previously stored feature by producing a similarity score. Depending on degree of similarity, individual can be identified. By considering Biological characteristics of IRIS Pattern can use Statistical Correlation Coefficient for this _IRIS Pattern recognition where Statistical Estimation Theory can play a big role. The suggested iris detection scheme has a positive impact on an the accuracy in computing the iris code, which has in turn a positive impact on the performance of iris recognition.
Keywords: Biometrics, real time, Iris Images, feature extraction, IRIS Pattern.

1. INTRODUCTION

Biometrics is an automated method of recognizing a person, based on physiological or behavioral properties. Physiological biometrics is based on Measurements and information collected from direct measurement of a part of the human body. Fingerprint, **iris-scan**, retina- scan, hand geometry, and facial recognition are physiological biometrics. Behavioral characteristics are based on an action taken by a person. Behavioral biometrics, are based on measurements and information getting from an action, and indirectly measure characteristics of the human body. Voice recognition, keystroke scan, and signature-scan are leading behavioral biometric technologies. [1]

Now a day's e-security are in critical need of finding accurate, secure and cost-effective alternatives to passwords and personal identification numbers (PIN) as financial losses increase dramatically year over year from computer-based fraud such as computer hacking and identity theft [2]. Biometric solutions address these fundamental problems, because an individual's biometric data is unique and biometric systems are superior, they provide non-transferred biometric properties. Biometrics which refers to identifying an individual by his or her physiological or behavioral characteristics has capability to distinguish between authorized user and an imposter.

A biometric system is a pattern recognition system that operates by acquiring biometric data from an individual, extracting a feature set from the acquired data, and comparing this feature set against the template set in the database. Depending on the application context, a biometric system may operate either in verification mode or identification mode. Before the system can be put into verification or identification mode, a system database consisting of biometric templates must be created through the process of enrollment.

Enrollment is the process where a user's initial biometric sample(s) are collected, assessed, processed, and stored for ongoing use in a biometric system as shown in Figure-1. If 45 users experience problems with a biometric system then

they have to re-enroll to gather higher quality data.

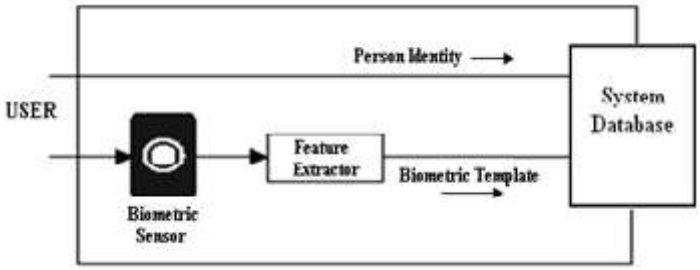

Figure-1 Enrollment process in biometrics system

Biometric system provides two main functionalities viz. verification and identification. Figure-2 shows, the flow of information in the verification and identification systems. In verification, also called authentication, the user claims an identity and the system verifies whether the claim is genuine. If the user‘s input and the template of the claimed identity have a high degree of similarity, then the claim is accepted as –genuine otherwise, the claim is rejected and the user is considered as –fraud. Verification is 1:1 matching process. In Identification, the user‘s input is compared with the templates of all the persons enrolled in the database and the identity of the person whose template has the highest degree of similarity with the user‘s input is outputted by the biometric system. Typically, if the highest similarity between the input and all the templates is less than a fixed minimum threshold, the system rejects the input, which implies that the user, who is presenting the input, is not one among the enrolled users. Therefore, the matching is 1: N process in an identification system.

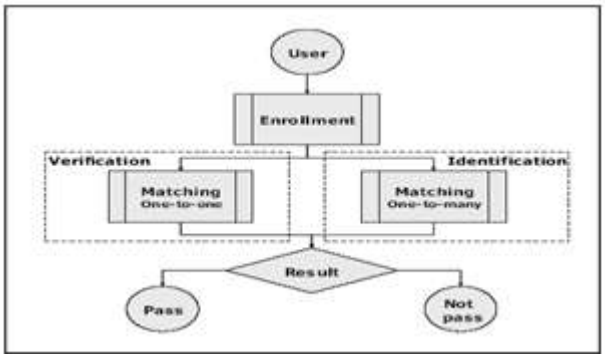

Figure -2 Verification and identification process

In the recent years, there is a trend of using the mechanism of biometrics for security purpose. For improving the security, here use the different types of biometric authentication techniques. Biometrics systems are quality because they provide nontransferable biometric properties. Nontransferable means it cannot be given or lent to another individual.

A biometric system is a pattern recognition system that operates by acquiring biometric data from an individual, extracting a feature set from the acquired data, and comparing this feature set against the template set in the database. Depending on the application context, a biometric system may operate either in verification mode or identification mode. Before the system can be put into verification or identification mode, a system database consisting of biometric templates must be created through the process of enrollment.

2. STRUCTURE OF IRIS

Iris is distinct for every person, even the twins have different iris patterns and it remains same for whole of the life. Thus this technology is now considered as providing positive identification of an individual without contact and at very high

confidence levels.

The iris is the annular part of the eye demarcated by the white sclera and surrounding the pupil, which is generally the darkest part of the eye image. The sclera consists of closely interwoven fibers and a small section in the front and center known as the cornea. The cornea consists of fibers arranged in regular fashion. Conveniently this makes the cornea transparent, allowing light to filter in. Behind the cornea is the anterior chamber filled with a fluid known as the aqueous humor. A spongy tissue, the ciliary bodies, arranged around the edge of the cornea, constantly produces the aqueous humor. Immersed in the aqueous humor is a ring of muscles commonly referred to as iris. The word iris is most likely derived from the Latin.[4]

Iris as in Figure-3 is like a diaphragm between the pupil and the sclera and its function is to control the amount of light entering through the pupil. Iris is composed of elastic connective tissue such as trabecular meshwork.[5]

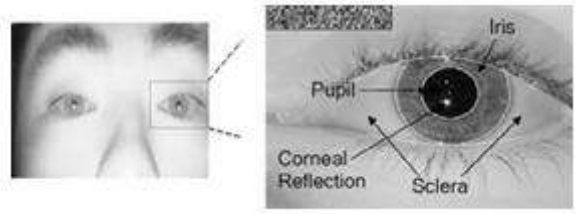

Figure-3: The structure of human iris [5]

3. IRIS RECOGNITION SYSTEM

Iris is a biometric feature, found to be reliable and accurate for authentication process comparative to other biometric feature. So Iris can be used for security applications, due to the non-invasiveness of the available iris acquisition devices, which are based on near infrared or visible light technology and being characterized by a large number of features, e.g., uniqueness, external visibility and life stability that make the performance of iris recognition higher with respect to that of other biometrics

Human iris identification process i.e. iris recognition system basically achieve a number of tasks:

1. **Eye image acquisition–** the image acquisition steps captures the iris images. Infra-red illumination is used in most iris image acquisition.
2. **Iris divide-** The iris segmentation step focuses the iris region in the image.
3. **Normalization-** Iris of different people may be captured in different size, for the same person also size may vary because of the variation in illumination and other factors.
4. **Feature extraction-** Iris provides abundant texture information, a feature vector is formed which consists of the ordered sequence of features extracted from the various representation of the iris images.
5. **Matching-** calculates the distance between iris codes, and decides whether it is an authorized match or unauthorized match. The feature vectors are classified through different thresholding techniques like Hamming Distance, weight vector function, etc.

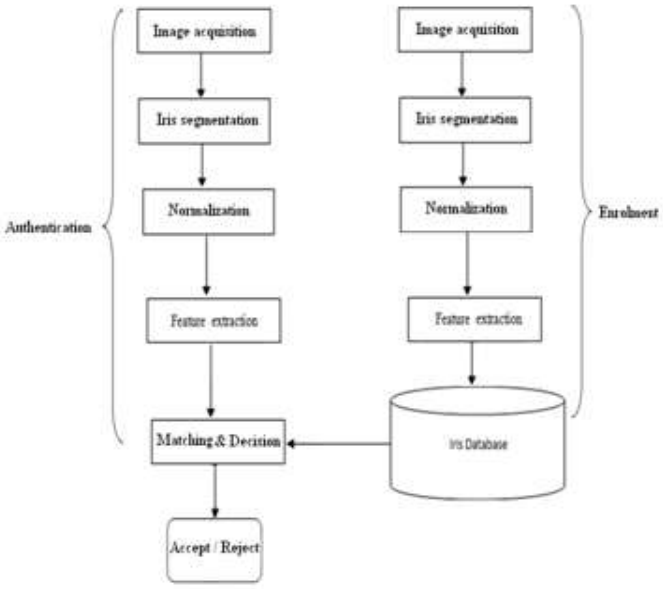

Figure-4: General steps of the iris recognition system

Enrollment: The enrollment phase creates a user profile for subsequent authentication activities. Typically, a new user provides multiple biometric reading samples that are combined to form one stored record.

Authentication: Where a template is created for an individual and then a match is searched for in the database of pre-enrolled templates.

Iris in the 1: N Search Identification Mode: - Iris recognition is ideal for use in the one to many search environment because the template is small and the ability to find large databases at speed with accuracy is unmatched by any biometric. A live present at the imager results in a conversion of that image to a template that is compared against all other templates in the database. Unlike other biometric technologies that pull out a set of – possible iris recognition uses the algorithmic parameters to establish only one best match. The probability of misidentification with one eye is 1 in 1.2 million. The probability of misidentification when two eyes are used is reduced by many orders of magnitude.

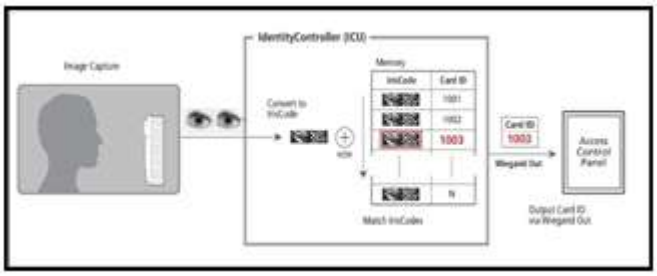

Figure 5: Iris in the 1: N Search Identification Mode

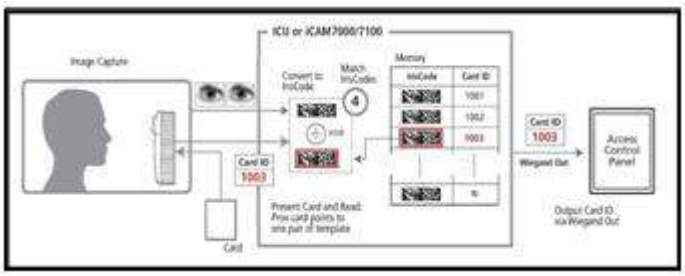

Figure 6(a): Iris in the 1:1 Verification Mode with a Card

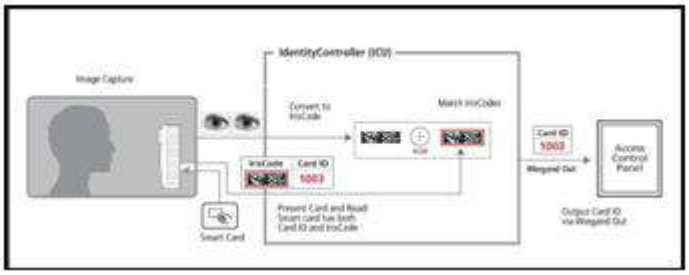

Figure-6(b): Iris in the 1:1 Verification Mode with a Card i.e. matching process

4. PROPOSED ATM MACHINE IRIS RECOGNITION SYSTEMS

An ATM iris scanner is a camera that takes a picture of the surface of the eye. The eye is illuminated by light-emitting diodes that surround the camera. The diodes emit in the visible light spectrum. The scanner is NOT a laser-retinal scanner so there are no laser eye hazards. Iris identification uses standard video cameras- the same kind we use to videotape our family — to take a picture of the iris of our eye. It does not use lasers and, therefore, has none of the inherent risks associated with lasers.

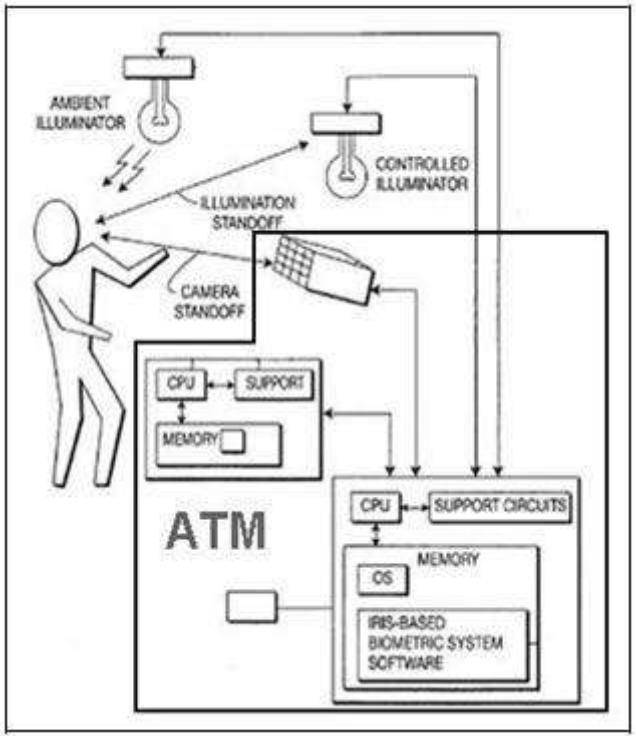

Figure 7: ATM iris recognition systems

In identifying one's iris, there are two types of methods that are used by Iris Identification systems: passive and active. The active iris system requires the user to move back and forth so that the camera can adjust and focus in on the user's iris. The active iris system method requires that a user be anywhere from six to 14 inches away from the camera. The passive iris system is different in that it incorporates a series of cameras that locate and focus on the iris. The passive iris system allows the user to be anywhere from one to two feet away from the camera(s). This method provides for a much more user-friendly experience.

ATM Iris Identification can be accessed by four steps. First, a person stands in front of the Iris Identification system, generally between one and two feet away, while a wide angle camera calculates the position of their eye. A second camera zooms in on the eye and takes a black and white image. After the iris system has one's iris in focus, it overlays a circular grid (zone's of analysis) on who he is

(Biometrics). The highly randomized appearance of the iris makes its use as a biometric well recognized. Its suitability as an exceptionally exact biometric gets from its extremely data-rich physical structure, genetic independence--no two eyes are the same, stability over time, and physical protection by a transparent window (the cornea) that does not inhibit external view ability. Conversion of an iris image into a numeric code that can be easily manipulated is essential to its use. Computing iris codes requires good quality iris images that have the customer‘s iris in focus and properly positioned. Once the image has been obtained, an iris code is computed based on information from a set. Iris codes derived from this process are compared with previously generated iris codes. The difference between two iris codes is expressed as the fraction of mismatched bits, termed a Hamming distance. For two identical iris codes, the HD is zero; for two perfectly unmatched iris codes, the HD is 1.

Most of the leading banks have been experimenting with biometrics for ATM machine use and as a general means of combating card fraud. A camera takes a digital record of each user‘s iris, which is coloured portion of the eye. The iris print is stored in a database and is used to verify identity during transactions.

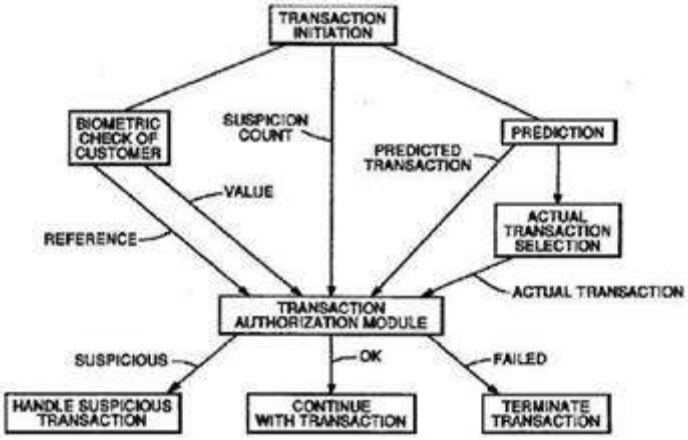

Figure 8 Verifying identity during transaction

Figure 9 ATM using Iris Security

When a customer puts in a bank card, a stereo camera locates the face, finds the eye and takes a digital image of the iris at a distance of up to three feet. As shown in figure- 8The resulting computerized "iris code" is compared with one the customer will initially provide the bank. The ATM won't work if the two codes don't match. The entire process takes less than two seconds, Sensor says the system works equally well with customers wearing glasses or contact lenses and at night. No special lighting is needed. The camera also does not use any kind of beam. Instead, a special lens has been developed that will not only blow up the image of the iris, but provide more detail when it does. Iris scans are much more accurate than other high-tech ID systems available that scan voices, faces and fingerprints.

5. IMPLEMENTATION ISSUES

This paper has not addressed many of the implementation issues which surround biometrics. These issues include establishing an effective enrolment process which educates the user and prevents identity fraud, dealing with those people who cannot use the chosen biometric either temporarily (failure to acquire) or permanently (failure to enroll) and how to deal with false rejects. Effective processes must be established to deal with these circumstances.

6. CONCLUSIONS

This paper has provided an overview of the user-centred work focused upon the provision of biometrics verification at the ATM machine user interface. Having adopted a variety of qualitative and quantitative methods, our research has revealed a number of non-trivial issues with the introduction of this type of technology to the general public. Moreover, as a result of our interventions we have made progress in significantly improving, from a user's perspective, the implementation of this technology. While technology continues to evolve and enhance, more work is required to address the usability issues which will be key to successful implementation of biometrics within a general public application such as banking. Finally, our understanding of user issues with respect to public technology, and especially the ATM machine, is improved, as the relevance and application of usability techniques at different stages of the design and development lifecycle. However, efforts remain to be taken to further improve its performance. In order to improve the automatic segmentation algorithm, a more elaborate eyelid and eyelash detection system could be implemented. Thus the above method can be effectively implemented for the ATM transactions.

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INDIAN BANKS STUDY ON NET INTEREST MARGIN AND MARKET CAPITALIZATION

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Abstract:- Finance and banking is the life blood of trade, commerce and industry. Now-a days, banking sector acts as the backbone of modern business. Development of any country mainly depends upon the banking system. A bank is a financial institution which deals with deposits and advances and other related services. It receives money from those who want to save in the form of deposits and it lends money to those who need it. The banking is one of the most essential and important parts of the human life. In current faster lifestyle peoples may not do proper transitions without developing the proper bank network. The banking System in India is dominated by nationalized banks. The performance of the banking sector is more closely linked to the economy than perhaps that of any other sector. The growth of the Indian economy is estimated to have slowed down significantly. The economic slowdown and global developments have affected the banking sectors' performance in India in FY12 resulting in moderate business growth. It has forced banks to consolidate their operations, re-adjust their focus and strive to strengthen their balance sheets. Here researcher's objective is to study the Indian banking sector and performance of Indian banks.
Keywords: Banking System, Banking, Indian Economy, Economic Slowdown.

1. INTRODUCTION TO MEANING OF BANK

Banks receive deposits from public and also borrow money from other sources for raising Working Capital Funds. They have to pay cost by way of interest on the funds raised. To recover this cost and to meet the administrative and other expenses as also to earn profit, banks have to utilize the working capital funds by either granting advances or making investments. Thus working capital funds, which are banks liabilities, get converted into assets. As we have already seen although a bank's earnings accrue only from advances and investments it has to hold " Cash in Hand" or "Balances with other banks in Current Accounts" and also invest some amounts in premises, furniture, fixtures and other assets which are essential tools for its trade. These assets do not generate any income for the bank on the other hand depreciation has to be provided taking into account their 'ware and tare'.

Banks are obliged by law, to repay the deposits and borrowings as and when they fall due for repayment. As these amounts have already been converted into assets, banks have to ensure all the time that all the assets are releasable, i.e. are liquid and can be fully recovered to meet the liabilities when need arises.

The main object of granting loans or making investments is to earn profit. If any income is not earned on any advances it is treated as a Non- Performing Assets where the accrual or expected income from an asset stop, the possibility of not recovering even the principal amount invested in the asset also arises.

1.1 Objective Of The Study

1.To study the Indian banking sector and performance of Indian banks.

1.2 Importance Or Need Of The Study

Before the establishment of banks, the financial activities were handled by money lenders and individuals. At that time the interest rates were very high. Again there were no security of public savings and no uniformity regarding loans. So as to overcome such problems the organized banking sector was established, which was fully regulated by the government. The organized banking sector works within the financial system to provide loans, accept deposits and provide other services to their customers. The following functions of the bank explain the need of the bank and its importance:

- To provide the security to the savings of customers.
- To control the supply of money and credit
- To encourage public confidence in the working of the financial system, increase savings speedily and efficiently.
- To avoid focus of financial powers in the hands of a few individuals and Institutions.
- To set equal norms and conditions (i.e. rate of interest, period of lending etc) to all types of customers.

2. RESEARCH METHODOLOGY

The procedure adopted for conducting the research requires a lot of attention as it has direct bearing on accuracy, reliability and adequacy of result obtained. It is due to reason that research methodology, which researcher used at the time of conducting the research, needs to be elaborate upon. It may be understood as a science of studying how research is done scientifically. So, the research methodology not only talks about the research methods but also consider the logic behind the method used in the context of the research study. Research methodology is a way to systematically study and solve the research problems. If a researcher wants to claim his study as a good study, he must clearly state the methodology adapted in conducting the research the research so that it may be judged by the reader whether the methodology of work done is sound or not.

2.1 Research Design Used In The Study:

Descriptive research design is used in this study because it will ensure the minimization of bias and maximization of reliability of data collected. Descriptive study is based on some previous understanding of the topic; research has got a very specific objective and clear cut data requirements. The researcher had to use fact and information already available through financial statements of earlier years and analyze these to make critical evaluation of the available material. Hence by making the type of the research conducted to be both descriptive and analytical in nature. From the study, the type of data to be collected and the procedure to be used for this purpose were decided.

2.2 Data Collection Method:

The process of data collection begins after a research problem has been defined and research design has been chalked out. There are two types of data.

2.2.1 Primary Data:

It is first hand data, which is collected by researcher itself. Primary data is collected by various approaches so as to get a precise, accurate, realistic and relevant data. The main tool is gathering primary data was investigation and observation. It was achieved by a direct approach and observation from the officials of the company.

2.2.2 Secondary Data:

It is the data which is already collected by someone else. Researcher has to analyze the data and interprets the results. It has always been important for the completion of any report. It provides reliable, suitable, adequate and specific knowledge. Researcher collected the secondary data by using banks annual reports and authorized websites of banks.

2.3 Type Of Data Used In The Study

The required data for the study are basically secondary in nature and the data are collected from The annual report of the Indian banks INTERNET –In which includes required financial data collected from Indian Bank's official websites i.e. www.axis.com, www.sbi.co.in etc. and some other websites on the internet for the purpose of getting all the
required financial data of the banks. The valuable cooperation extended by staff members and the branch manager of different banks, contributed a lot to fulfill the requirements in the collection of data in order to complete this research.

2.4 Methods Of Data Analysis:

For measuring various phenomena and analyzing the collected data effectively and efficiently to draw sound conclusions, certain statistical techniques were used. The data collected were edited, classified and tabulated for analysis. The analytical tool used in this study is graphical method to compare the performance of Indian banks. The MS- EXCEL tool is used to analyze the data.

3. REVIEW OF LITERATURE

Banking in India originated in the first decade of 18th century. The first banks were The General Bank of India, which started in 1786, and Bank of Hindustan, both of which are now defunct. The oldest bank in existence in India is the State Bank of India, which originated in the "The Bank of Bengal" in Calcutta in June 1806. This was one of the three presidency banks, the other two being the Bank of Bombay and the Bank of Madras. The presidency banks were established under charters from the British East India Company. They merged in 1925 to form the Imperial Bank of India, which, upon India's independence, became the State Bank of India. For many years the Presidency banks acted as quasi-central banks, as did their successors. The Reserve Bank of India formally took on the responsibility of regulating the Indian banking sector from 1935. After India's independence in1947, the Reserve Bank was nationalized and given broader powers.

3.1 Early History Of Indian Banking Sector

The first fully Indian owned bank was the Allahabad Bank, established in 1865. However, at the end of late-18th century, there were hardly any banks in India in the modern sense of the term. The American Civil War stopped the supply of cotton to Lancashire from the Confederate States. Promoters opened banks to finance trading in Indian cotton. With large exposure to speculative ventures, most of the banks opened in India during that period failed. The depositors lost money and lost interest in keeping deposits with banks. Subsequently, banking in India remained the exclusive domain of Europeans for next several decades until the beginning of the 20th century.

Foreign banks too started to arrive, particularly in Calcutta, in the 1860s. The Comptoire d'Escompte de Paris opened a branch in Calcutta in 1860, and another in Bombay in 1862; branches in Madras and Pondicherry, then a French colony, followed. Calcutta was the most active trading port in India, mainly due to the trade of the British Empire, and so became a banking center.

4. NATIONALIZED BANKS IN INDIA

Banking System in India is dominated by nationalized banks. The nationalization of banks in India took place in 1969 by Mrs. Indira Gandhi prime minister of India. The major objective behind nationalization was to spread banking infrastructure in rural areas and make available cheap finance to Indian farmers. Fourteen banks were nationalized in 1969.

Before 1969, State Bank of India (SBI) was the only public sector bank in India. SBI was place in the year 1980. Seven more banks were nationalized with deposits over 200 crores. Around the turn of the 20th Century, the Indian economy was passing through a relative period of stability. Indians had established small banks, most of which served particular ethnic and religious communities.

The presidency banks dominated banking in India. There were also some exchange banks and a number of Indian joint stock banks. All these banks operated in different segments of the economy. The exchange banks, mostly owned by Europeans, concentrated on financing foreign trade. Indian joint stock banks were generally undercapitalized and lacked the experience and maturity to compete with the presidency and exchange banks. This segmentation let Lord Curzon to observe, "In respect of banking it seems we are behind the times. We are like some old fashioned sailing ship, divided by solid wooden bulkheads into separate and cumbersome compartments." A number of banks established then have survived to the present such as Bank of India, Corporation Bank, Indian Bank, Bank of Baroda, Canara Bank and Central Bank of India.

4.1 Private Banks In India

All the banks in India were earlier private banks. They were founded in the pre-independence era to cater to the banking needs of the people. But after nationalization of banks in 1969 public sector banks came to occupy dominant role in the banking structure. Private sector banking in India received a fillip in 1994 when Reserve Bank of India encouraged setting up of private banks as part of its policy of liberalization of the Indian Banking Industry. Housing Development Finance Corporation Limited (HDFC) was amongst the first to receive an 'in principle' approval from the Reserve Bank of India (RBI) to set up a bank in the private sector.

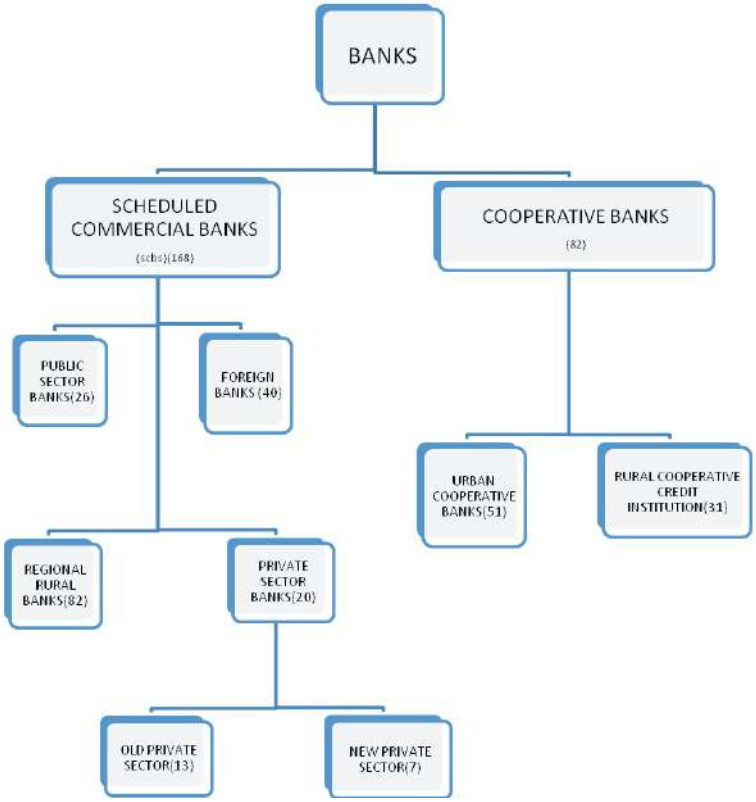

Figure no. 1- Structure of Bank

5. STRUCTURE OF BANKS

5.1 Performance Of Indian Banking Sector

The top 10 banks selected for the analysis, as based on the market capitalization as of 30 March 2012, are: State Bank of India (SBI), Punjab National Bank (PNB), Canara Bank, Bank of India (BoI), Bank of Baroda (BoB), ICICI Bank, HDFC Bank, Axis Bank, Kotak Mahindra Bank (KMB) and IndusInd Bank (IIB).

The performance of the banking sector is more closely linked to the economy than perhaps that of any other sector. The growth of the Indian economy is estimated to have slowed down significantly from 8.39 percent in FY11 to 6.88 percent in FY12. This slowdown could be attributed to a number of factors:

- Continuing problems in Europe and economic slowdown in the United States affecting foreign investments coming into India
- Policy paralysis in view of the government's inertia on various policy issues and reforms
- Fiscal indiscipline leading to fiscal deficit
- High inflation leading to high interest rate
- Rupee devaluation which further deteriorates the current account deficit

Besides these factors, rising inflation forced the RBI to tighten the monetary policy during the last two years, increasing the benchmark repo rate 13 times successively. While the high interest rates impacted the economic growth significantly, they had little impact on inflation. Persistent high inflation has led to a

slowdown in credit growth and increase in cost of funds, hence adversely affecting the profitability of banks.

A number of changes in the policy and regulatory domain also affected the performance of Indian banks. These included migration to the system tracking of non- performing assets (NPAs) of the entire loan book, increasing the provisioning percentages for NPAs and restructured loans and the mandate to expand in relatively less profitable under-banked and unbanked areas.

5.2 Net Interest Margin

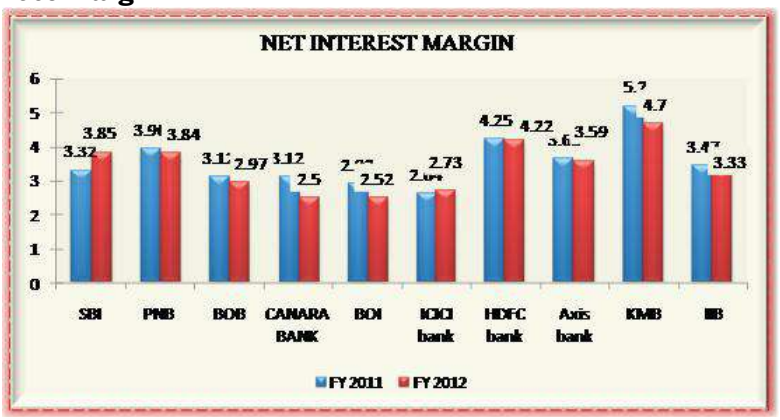

Figure no. 2 Net interest margin chart

Observations:

Researcher notice that interest rates had peaked towards the end of FY12 after almost two years of monetary tightening cycle. Consequently, the lag in deposits has come to an end which adversely affected growth (due to high interest rate differential), deregulation of savings deposits rate and higher cost of bulk deposits. NIMs declined in FY12 for eight of the 10 banks under study with SBI and ICICI Bank being the only two exceptions. Here NIM of SBI increased to 3.85 percent in FY12. It was the result of an increase of 30 bps and 54 bps in its NIMs of overseas and domestic operations to 1.67 percent and 4.17 percent, respectively.

Although total operating income ratio for PNB was more or less stable at 76.14 percent, it's NIM declined by 3.96 percent in FY11 to 3.84 percent in FY12. The reduction in the bank's NIM was mainly attributed to the increase in deposits cost from 4.57 percent in FY11 to 5.62 percent in FY12 due to a number of reasons. The NIM of BoB declined by 2.97 percent, primarily due to a decline of 21 bps in its NIMs of domestic operations to 3.51 percent. The bank's cost of funds primarily increased due to lower CASA deposits and general increase in funding costs. Canara Bank witnessed a decline in NIM by 2.50 percent in FY12 as increase in yield on advances was lower than the increase in cost of funds.

Observations:

In the above figure researcher notice that the market capitalization of banks currently under reviev. The SBI is the highest market capitalization with market cap INR 107643 crores. The other nationalized banks are shows the less market capitalization with small market cap value compare to the SBI market cap value. HDFC and ICICI shows highest market capitalization in private banking sector with market cap INR 147982 and INR 97661 billion respectively. The private banks are shows variation in market cap value.

6. CONCLUSIONS

Today the banking sector in India is fairly mature in terms of supply, product range and reach. As far as private sector and foreign banks are concerned, the reach in rural India still remains a challenge. A growing economy like India requires a right blend of risk capital and long term resources for corporate to choose an appropriate mix of debt and equity, particularly for infrastructure projects which is the need of the day. A well functioning domestic capital market is also necessary for the banking

sector to raise capital and support growth and also have suitable capital adequacy ratio to mitigate risk. Bank investments are also showing an increasing trend. After researching banking sector researcher found that different problems are increasing to banking sector because of the money market has always down.

6.1 Limitations Of The Study:

- Difficulty in data collection.
- Generally the organization does not allow outsiders to conduct any study or research work in the organization. Therefore, get the research done in the organization itself was very difficult.
- Limited knowledge about the bank in the initial stages.
- Branch manager was reluctant for giving financial data of the bank
- The analysis and interpretation are based on secondary data contained in the published annual reports of the Indian banks for the study period
- Due the limited time available at the disposable, the study has been confined for a period of 5 years (2009- 2013).

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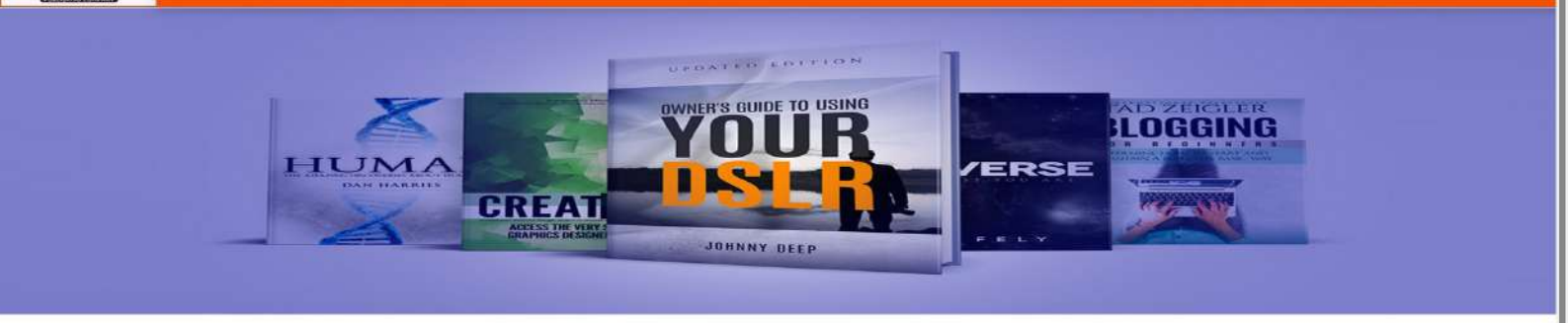

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