Proceeding
Of
4th International Conference on Cloud Computing Computer Science and Advances in Information Technology (ICCCCIT 2015),
4th International Conference on Electrical Electronics Communication Robotics and Instrumentation Engineering (ICEECIE 2015)
&
4th International Conference on Recent Development In Mechanical, Production, Industrial And Automobile Engineering (ICMPIAE 2015)

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Editor-in-Chief

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About Conference

Technical Research Organisation India (TROI) is pleased to organize the 4th International Conference on Cloud Computing Computer Science and Advances in Information Technology (ICCCCIT 2015), 4th International Conference on Electrical Electronics Communication Robotics and Instrumentation Engineering (ICEECIE 2015) & 4th International Conference on Recent Development in Mechanical, Production, Industrial and Automobile Engineering (ICMPIAE 2015).

ICCCCIT-2015 is a comprehensive conference covering the various topics of Computer Science and Information Technology. The aim of the conference is to gather scholars from all over the world to present advances in the aforementioned fields and to foster an environment conducive to exchanging ideas and information. ICEECIE-2015 conference will also provide a golden opportunity to develop new collaborations and meet experts on the fundamentals, applications, and products of Electrical & Electronics Engineering. We believe inclusive and wide-ranging conferences such as ICEECIE & ICMPIAE can have significant impacts by bringing together experts from the different and often separated fields of Engineering and Technology. It creating unique opportunities for collaborations and shaping new ideas for experts and researchers. This conference provide an opportunity for delegates to exchange new ideas and application experiences, we also publish their research achievements. ICMPIAE shall provide a plat form to present the strong methodological approach and application focus on Mechanical, Production, Industrial and Automobile Engineering that will concentrate on various techniques and applications.

Topics of interest for submission include, but are not limited to:

Computer Science & Engineering
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Instrumentation Engineering
Industrial Engineering
Mechanical Engineering
Aeronautical Engineering
Nano-Technology,
Genetic Engineering
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Soft computing
Aeronautical Engineering
Engineering Science
Network Engineering
Software Engineering
Telecommunication Engineering
And many more....

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Editorial

The conference is designed to stimulate the young minds including Research Scholars, Academicians, and Practitioners to contribute their ideas, thoughts and nobility in these two integrated disciplines. Even a fraction of active participation deeply influences the magnanimity of this international event. I must acknowledge your response to this conference. I ought to convey that this conference is only a little step towards knowledge, network and relationship.

The conference is first of its kind and gets granted with lot of blessings. I wish all success to the paper presenters.

I congratulate the participants for getting selected at this conference. I extend heart full thanks to members of faculty from different institutions, research scholars, delegates, TROI Family members, members of the technical and organizing committee. Above all I note the salutation towards the almighty.

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SURVEY OF GRID SIMULATION AND COMPUTING

Technological Advancement And Future Scope

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Abstract—Peer-to-Peer or Grid computing is coming out as a next generation platform to solve large-scale problems in fields of science, commerce, and engineering. It is expected to involve many (heterogeneous) resources distributed in multiple organizations, administrations, and policies. The management of resources and their scheduling in such large-scale distributed systems is complicated and therefore, sophisticated tools for analyzing and tuning the algorithms before applying them to the real systems are needed. This paper combines and recapitulates the findings of prevalent research in this field.

Keywords—Grid Computing, Grid Simulation, Resource management, Resource allocation, Distributed Computing

I. INTRODUCTION

Grid Computing is a type of parallel and distributed system that allows the sharing, choosing, interchange, & collectivization of geographically separate "autonomous" computing systems. A primary strategy of grid computing is to use middleware to divide and break pieces of a program among several computers, sometimes in thousands. Grid computing involves computation in a fashion that is distributed, which may include the aggregation of large-scale clusters. The Global grid has been explained in Figure 1 below[1].

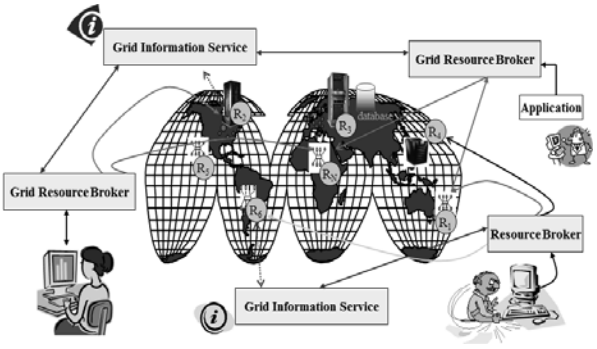

Figure 1: A Bird's eye view of Global Grid

II. ANALYSIS OF GRIDS

A. Simulation

Simulation is the only feasible way to study algorithms on large-scale distributed systems of heterogeneous computing systems. Unlike using the actual infrastructure in real time, simulation works ingeniously, without making the mechanism undesirably complex, by evading the overhead of co-ordination of real parts of the system. Simulation is also useful in working with very large hypothetical problems that would generally need involvement of a high population of active users and resources, which is very difficult to manage and build at large-scale research environment for exploration purposes[2].

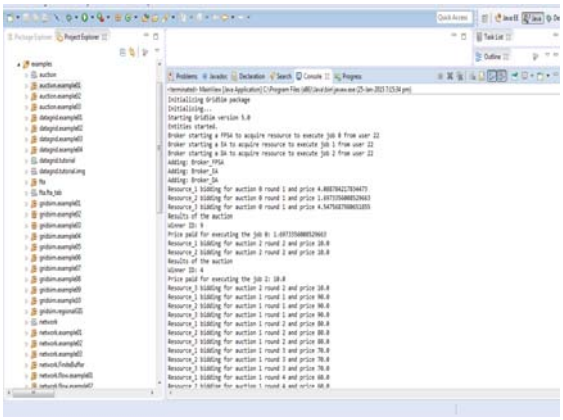

Figure 2: Screenshot of Gridsim Toolkit

B. Uses

Even if only one grid can be dedicated to a particular application, commonly a grid is used for a sundry of purposes. Grids are generally built with general-purpose grid middleware application libraries. E-commerce and E-science are main application areas of Grid Technology. These include the following:

- Utility Computing
- Collaborative Design
- High Performance Computing
- High Energy Physics
- Life Sciences
- Collaborative Data Sharing
- Financial Modeling
- Data center automation
- Drug Discovery

C. Challenges

The main Challenges in Grids are presented below.

- Security
- Uniform access
- Computational Economy
- System Management
- Resource Discovery
- Data Locality
- Network Management
- Application Construction
- Resource Allocation and Scheduling

III. LOAD BALANCING WITH FAULT TOLERANCE

D. Nanthiya and P. Keerthika propose an algorithm to enable efficient management of resources to tackle load problems [3]. The utilization of the Gridsim simulator has been key to verify the functioning of the algorithm[4].When a job is submitted to the Machine, the algorithm works at two phases namely:-Selection of fittest resource and load balancing algorithm.

A. Selection of Fittest Resource

Each job is submitted to the Machine in the grid environment with the user deadline. Then for each available job, ECT (Expected Completion Time) value for each resource is found. Then the resources that are satisfying the user deadline (less than or equal to ECT value of the job) alone are considered. The resource with highest fittest value is considered to be the fittest resource for that job.

B. Load Balancing algorithm

The load balancing mechanism is performed at all the three levels: Broker, Resource and Machine.The algorithm classifies the nodes at three levels into three lists: overloaded list, normally loaded list and under-loaded list based on the load threshold values namely:-PE level threshold, Machine level threshold and Resource level threshold. Overloaded list means set of nodes with over-commitment of jobs. Normally loaded list is a list of nodes, if any job is further submitted to these nodes then they are shifted to the overloaded list. The under-loaded list is a list of nodes which can be submitted with jobs. If the selected node is present in the under-loaded list, then the job is scheduled to the same resource else check for the presence of the next fittest resource in the under-loaded list. Before scheduling the job, expected load of the selected resource should be calculated by adding the load of the job with current load of that particular resource. If the expected load exceeds the load threshold value then it is assumed that the submission of job may lead to the overloaded node condition. If the expected load value below the load threshold, then the job can be submitted. Finally if the load is unbalanced at the PE level, then few jobs are selected and forwarded to the Machine level. If the load is unbalanced at the Machine level, then few jobs are selected and forwarded to the Resource level. Almost the load is balanced at

the Machine level itself. By this way the load balancing mechanism is performed at each level considering the fault tolerance factors.

IV. SCHEDULING OF RESOURCES

Simulated Annealing is an algorithm that simulated the procedure of physical solidification. The most difference is its principle of reception, which was called "Metropolis" rule. It transmitted from one state to another not only according to the fact that the new state was better than the older one, but it also transmitted if the new and worse state was "hit" by a function of random. It made it jump out of local extremum. All the states made up of a link, called "Markov chain". The advantage is its capability of global optimization. The procedure of searching of the state of optimization was controlled by many factors. So, applying of SA should obtain those factors' appropriate value. Those parameters interacted tightly and controlled the optimization procedure. In order to reduce SA's overhead, hierarchical structure of grid scheduling should be adopted. But scheduling algorithms in each level may be the same. It should not only take load of machines (CPUs) into account, but also network's load should be considered, especially for data intensive application.

The algorithm run as follows:

(1) Request and discovery resources and filter them, according to characters of resource and demand from task, performance;

(2) Extract tasks to be scheduled; the condition here is that the number of tasks extracted should not be greater than the number of resources;

(3) Retrieve dynamic information of each resource, then estimated completion time of the task and its communication;

(4) Call simulated annealing algorithms in grid computing;

(5) Distribute the task scheduled to target resources and update resources' information;

(6) Compute the number of returning tasks;

(7) If there is more work to be scheduled, return step (2)

(8) Repeat (1)-(7) until all tasks completed [5].

The Sample Simulation Network and deployed resources is as given in figure 3 below[5].

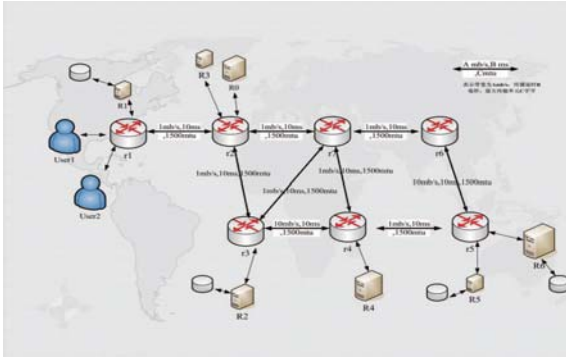

Figure 3: Sample Simulation Network and resources deployed

V. PRICING MODEL FOR GRIDS

Analysis of grid resources utilization from real grid trace data shows the feasibility of a financial option based model for pricing grid resources to attract more users for profitability for the grid provider while making the provision of good Quality of Service (QoS) to clients [6]. However, in the absence of the grid resource cost pricing scale, we simulate grid resources usage in order to justify our pricing model using GridSim toolkit. In this work a financial option based pricing model with GridSim framework was integrated and used as a grid simulation tool to price grid compute resources. Grid resources such as CPU cycles, network bandwidths, computing power or capacity, memory, disks present, throughput, processors, and various measuring and instrumentation tools are non-storable compute products. Pricing these compute products is challenging because of the specific characteristics of the grid resources: heterogeneity of resources (geographically dispersed ownership and time zones affects availability of resources) and volatility of resources since they exist as compute cycles).

The Algorithm:

1. Begin: GridSim;
2. Begin: Create grid scenario;
/* Create the environment scenario
and initialize the GridSim Toolkit*/
3. Start: for each grid resource do; /*Ri*/
4. Create new processing elements; /*PE*/
5. Create new machines;/*Mi*/
6. Create new resources Ri; /*where Ri have one
or more Mi that also have one or more PEs */
7. End: Create grid scenario
8. Begin: Create users' scenario

9. for each user do
10. create a grid task;
11. End: users' scenario;
12. Begin: bid and trinomial;
13. for each user do
14. for grid resource do
15. resource bid and utilization;
16. Apply trinomial;
17. compute option value;
18. End: resource use and trinomial;
19. Start GridSim simulation;
20. Obtain simulation data;
21. End GridSim simulation;
22. End:GridSim;

The work presented puts forward an important idea: feasibility of a financial option based model for pricing grid resources with emphasis to attract more users for cost recovering on grid infrastructure for the grid provider while there is uncompromised QoS for the users.

VI. QUALITY OF SERVICE

Quality of service is an important concept as it offers a basis for informing users about the sort of service they might expect. Often users will just wish to specify the time by which they would expect their job to be completed and would be happy to pay a predefined amount to achieve that. Other users may wish to reserve resources in advance for a particular time period. Others, who are more computationally aware, may wish to specify the services they expect more precisely through defining specific criteria. Currently, most Qualities of Services are defined as low level parameters that are, to the inexperienced computer user, vague and complex. Defining QoS at a higher level not only makes their measurement simpler but also helps users identify their requirements faster, more accurately and more realistically (Bhatti et al 2003; Rio et al2003, Albodour 2008 [7] . Another challenge is that of measuring Qualitative QoS. While Quantitative QoS such as bandwidth have standard measurement metrics that can be used, for example bandwidth can be measured by Mbps; Qualitative QoS such as reliability and availability do not and must therefore be defined with suitable metrics.

A. Quantitative QoS:

- Guaranteed number of Resources (Computational)
- Access period (Range of dates)
- Memory per core (in MB)
- Average power of single CPUs (in GHz)
- Storage required (in GB)
- Bandwidth Required (in Mbps)
- Short term storage requirements.
- Required time of completion (time deadline in hours)

B. Qualitative QoS:

- Resource availability (in %)
- Resource reliability (in %)

C. Other QoS considerations

Differing policies between different organizations and their resources have to be taken into account, as well as, authentication and authorization of users who may transcend their own domain into others in search of resources that meet their requirements for their applications, not to mention, the actual differing security domains within a single institutions. It is therefore vital for these considerations to be used in any simulation that tests an application that is to be run on top of a real Grid platform or system. It is for this purpose that we have distinguished multiple levels of users, meeting some of the access control demands of modern applications.

Varying QoS can be expressed and maintained through the identification a number of resource characteristics that affect performance. These types of characteristics can be used both to specify QoS and as metrics to measure performance against an agreed Service Level Contracts. Complications may arise if resources fail or if infrastructures across Grids differ and cause deterioration of service. In this case renegotiation of SLA may need to occur.
The essential extension of classes already present and the necessary introduction of new classes have been elaborated.

VII. GRID WORKFLOW SCHEDULING OPTIMIZATION

Workflow scheduling problem in grid environment optimises mainly based upon the time and cost constraints, but the main problems about, flexibility, stability, security and load balancing are not enough considered. Redefining parameters of quality of service (QoS) and the model of grid workflow scheduling a rotary hybrid discrete particle swarm optimization (RHDPSO) algorithm has been put forward, in which double extremums are disturbed by the method of random time sequence based on rotation discretization, to control premature convergence and local optimum. The approach is used to generate an optimal solution so as to complete the multi-QoS constrained grid workflow scheduling as well as to utilize the resource in an efficient way. Empirical results reveal that the proposed approach can be applied for grid workflow scheduling. Simulation results prove that the RHDPSO algorithm has fast convergence, is very precise and is very robust, and can effectively restrain preterm convergence, As compared to DPSO [8].

VIII. SERVICES MONITORING IN GRID MARKET

A. Performance Metrics

The performance of Grid is not well defined, neither is the performance of Grid services. The obstacles are mainly the nature of Grid (heterogeneity, dynamism, wide distribution, etc) and these make traditional performance metrics not directly applicable to Grid environments. However, there has been pretty much work on Web services which can provide good references when we consider the performance features of Grids. In Grid market environments, the following metrics can be considered to monitor for Grid services:

- Availability: whether a Grid service is present and ready for immediate use. This is a very basic metric showing the status of a Grid service.
- Throughput: how many requests can be serviced in a given time period. Throughput can be an important concern by system administrators. The throughput could be limited by either the service itself of the system that it is running on.
- Latency (or response time): how much time elapses between the request and response is given by this. Response time is usually a concern by end users, and it can be affected by a lot of factors such as workload of the server, efficiency of the current service, network capability, actual degree of completion, and many more small factors.
- Scalability: How scalable the service is, in terms of number of service instances.

B. Other Metrics

There are many other concerns for Grid services, which may not be directly related to performance. The concerns could be from the view point of the consumer's commercial and non-technical considerations like:

- Service cost: Price of using the service. It should be provided by the service provider.
- Rate of failure: The failure rate reveals the number of failures for a given number of requests. This is one of the metric that should be monitored since the consumer needs to have an idea of how stable the service is, or how reliable the service is. The failure may not necessarily be caused by the service itself there can be other reasons like networks non fulfilment in communication.
- Rate of rejection: Sometimes the request for using the Grid services can be rejected. The reasons of rejection could be various: no agreement on the cost of the usage, unauthorized user, etc.
- Rate of request (or Popularity): The request rate reveals the popularity of the service to some extent. If other parameters are same, the higher the request rate, the more popular the Grid service is. This information can be used for marketing evaluation and other tasks.
- Service Guarantee: Service Guarantee tells consumer how high chance he can get the promised quality of service.

Liang Peng et al. proposed a Grid market framework to build commercial Grid market and support the commercialization of any Grid, for organizations to be able to share resources for profit. Such a framework is a must if the Grid is going to evolve from its current experimental status into professional or commercial use[9].

IX. CONCLUSION

Grid Computing finds its applications in the fields discussed above and provides a large scope for research in areas highlighted. From the survey we show how simulation has aided to ease in development of more efficient algorithms. Also, feasibility analysis of such projects can be tested through the use of the GridSim Toolkit.

Grid Computing forms the basis of Cloud environment creation and hence finds its way into applications of the future. Hence, commercially, Grids hold an essential position, especially in the field of e-commerce amongst other businesses.

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CLOUD BASED HOME SECURITY

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Abstract— This report deals with the design and implementation of a Home Security system through mobile devices, that take advantage of mobile technology to provide essential security to our homes that does not require specific hardware or skilled technicians. We have proposed to remotely monitor security surveillance system through cloud computing using any Internet enabled device. As an interruption is detected, an SMS alert will be given to the user and the user can view the video and image of the intruded room through Email or SMS and can secure his house by giving an alert to the vicinal. The user can monitor the intrusion from anywhere, on any internet enabled device. If the intrusion is true , the user is provided with the options to quietly alert proximates, play alarm sounds and post to the police. Thus, theft can be prevented. The implementation shows three use scenarios: (a) functioning and controlling video cameras for remote monitoring through mobile devices or sound sensors; (b) streaming live video from device and sending captured image to user's mobile devices; (c) recording and saving videos as well as images on a cloud computing platform for future playback. Furthermore, our application is not only limited to smart phones but also can be used by feature phones through their browsers.

Keywords- Cloud Computing platform, Home Security System, Remote Monitoring and Security Surveillance System.

I. INTRODUCTION

With the increasing necessity of individual and resource security, residential monitoring services and applications have engaged much attention from both pedantic and industry. Blending with cloud computing technology is a trend in the development of Smart Home monitoring services. Cloud computing acts as a reliable, elastic, and secure data storage centre with low-profile facilities to provide data sharing and creates infinite possibility of applications in real life. However, there are still a lot of technical issues waiting for urgent answers:

1. Remote access and control.

Owing to the wired medium, monitoring service was limited in local network and spaces. So users were not able to access camera from a distance.

2. Mechanization and Intelligence.

Extra manual management is required to be deployed which is very difficult for Conventional monitoring systems. For example closed-circuit television. Surveillance systems must have necessary communication bandwidth to each camera and couldn't be constructed automatically. Besides, there is no system for camera to regularly work or impart data back,

which is unsuitable and may lose data if lack of physical storage operation in time. In our solution, Media information captured by camera would be uploaded/stream to cloud computing platform, and user with mobile device is capable to download/stream media resource anywhere with network connection.

Aim of our project is provide remote monitoring on the go, Two-way talk..

The remainder of this paper is organized as follows: In section II, we have provided the background knowledge and problems faced by current home security system and improvements made in proposed system. In section III, we have discussed about system architecture and implementation details. In section IV, we have concluded our work.

II. BACKGROUND

A. System Architecture [5]

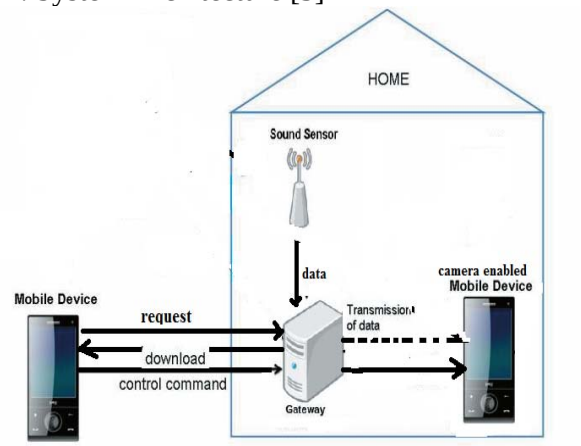


Fig 1

Whether you feel the need to be aware of invader at home, pay attention on the baby in the other room or just want to see what your pets are doing when you're not around, this app can help. This app can display live video feeds and provide you screenshots of what you're viewing at any given time.It only requires camera enables mobile device placed at home which will capture streams and transmit to user's mobile device.It supports night vision functionality. It is recommended because it not only enables you to see clearly what's happening in dark rooms at night, but also makes it easier to see what's going on in dimly lit rooms on cloudy days.

When you do get alerts, they generate either one or more still images or a link to a video clip that typically lasts about 30 seconds. It let you store images in the Gateway server. For security, it require a user account name and password, and some additional details to access device. All video streams from your cameras go through the Gateway before arriving at your mobile device or personal computer. The Gateway server acts as the mediator, imparting video feeds and storing video clips. Because the Gateway server sends out the email alerts, all you need to do is provide the email address to which you want the alerts sent and you're done. Currently, the security services offered in our server are:

(1) Real-time Monitoring.

(2) SMS notifications and user's confirmation in case of intrusion detection.

B. Image detection [2], [3]

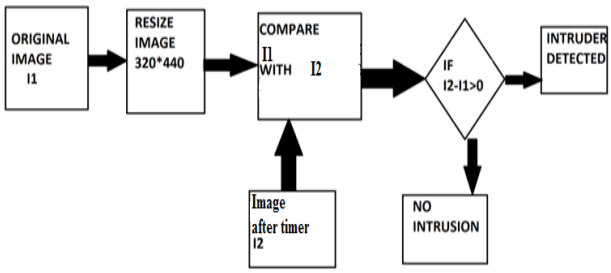


Fig 2: Image detection algorithm

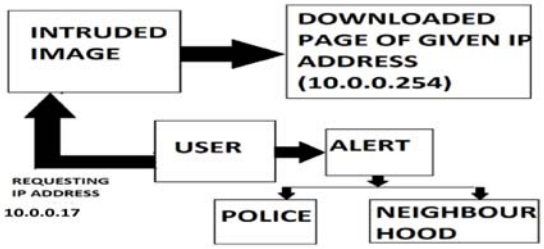


Fig 3: Intrusion detection flow diagram

Fig 2. Describes how the image detection algorithms works. Initially image is captured which will be compared with image captured after some timeout. If there is difference in those images than it means something unreal has occurred. If not, than it means no intrusion. Fig 3. Shows how user, vicinal , police will be alerted.

C. Remote-Control based Monitoring

In remote monitoring, the camera is manually controlled. In case user detects that camera at home is turned off he can turn it on remotely by sending alert to phone placed at home This approach provides a convenience for user away from home to operate camera for implementing surveillance. After user login process, mobile terminal is capable to activate a residential camera to capture images/video through sending command to gateway that controls camera directly.

Fig 4

A remote-control based monitoring use scenario Use case 1 shows how remote user utilizes mobile devices to control and acquire monitoring media resource, as shown in Fig.2.3. Possible messages flows are:

1) Alice (user of mobile device) detects that camera at home is not functioning so sends a control command (Message "VIEW CAMERA") to gateway Fig: (a).
2) Home gateway analyses the command received and activates a camera Fig: (b).
3) The camera captures images and regularly sends media data back to gateway.
4) Home gateway generates media files, and sends a response to Alice.
5) Alice sends a request to gateway server for downloading media resource.
6) Cloud server sends a response which includes media data back. Alice is capable to play and watch monitoring media resource.

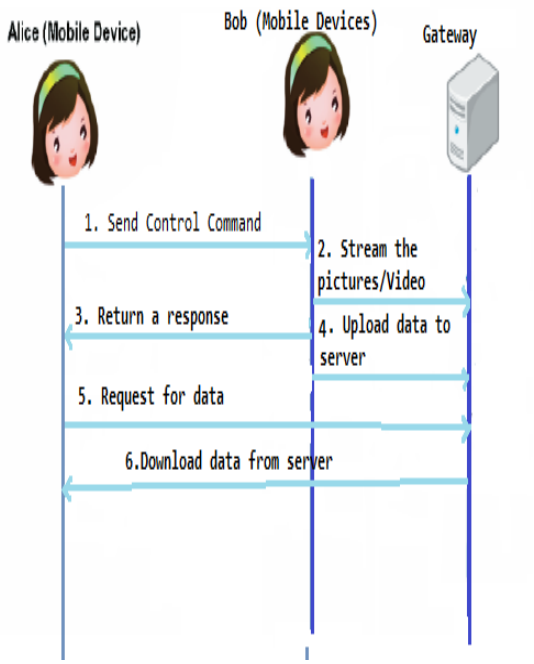


Fig 5: Remote-control based monitoring use scenario

III. SIMULATION

Prototype Implementation Tools

Elements	**Tools**
Mobile Client	Android mobile device
Gateway Server	MySQL
Media Capture Technique	Ffmpeg ,Camera android APK
Programming Language	Java

Table 1: Prototype Implementation Tools

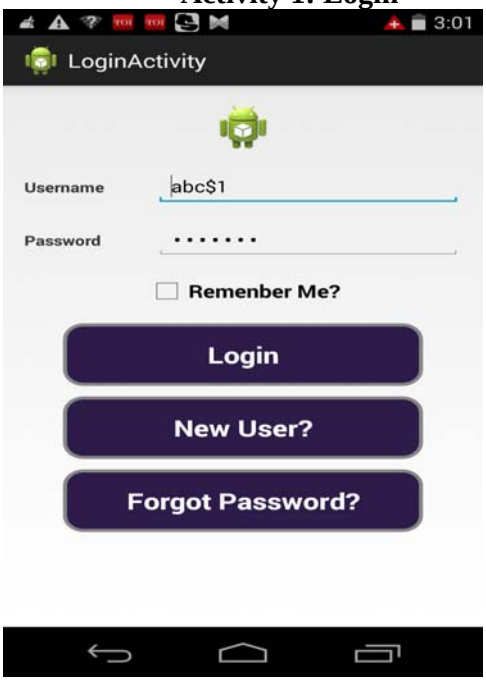
Pre-Condition

We also define some pre-condition for the prototype implementation. The pre-conditions are:

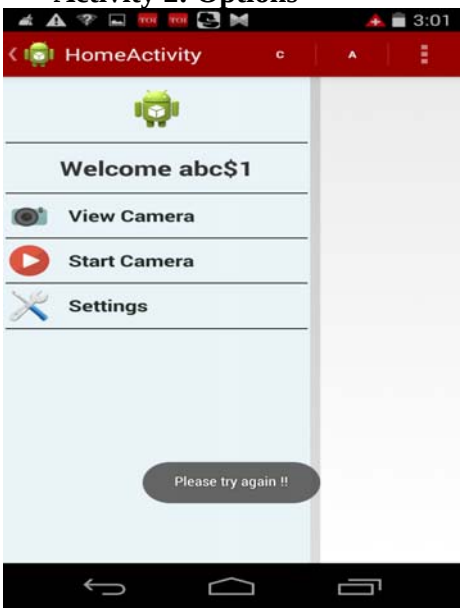
1) Internet Connectivity.
2) This application must be installed in both the phones i.e. phone acting as camera and user's phone.
3) Phone should be unlocked.

D. User Interfaces Display

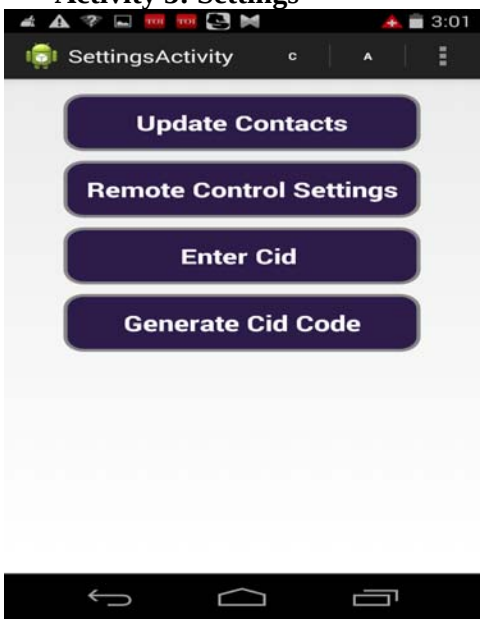
Activity 1: Login



Activity 2: Options



Activity 3: Settings



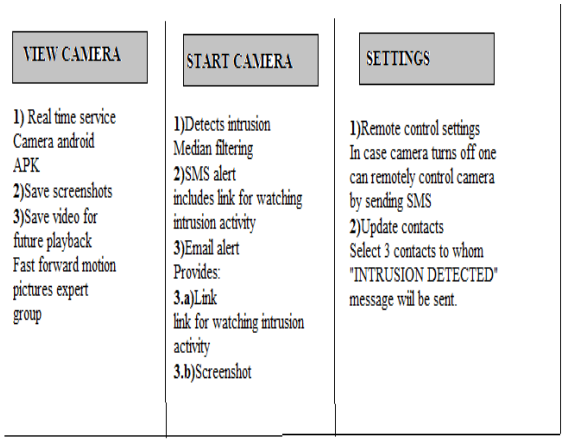


Fig 8: Modular approach

IV. CONCLUSION AND FUTURE SCOPE

Entire app will be deployed on cloud server. On improving the security surveillance system, we plan to add more social integration through social networking sites like Facebook and Google+. With the help of these online social networks, we can easily contact and inform a user's friends in case of an intrusion event and thus make burglary prevention more effective. For further work project will be deployed on cloud. The use of cloud services in home

automation derives many benefits extending from cost reduction to value added services. In the future we intend to detect smoke and fire.

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DESIGN AND IMPLEMENTATION OF PORT SCANNER AND SNIFFER

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Abstract: A port scanner is a piece of software designed to search a network host for open ports. The only way to track open ports is by using a port scanner, and the most accurate port scanner will be an online port scan. This project aims at the creation of a comprehensive application, which can be used at corporate environments. The port scanner and sniffer software is as simple as possible so that it can be configured even by a nontechnical person. This is often used by administrators to check the security of their networks and by hackers to compromise it. The main objective of this project is to scan the various ports within a specified range. With help of this administrator can easily identify the open ports and warn the clients. Packet sniffing is a technique of monitoring every packet that crosses the network. A packet sniffer is a piece of software that monitors all network traffic. The security threat presented by sniffers is their ability to capture all incoming and outgoing traffic, including clear-text passwords and usernames or other sensitive material.

INTRODUCTION

Port scanning: Port scanning presents a method used to recognize ports for the open network in the computer system that they can break into. Port scanning has different legitimate uses that it performs in a system. It can be used to send a request to connect to the aimed computer and note the ports that responds or appears to open. Port scanning is also used to configure applications for network security to inform the administrators in case they detect some connections across a wide range of ports from a single host. Port scanning may involve all of the 65,535 ports or only the ports that are well-known to provide services vulnerable to different security related exploits. If a port on a remote host is open for incoming connection requests and you send it a SYN packet, the remote host will respond back with a SYN+ACK packet. If a port on a remote host is closed and your computer sends it a SYN packet, the remote host will respond back with a RST packet.

Packet sniffer: A packet sniffer is a tool that plugs into a computer network and monitors all network traffic. It monitors traffic destined to itself as well as to all other hosts on the network. Packet sniffers can be run on both non-switched and switched networks. Packet sniffers are more formally known as network analyzers and protocol analyzers. It monitors hub is called a Switched Ethernet. The switch maintains a table keeping track of each computer's MAC address

and delivers packets destined for a particular machine to the port on which that machine is connected. Packet sniffing is an essential activity for network engineers as well as security experts. If, used in a positive way, it is the most essential tool for network analysis, protocol analysis, network troubleshooting, intrusion detection and hundreds of such other applications.

A packet sniffer works by looking at every packet.

Sniffing methods

There are three types of sniffing methods. Some methods work in non-switched networks while others work in switched networks. The sniffing methods are:

- **IP-based sniffing:** This is the original way of packet sniffing. It works by putting the network card into promiscuous mode and sniffing all packets matching the IP address filter. Normally, the IP address filter isn't set so it can capture all the packets. This method only works in non-switched networks.

- **MAC-based sniffing**: This method works by putting the network card into promiscuous mode and sniffing all packets matching the MAC address filter.

- **ARP-based sniffing:** This method works a little different. It doesn't put the network card into promiscuous mode. This isn't necessary because ARP packets will be sent to us. This happens because the ARP protocol is stateless. Because of this, sniffing can be done on a switched network. To perform this kind of sniffing, you first have to poison the ARP cache1 of the two hosts that you want to sniff, identifying yourself as the other host in the connection. Once the ARP caches are poisoned, the two hosts start their connection, but instead of sending the traffic directly to the other host it gets sent to us. We then log the traffic and forward it to the real intended host on the other side of the connection. This is called a man-in-the-middle attack.

This application is designed into three independent modules which take care of different tasks efficiently:

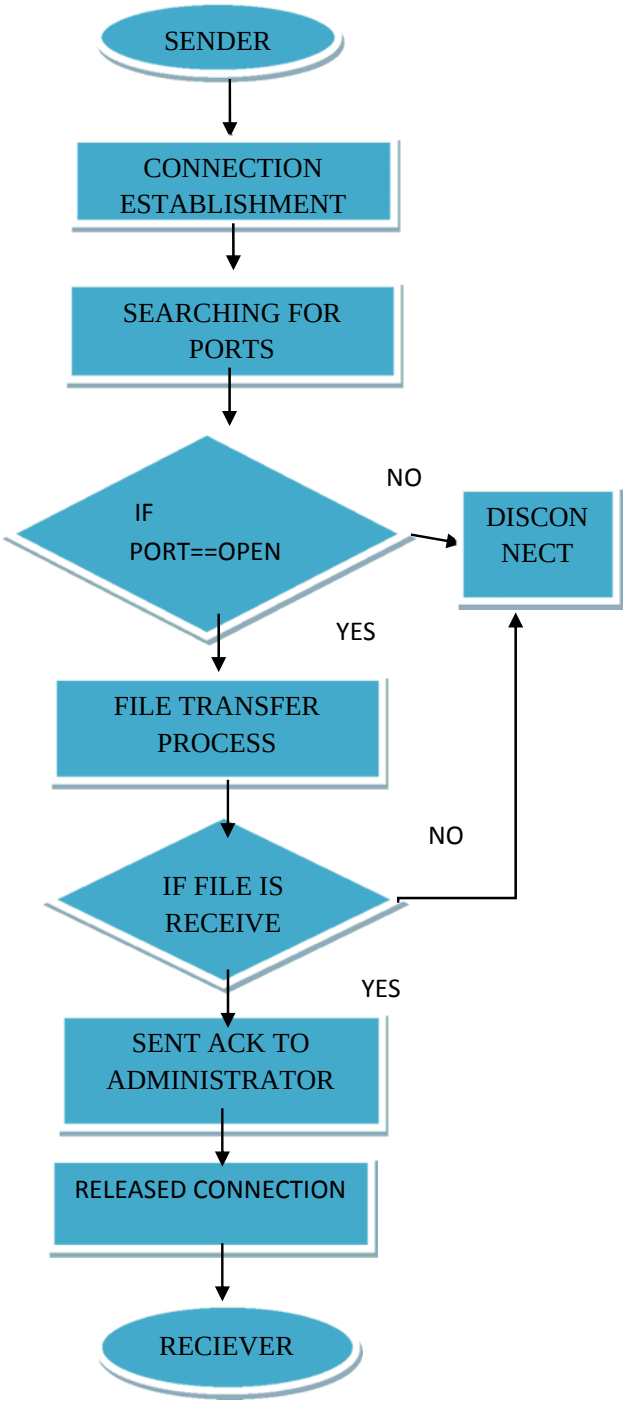
- **Authentication module:** In this module the administrator verifies the username and password. In ms access the administrator creates a database and in that the fields' username and passwords are entered. Whenever a client enters his details the system checks those details by comparing them with the details present in the database. If he is an authorized user he can log onto the system or else the access will be denied.
- **Scanning module:** In this we use the concept called multithreading to scan the multiple ports simultaneously. There are two types of scanning one is TCP scan and other is UDP scan. In TCP scan we send connect () system call to each and every port. If the port is open then connect() will proceed. In UDP scan we send a packet, if the packet is unreachable then we get ICMP port unreachable error. TCP scan is more reliable than UDP scan. In the scan page the admin/clients have to specify the IP address of the target machine, type of scanning and the range of the ports to be scanned.
- **Packet Sniffing Module**: Packet sniffer's, are protocol analyzers meant to capture the packets that are seen by a machine's network interface. When a sniffer runs on a system, it grabs all the packets that come into and goes out of the Network Interface Card (NIC) of the machine on which the sniffer is installed then it will receive all the packets sent to the network if that network is connected by a hub.

PROPOSED SYSTEM

Over time, a number of techniques have been developed for surveying the protocols and ports on which a target machine is listening. We send a blizzard of packets for various protocols, and we deduce which services are listening from the responses we receive (or don't receive). The application creates threads which attempt to connect to the supplied IP address and using the range of port numbers supplied. In this approach

the effects of connection timeouts is minimized and the application can process a range of port. In this application it can show the "packet sniffing" concept. In this manner it can show the captured packets and size of the packet and source and destination machine IP addresses which are involved in the packet transferring.

METHODOLOGY



Methodology: This project works as sender and receiver based application. Firstly client sends request to the admin or server after that server accepts request and connection will be established between client and server. After that the port scanning process starts if the port is open then file transfer process will be started else connection will be disconnected. If file is received then acknowledgement is send by receiver else connection will be disconnected. After the successful file transfer process the connection between sender and receiver is released.

CONCLUSION

The technological benefits of PORT SCANNER are monitor and enhance the performance of the system and provide security to the system. Using port scanner we can scan multiple ports simultaneously by using the concept called multi threading, by this time will be saved. Mainly port scanners are used in firewalls to find the open ports, so that the firewall can protect our system from threats which attack through these open ports. We can scan our own system without any help of a web server and we don't require any additional software to use this.

FUTURE WORK

In future administration will be given rights to close the open ports of the clients.Time limit will be given for each and every open port, if the port is not closed in the specified time it will be closed automatically.It can be extended as online port scanner.

ACKNOWLEDGMENT

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MOSES: SUPPORTING AND IMPLEMENTING SAFETY ENVIRONMENT USING ANTI-THEFT CONCEPT ON SMARTPHONE

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Abstract- As all we know that the usage of smartphone is increasing very rapidly because of the numerous services it provides to the end user. As a result of this many organization are willing to support customer-owned smartphone in order to increase the productivity of business user. Now, as it is providing so many services there is a necessity to provide security measures in order to protect data on smartphone. This manuscript provides policy based framework called as MOSES which allow user to create separate environment related to different context definition within the same device.

Index Terms—virtualization, security profile, isolation, taint values, context.

I. INTRODUCTION

Today's world is tightening with the progress of cell phone machinery. As the numbers of cell phone users are growing day by day, services are also increasing very rapidly. Beginning with old simple handsets which could be used for making calls, sending messages, cell phones have drastically changed user's life and became one of the most important parts of it. But now it has countless uses such as making calls, playing games, music, browsing internet and many more. And by means of these new emerging equipment's and its services, there is a requirement of new operating systems and software's.

A. What Is an Android?

Many operating systems have evolved in past 16 years. Beginning with black and white cell phone to latest smartphones or tablet, mobile operating system has become popular and come far off. Especially for smart phones, Mobile OS has greatly evolved from Palm OS in 1996 to Windows pocket PC in 2000 then to Blackberry OS and Android. Now-a-days most widely used mobile OS is Android which is nothing but a bunch of software consisting of not only operating system but also key and middleware applications.

B. Final Stage

Android is a most widely used and powerful Operating system which supports a countless applications that runs on smartphones. The usage of these applications has made life relaxed and innovative for smartphone users. It was established by Google. It permits users to choose and download the applications which are developed by third party vendor. Hardware component that supports Android OS are mainly founded on ARM architecture policy. Some of the current features and specifications of android

are:

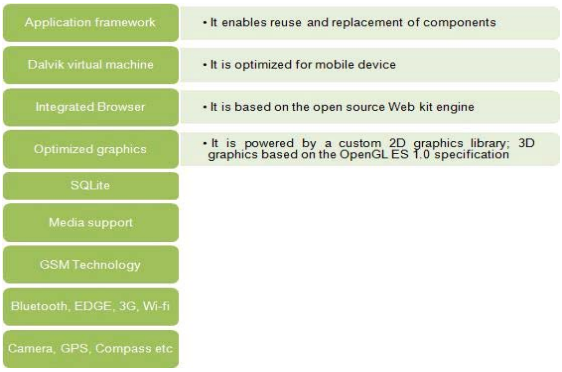

Fig. 1.1 Features and Specification of Android OS

C. Android Applications

Android is nothing but the extension on JAVA platform hence all Android applications are transcribed in java programming language. It is accessible as open source for inventors to invent applications that can be further used for selling in android market. Around 200000 applications were developed for Android OS with near about 3 billion+ downloads were made. Android bank on Linux version 2.6 for core system services such as security, memory management, process management, network stack, and driver model.

Following are the basics of Android applications:

• Android applications are self-possessed of one or more application components such as activities, services, content providers, broadcast receivers and intents.

• The role of each component is different as compared to overall applications behavior and each component can be activated individually.

• Another important part is the manifest file which must include all components in the application and should also include all application requirements, like as the minimum requirement of Android version and any hardware configurations.

• Non-code application resources such as images, strings, layout files, etc. should consist of replacements for dissimilar device.

In short, it is becoming a very effective and efficient tool for increasing productivity of business users. Many companies are willing to support customer owned smartphone because of increasing productivity of their customer and keep updated while they being on the move. Despite of this positive scenario, Android smartphones needs some security concerns. For example, malicious applications may access mails, SMS, and personal/private data stored on cell phone. Not only these malicious applications but an also legitimate application needs security concerns. Hence it is very important to provide internal and external security to it. The solution is given by policy-based framework called as MOSES in which this can be possible by separating data and apps related to corporate world from recreational apps and personal/private data. Within the same devices, separate environments are created which can run in their own address space. Data and apps related to first environment cannot access data from second environment. This can be possible with the help of virtualization. It is nothing but creating virtual versions of different instances of OS that can run separately on the same device. Two types of virtualization:

Para-virtualization is virtualization in which the guest operating system (the one being virtualized) is aware that it is a guest and accordingly has drivers that, instead of issuing hardware commands, simply issues commands directly to the host operating system. This will include things such as memory management as well.

Full Virtualization is virtualization in which the guest operating system is unaware that it is in a virtualized environment, and therefore hardware is virtualized by the host operating system so that the guest can issue commands to what it thinks is actual hardware, but really are just simulated hardware devices created by the host.

D. Android Architecture

Android OS consists of four main layers kernel, libraries, android runtime, applications framework and applications.

Linux kernel: Bottom layer is Linux kernel layer which provides basic functionality of system such as memory management, process management, device management as keypad, camera, display etc. The kernel manages all the things that Linux is thoroughly good at for example networking and a vast array of device

drivers, which take out the burden of interfacing to peripheral hardware.

Libraries: On top of Linux kernel layer there is a bunch of libraries including open-source Web browser engine WebKit, well known library libc, SQLite database is an important repository for storing and sharing of application data, libraries to record and play video and audio, SSL libraries are trustworthy for Internet security etc.

Android Runtime: This part provides a vital component called Dalvik Virtual Machine (DVM) which is a sort of Java Virtual Machine specially designed and optimized for Android OS.

The DVM rely on Linux core features such as memory management and multi-threading, which is inherent in the Java language. The DVM allows every Android application to run in its own address space, with its own instance of the DVM. The Android runtime also gives a set of core libraries which allows Android application developers to write Android applications using standard Java programming language.

Application Framework: The Application Framework layer is responsible for many higher-level services to applications in the form of Java classes. Application developers are relying on these services in their applications.

Applications: Android applications are at the top layer. You are able to write your application to be installed on this layer only. For example, Contact Books, Browser, Games, Media player etc.

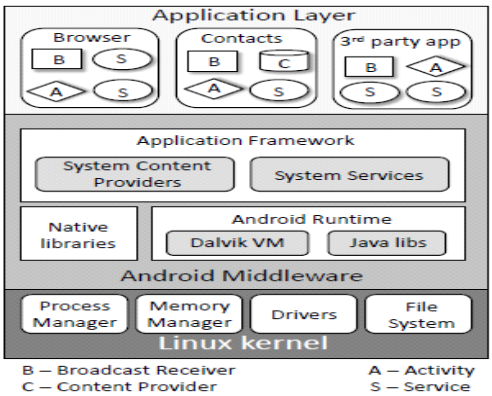

Fig. 1.2 Android Architecture

II. Review Of Literature

Countless solutions are there to plan to advance the safety of Android. We are going to consider only those that are correlated to our system. On Android platform, user has to grant all permissions at installation time which are requested in the manifest file. In short it supports an all-or-nothing approach, which is the user has to either grant all the permissions specified in the manifest or abort the installation of the application. Moreover, permission cannot be revoked at runtime.

In order to solve this problem several solutions have been proposed. This section provides gives review on related work which describes research efforts in order to increased security on Android platform. There are many solutions which help to improve security measures on Android. Some of them that related to our work are considered.

Basically, what happens on Android, at installation time users has to grant applications the permissions which are requested in the manifest file. Android endures an all-or-nothing approach that is the user has to either allow all the permissions specified in the manifest or abort the installation of the application. Moreover, permission cannot be reversed at runtime. In order to solve this problem several solutions have been proposed.

Apex [2] provides policy based framework for android that allows a user to selectively grant/restrict permissions to applications as well as user had several options on restricting the usage of resources i.e. user was allow using some functionality of application while restricting the access to resources which was critical/costly. It also described an extended package installer called as Poly that allowed the user to set these conditions through an easy interface. In this paper authors had incorporated only simple conditions such as restricting the time of usage and the time of the day on which to allow permission. This simplification was for user convenience.

In Secure Application INTeraction [3] aimed at run time, communication between applications were to security policies. Policies which were given in Saint had performed permissions checks by restricting access based on run-time state such as location, phone or network configuration, time, etc. Saint addressed

the current security problems on Android. They were at the beginning of integration of more applications and the policies.

CRePE [4] allowed a user to create policies that could automatically control the granting of permissions during runtime. Current smartphone systems permitted the user to use only contextual information to identify the working of the application. This makes difficult for the wide adoption of this technology to its full potential. This drawback was filled by proposing CRePE, a fine-grained Context-Related Policy Enforcement System for Android. While the concept of context-related access control is not an innovative idea. In particular, a context was defined by the state of variables imported by physical (low level) sensors, like time and location; additional processing on these data via software (high level) sensors; or particular interactions with the users or third parties. CRePE allows context-related policies to be set even at runtime by both the user and authorized third parties locally via an application or remotely via SMS, MMS, Bluetooth, and QR-code.

In MockDroid [5], is a modified version of the Android operating system which allowed a user to `mock' an application's access to a resource. In this system was able to limit the access of installed application by filtering out information they were accessing. This resource was subsequently reported as empty or unavailable whenever the application requests access. This approach allowed users to reverse access to particular resources at run-time, encouraging users to consider the trade-off between functionality and the disclosure of personal information whilst they use an application For instance, an application querying the IMEI number of phone may receive fake results even if the original is on the phone.

The goal of TISSA [6] was to prevent private information leakage by untrusted third-party smartphone application. Suppose any application requested to send a piece of data which may be private at that time it sent request to content provider. Instead of serving the request directly, it checked the current privacy setting for the application because user can change / readjust the permission for application at runtime. If reading was permitted then system returned normal result and if not then provide empty / anonymized / fake result.

Taintdroid [7] was responsible for tracking the flow of information between the applications. Taintdroid automatically taints the data from sensitive sources and applies taint on the data that were moving out through the smartphone over internet. When this happened, Taintdroid kept the record of the tainted data, which application sending the data, destination of tainted data. But the limitation of this is that it only kept the record of tainted data and was not able to provide security measure for sending data through unauthorized third party application. Also some legitimate applications are responsible for leaking out sensitive data which may cause harm to end-user.

This was solved by MOSES [1], in which separation between the safety environments (SE) was given depending upon different context. Each safety environment consists of its own apps and data and associated with its context. For example, application and data related to corporate world is separated from personal application and data. Safety environments are nothing but the set of protocols to limit the execution of application and data on particular environment. Here context is the most important term because; context provides security measures to smartphones. Context is a Boolean term which can be obtained from physical and logical sensors.

When the context returns true value SE associated with it is activated. It may happen that context is associated with one or more SE hence, to solve this each SE has assigned the priority. SE having highest priority will be activated first than the lower one. It may happen that two SE is having same priority in that case SE which had been activated will remain in processing. In MOSES [1] switching between the SE was possible by using virtual phone technique given in the Cells [8].

III. MOSES ARCHITECTURE

As given in [1], MOSES architecture consists of the components presented in Figure. 2. Main

part of MOSES is the phenomenon of Context. The Context Detector System is responsible for activating/deactivating of context. When it happens, the component Context Detector System notifies about this to the Security Profile Manager. The Security Profile Manager handle this information linking a SP with the Context. The component Security Profile Manager is used for the activation and deactivation of Security Profiles. The Security Profile Manager works as follow:

The Moses Hypervisor is the component that acts as a policy decision point (PDP) in MOSES. The Moses Hypervisor provides a central point for MOSES security checks against the policies defined for the active SP to regulate access to resources. The Moses Hypervisor delegates the policy checks to its two managers: the Moses App Manager and the Moses Rules Manager. The former is responsible for deciding which apps are allowed to be executed within a SP. The latter takes care of managing Special Rules.

The Moses Policy Manager acts as the policy administrator point (PAP) in MOSES. It provides the API for creating, updating and deleting MOSES policies. It also allows a user to define, modify, remove monitored Contexts and assign them to SPs. Moreover, this component also controls access to MOSES policy database (moses.db) allowing only applications with special permissions to interact with this component.

The Moses Taint Manager component manages the “shadow database” which stores the taint values used by Taintroid. In MOSES, we can taint specific rows of a content provider: to be able to perform per row filtering when an app access data in the content provider. For instance, it is possible to filter out from the query result data the rows which contain the information about device identifiers or user contacts. Given the fact that the enforcement of policies depends on the information provided by the Moses Taint Manager, this component acts as a policy information point (PIP).

The decisions taken by the Moses Hypervisor need to be enforced by the policy enforcement point (PEP). MOSES affects several components within Android middleware where decisions need to be enforced. For this reason, the PEP includes several Android components offering system services such as Location Manager and Activity Manager Service. Moreover, some Android core classes (such as the OS File System and OS Network System) are modified to enforce decisions regarding the access to the file system and network, respectively.

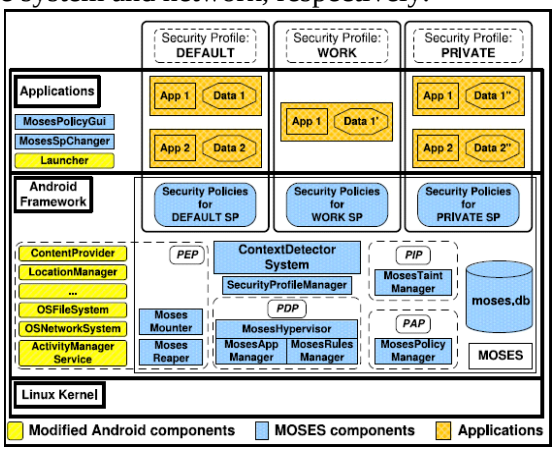

Fig. 3.1 MOSES Architecture

The enforcement of separated SPs requires special components to manage application processes and file system views. When a new SP is activated, it might deny the execution of some applications allowed in the previous profile. If these applications are running during the profile switch, then we need to stop their processes. The Moses Reaper is the component responsible for shutting down processes of applications no longer allowed in the new SP after the switch. In MOSES, applications have access to different data depending on the active profile. To separate data between profiles different file system view are supported. This functionality is provided by the Moses Mounter. To allow the user of the device to interact with MOSES, we provide two MOSES applications: the Moses Sp Changer and the Moses Policy Gui. The Moses Sp Changer allows the user to manually activate a SP. It communicates with the Moses Hypervisor and sends it a signal to switch to the profile required by the user. The Moses Policy Gui allows the user to manage SPs.

The most important thing comes into consideration is storage overhead. As it is explained earlier about MOSES, separation of data for different security profiles may be

duplicated. So in general, storage size required by operating system can be given as,

$$s\_size = s\_size(OS) + size((executing\ apps)_i) + size((executing\ apps\ data)_i) \quad (1)$$

where, s_size(OS) is the total size required by the operating system of handset, size((executing apps)i) is the size required for executing the ith application and size((executing apps data)i) is the size required for storing ith application's data and j is the number of installed applications. But in specific case of MOSES, size of application's data is equal to [1]:

$$size\_MOSES((executing\ apps\ data)) = \sum_{k=1}^{n+1} \sum_{i=1}^{j} size((executingappsdata)_{ik}) \quad (2)$$

where, k is the security profile. As given in MOSES architecture, same application can be assign to two different profiles having different priorities. In this case, additional copies of information (n+1) is required to store initial data of application i.e. replication of data. For example, suppose Message app is assign in two profiles then updating present in one profile need to be replicated in another profile.

IV. DESCRIPTION

This section describes overview of implementation about the key terms of MOSES [1]. As we discuss earlier Moses provides abstraction for data and apps devoted to distinct contexts that are mounted in a solo device. For example, commercial data and apps can be separated from private data and apps within a solo device. This approach offers sections where data and apps are stored. MOSES guarantees that data and apps within a section are inaccessible from others sections' data and apps. These sections are nothing but the Security Profiles in MOSES. In general, a SP is a set of policies that regulates what applications can be executed and what data can be accessed.

As described in [1], one of the terms presented in MOSES is the automatic activation of SP depending on the context, in which the device is being used. SPs are associated with one or more definitions of Context. A context definition is a Boolean expression defined over any information that can be obtained from the smartphone's raw sensors (e.g., GPS sensor) and logical sensors. Logical sensors are functions which combine raw data from physical sensors to capture specific user behavior's (such as detecting whether the user is running). When a context definition evaluates to true, the SP associated with such a context is activated. It is a possible situation when several contexts, which are associated with different SPs, may be active at the same time. To resolve such conflicts, each SP is also assigned with a priority allowing MOSES to activate the SP with the highest priority. If SPs have the same priority, the SP, which has been activated first, will remain active. Also it allows user to switch between the profiles manually for this MOSES provides an application which forces MOSES to activate the required SP. Each SP is associated with the holder of the profile and can be secured with the password given by holder. Additionally, it supports remote SP management in which SP is secured with the password provided by organization this helps to control tampering with data.

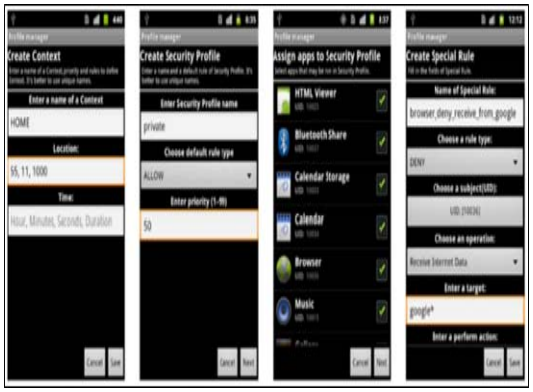

Fig. 4.1 Snapshots of MOSES application [1]: (a) Context creation, (b) Security profile creation, (c) Apps assignment to SP, (d) ABAC rule generation

Here, ABAC rule is attribute based access control [13], which enforces in each SP. The notion is that within each SP, users can define fine-grained access control policies to restrict application behavior. For example, the user might want to negate an application to read the files on an external storage. In this case, the user might write a policy which will still let the

application to run within the profile but the access of this application to files on an external storage will be limited.

This is all about internal security which can secure data present on smartphone. But, what about external threat? It may happen unauthorized user is trying to access data present on the smartphone or suppose it get stolen. In all circumstances, user is trying to secure his/her data. In order to provide safety, following algorithm is given which can protect data from external threat.

Step 1: User has to create or insert Security measures in terms of pattern or pin-password type format in order to provide a kind of security.

Step 2: Check whether the entered measures are correct or not. If "YES", then it will direct to MOSES application. Otherwise, it will direct to Step 3.

Step 3: System will allow user to enter it correctly two more times. If user fails again, then it will direct to Step 4.

Step 4: Check whether internet connection is available or not. If "YES", it will wipe all the data and send it to authorized email-id otherwise goes to Step 5:

Step 5: It will encrypt the data present on smartphone and whenever internet connection become available it will transfer it to authorized email-id. For encryption, AES algorithm is used. The Advanced Encryption Standard (AES) is an encryption algorithm for securing information in commercial transactions in the private sector. AES is a symmetric key encryption standard. The Advanced Encryption Standard consists of three block ciphers. They are: AES-128, AES-192, and AES-256. Each of the above standard ciphers is 128-bit block size with key sizes of 128, and 192 & 256 bits respectively.

In case of stealing, it may happen that unauthorized user is handling the cell phone. At that time, he/she will take out the SIM-CARD first so what the system will do, it will delete all the data from it. So that if in future, he/she accesses the phone he will get blank phone. But, it might be the case that authorized party wants to change the SIM-card then the system must provide the provision that user will be asked about new SIM-card insertion.

Again, daily back-up will be sent to authorize email-id.

This is all about how to secure data internally as well as externally. Because, in today's corporate world data is one of the most important thing in compare with mobile handset. So, this is the security mechanism which can be helpful to secure data.

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DESIGN AND IMPLEMENTATION OF WEB CRAWLER

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ABSTRACT:

The large size and the dynamic nature of the Web highlight the need for continuous support and updating of Web based retrieving information system. Web crawlers are programs that exploit the graph structure of the Web to move from page to page. When an user initiates a search, the key words are extracted and searches the index for the websites which are most relevant. The size of the web is huge, search engines practically can't be able to cover all the websites. There should be high chances of the relevant pages in the first few downloads,as the web crawler always download web pages (in fractions). Implementing the proposed method, we download web page and get the title, body and the number of outgoing links on that particular page in order to calculate relevancy.

Keyword :

Web crawler: A web crawler is a program that, given one or more seed URLs,downloads the web pages associated with these URLs, extracts any hyperlinks contained in them, and recursively continues to download the web pages identified by these hyperlinks.

Seed: It is starting URL from where Web Crawler starts traversing World Wide Web.
Frontier: It is list of unvisited URLs.
Page weight: Weight of page which is decided on the certain parameters.
Threshold value: Certain limit which we decide the importance of page.

INTRODUCTION

Internet is the shared global computing network. It enables global communications between all connected computing devices. It provides the platform for web services and the World Wide Web. Web is the totality of web pages stored on web servers. There is a spectacular growth in web-based information sources and services. It is estimated that, there is approximately doubling of web pages each year. As the Web grows grander and more diverse, search engines also have assumed a central role in the World Wide Web's infrastructure as its scale and impact have escalated. In Internet data are highly unstructured which makes it extremely difficult to search and retrieve valuable information. Search engines define content by keywords. With the explosive growth of information sources available on the World Wide Web, it has become increasingly necessary for users to

utilize automated tools in order to find, extract, filter, and evaluate the desired information and resources

A web crawler(also known as a *robot* or a *spider*) is a system for the bulk downloading of web pages. Web crawlers are used for a variety of purposes. Most prominently, they are one of the main components of web search engines, systems that assemble a corpus of web pages, index them, and allow users to issue queries against the index and find the web pages that match the queries.

Web crawlers are an important component of web search engines, where they are used to collect the corpus of web pages indexed by the search engine. Web crawlers are programs that exploit the graph structure of the Web to move from page to page. In their infancy such programs were also called wanderers, robots, spiders and worms, words that are quite evocative of Web imagery. . The large size and the dynamic nature of the Web highlight the need for continuous support and updating of Web based information retrieval systems The last key dimension is regarding crawler evaluation strategies necessary to make comparisons and determine circumstances under which one or the other crawlers work best. Crawlers facilitate the process by following the hyperlinks in Web pages to automatically download a partial snapshot of the Web.

Features a crawler should provide

Distributed: The crawler should have the ability to execute in a distributedfashion across multiple machines.

Scalable: The crawler architecture should permit scaling up the crawl rate by adding extra machines and bandwidth. Performance and efficiency: The crawl system should make efficient use of various system resources including processor, storage and network bandwidth.

Quality: Given that a significant fraction of all web pages are of poor utilityfor serving user query needs, the crawler should be biased towards fetching “useful” pages first.

Freshness: In many applications, the crawler should operate in continuous mode: it should obtain fresh copies of previously fetched pages. A search engine crawler, for instance, can thus ensure that the search engine’s index contains a fairly current representation of each indexed web page. For such continuous crawling, a crawler should be able to crawl a page with a frequency that approximates the rate of change of that page.

Extensible: Crawlers should be designed to be extensible in many ways –to cope with new data formats, new fetch protocols, and so on. This demands that the crawler architecture be modular.

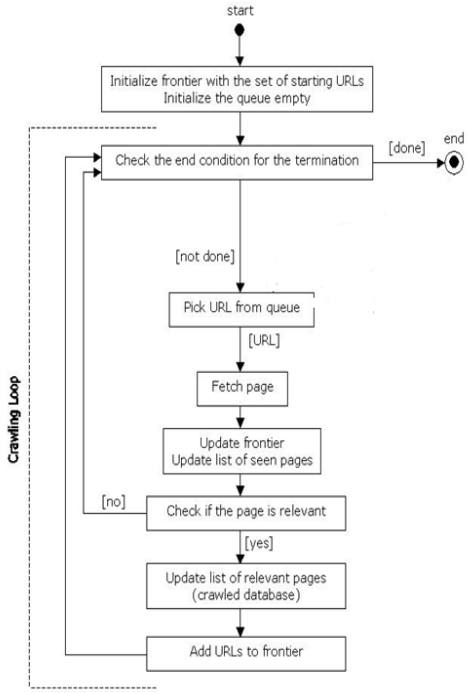


Fig : Flowchart of Web Crawler

I. Materials & Methods

We define the factors for which we specify the page importance:

weight(page) = weight(URL) + weight(outlinks) + weight(title) + weight(body) where,

1) if (search string present in URL)
   {
   weight(URL) returns a predefined weight
   }
   Else
   {
   Return 0
   }
   This will return the weight assigned for the URL occurrence. If the search string is found in the URL, the page acquires certain importance.
2) if (search string present in title)
   {

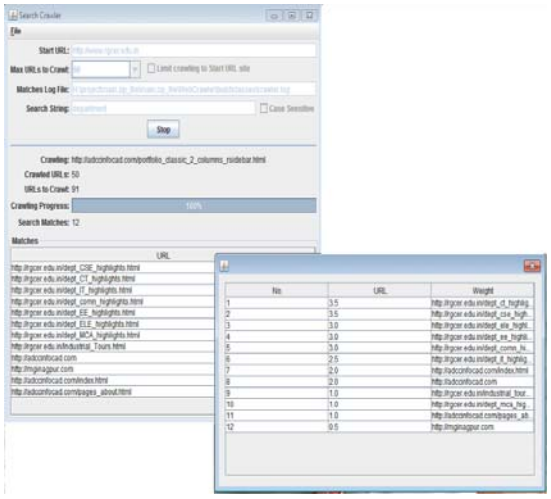
weight(title) returns a predefined weight
}
Else
{
Return 0
}
This will return the weight assigned for the title occurrence. If the search string is found in the title, the page acquires certain importance.

3) Occurrence of search string in the body
{
weight(body)=occurrence*weight for each occurence
}
This will return the weight assigned for the body occurrence. If the search string is found in the body, the page acquires certain importance. When the search string occurs certain number of times in the body, the occurrence is noted and the page importance is calculated using the occurrence count.

4) Number of hyperlinks on the page
{
weight(outlinks)=occurrence*weight for each occurence
}
This will return the weight assigned for the out-links occurrence. The number of links linking to the other page has also been assigned some importance. Giving importance to each component of the parsed page, we have assigned weight to each component and hence acquired the page importance in totality. As we get the page weight, we will compare it with the threshold frequency implicitly provided to the algorithm. Depending on the result of comparison, the links are either added to the output or they may be discarded. Thus, we get the search more focused to the search string eliminating the least.

II. RESULT & DISCUSSION

Seed URL : http://www.rgcer.edu.in
Search String : Department



Seed URL passed is http://www.rgcer.edu.in and the search string was department. Matched url i.e. Relevant url out of total 50 urls were 12 . Crawler had calculated 24% relevant url's out of total URLs.

Calculations of Result 1

$$\frac{\text{Relevant URLs}}{\text{Total URLs}} = \frac{12}{50} * 100 = 24\%$$

III. CONCLUSION

Hence by using the concept of Page Weight, we scan web pages as well as compute the weight of page and hence we can increase efficiency of web crawler as output set of URL generated by this way will always be of better importance than what traditional web crawler is generating. Hence we have obtained the pages with their respective weights and compared them with the threshold weight. Hence acquiring the more relevant pages.

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DEDUPLICATION STRATEGY FOR EFFICIENT USE OF CLOUD STORAGE

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Abstract--- With the enormous creation of data in the day to day life, storing it costs a lot of space, be it on a personal computer, a private cloud, a public cloud or any reusable media. The storage and transfer cost of data can be reduced by storing a unique copy of duplicate data. This gives birth to data deduplication, is one of the important data compression techniques and has been widely used in cloud storage to reduce the amount of storage space and save bandwidth. However it leads to high cost in terms of new security and privacy challenges while protecting sensitive data. The proposed system uses convergent encryption technique which assures block level deduplication and data confidentiality at a same time. As a requirement for data duplication at block level raises an issue with block creation, block comparison and key management system suggests including new components in order to implement these issues for each block together with the actual deduplication operation. In addition to this system uses another component which takes care of authenticity of users and data confidentiality. The proposed system shows that overhead introduced by these components is minimal and does not impact the overall storage and computational costs. The results were compared against file level data deduplication and encryption system which refers to data copy as a whole a file and it eliminates the storage of any redundant files. However this system cannot identify two or more files with slightly modified data thus making redundant copies of the identical data which can be overcome by using block level data deduplication where user performs block level duplicate check and identify unique blocks to be uploaded by encrypting them.

Index terms--- cloud, convergent encryption, deduplication

I. INTRODUCTION

With the potentially infinite storage space offered by cloud, users tends to use as much space as they can and vendors constantly look for techniques aimed to minimize redundant data and maximize space savings. A well know technique which has been widely adopted is data deduplication, is a data compression technique for eliminating duplicate copies of repeating data. The technique is used to improve storage utilization and can be also applied to network data transfers to reduce the no of bytes that must be sent. Simple idea behind deduplication is to store duplicate data only once. Deduplication can take place at either file level or block level. For a file level deduplication it eliminates the duplicate copies of the same file. For block level deduplication it eliminates duplicate block of data that occur in non identical files.

Along with low ownership cost and flexibility, users require the protection of their

data and confidentiality guarantees through encryption. Unfortunately deduplication and encryption are two conflicting technologies. While the aim of deduplication is to detect identical data segments and store them only one, the result of encryption is to make to identical data segments indistinguishable after being encrypted. This means that if data are encrypted by users in a standard way the cloud storage provider cannot apply deduplication since two identical data segments will be different after encryption. On the other hand, if data are not encrypted by users, confidentiality cannot be guaranteed and data are not protected against curious cloud storage providers.

A technique which has been proposed to meet these two conflicting requirements is convergent encryption (CE). It encrypts or decrypts a data copy with a convergent key, which is obtained by computing the cryptographic hash value of the content of the data copy. After key generation and data encryption, users retain the keys and send the cipher text to the cloud. In this scheme, identical data copies will generate the same convergent key and hence the same cipher text. To prevent unauthorized access a secure proof of ownership protocol is also needed. To provide the proof the user indeed owns the same file when duplicate is found. After the proof, subsequent users with the same file will be provided a pointer from the server without needing to upload the same file. A user can download the encrypted file with the pointer from the server, which can only be decrypted by the corresponding data owners with their convergent keys. Thus, convergent encryption allows the cloud to perform deduplication on the cipher texts and the proof of ownership prevents the unauthorized user to access the file.

II. LITERATURE REVIEW

A. *Cloud Computing*

Cloud computing is the delivery of computing as a service rather than a products, whereby shared resources, software and information are provided to computers and other devices as a utility over a network. Clouds can be classified as public, private or hybrid. Cloud offers features such as on demand capabilities, resource pooling, broad network access, rapid elasticity, measured service. Cloud offers following service models:

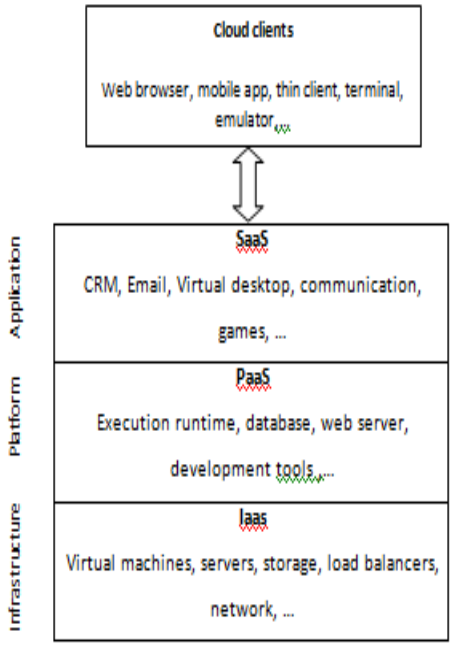

Fig.1 Cloud Computing offers three different service models

B. *Deduplication*

According to the data granularity, deduplication strategies can be categorized into two main categories: file level deduplication and block level deduplication, which is now days, a most common strategy. In block based deduplication, the block size can either fixed or variable. Another categorization criterion is the location at which deduplication is performed: if data are deduplicated at the client then it is called source based deduplication, otherwise target based. In source based deduplication the client first hashes each data segment he wishes to upload and sends those results to the storage provider to check whether such data are already stored: those only "un deduplicated" data segments will be actually uploaded by the user.

C. *Convergent Encryption*

- Advanced Encryption Standard: Symmetric encryption uses a common secret key κ to encrypt and decrypt information. AES is a symmetric block cipher that can encrypt data blocks of 128 bits using symmetric keys 128,192, or 256. AES encrypt the data blocks of 128 bits in 10, 12, and 14 rounds depending on the key size. Brute force attack

is the only effective attack known against this algorithm. AES encryption is fast and reliable.

- Convergent Encryption: Convergent Encryption provides data confidentiality in deduplication. A user derives a convergent key from each original data copy and encrypts the data copy with the convergent key. In addition, the user also derives a tag for the data copy, such that the tag will be used to detect duplicates. Here, we assume that the tag correctness property holds, i.e., if two data copies are the same, then their tags are the same. To detect duplicates, the user first sends the tag to the server side to check if the identical copy has been already stored. Note that both the convergent key and the tag are independently derived and the tag cannot be used to deduce the convergent key and compromise data confidentiality. Both the encrypted data copy and its corresponding tag will be stored on the server side. Formally, a convergent encryption scheme can be defined with four primitive functions:

  - ✓ $keyGen_{CE}(M) \rightarrow K$ is the key generation algorithm that maps a data copy M to a convergent key K;
  - ✓ $Enc_{CE}(K,M) \rightarrow C$ is the symmetric encryption algorithm that takes both the convergent key K and the data copy M as inputs and then outputs a cipher text C;
  - ✓ $Dec_{CE}(K,C) \rightarrow M$ is the decryption algorithm that takes both the cipher text C and the convergent key K as inputs and then outputs the original data copy M; and
  - ✓ $TagGen(M) \rightarrow T(M)$ is the tag generation algorithm that maps the original data copy M and outputs a tag T(M).

D. Identification Protocol:

An identification protocol II can be described with two phases: Proof and Verify. In the stage of Proof, a prover/user U can demonstrate his identity to a verifier by performing some identification proof related to his identity. The input of the prover/user is his private key skU that is sensitive information such as private key of a public key in his certificate or credit card number etc. that he would not like to share with the other users. The verifier performs the verification with input of public information pkU related to skU. At the conclusion of the protocol, the verifier outputs either accept or reject to denote whether the proof is passed or not. There are many efficient identification protocols in literature, including certificate-based, identity-based identification etc.

III. PROBLEM DEFINITION

Aiming at efficiently solving the problem of deduplication with differential privileges in cloud computing, we consider a hybrid cloud architecture consisting of a public cloud and a private cloud. Previous deduplication systems cannot support differential authorization duplicate check, which in important in many applications. In such an authorized deduplication system, each user is issued a set of privileges during system initialization, each file uploaded to the cloud is also bounded by a set of privileges to specify which kind of users is allowed to perform the duplicate check request for some file, the user needs to take this file and his own privileges as inputs. The user is able to find a duplicate for this file if and only if there is a copy of this file and a matched privilege stored in cloud. For example, in a company, many different privileges will be assigned to employees. In order to save cost and efficiently management, the data will be moved to the storage server provided (S-CSP) in the public cloud with specified privileges and the deduplication technique will be applied to store only on copy of the same file. Because of privacy consideration, some files will be encrypted and allowed the duplicate check by employees with specified privileges to realize the access control. Traditional deduplication systems based on convergent encryption, although providing confidentiality to some extent; do not support the duplicate check with differential privileges. In other words, no differential privileges have been considered in the deduplication based on convergent encryption technique. It seems to be contradicted if we want to realize both deduplication and differential authorization duplicate check at the same time.

IV. COMPONENTS OF PROPOSED SYSTEM

Unlike existing data deduplication systems, the private cloud is involved as a proxy to allow data owner/users to securely perform duplicate check with differential privileges; such architecture is practical and has attracted much attention from researchers. The data owners only outsource their data storage by utilizing public cloud while the data operation is managed in private cloud. A new deduplication system supporting differential duplicate check is proposed under this hybrid cloud architecture where the S-SCP resides in the public cloud. The use in only allowed to perform the duplicate check for files marked with the corresponding privileges.

Furthermore, system will be enhanced in security specifically using an advanced scheme to support stronger security by encrypting there file with differential privilege keys. In this way, the users without corresponding privileges cannot perform the duplicate check. Furthermore, such unauthorized users cannot decrypt the cipher text even collude with the S-CSP. Security analysis demonstrates that our system is secure in terms of the definitions specified in the proposed security model.

Finally, a prototype of the proposed authorized duplicate check will be implemented and testbed experiments will be conducted to evaluate the overhead of the prototype. Proposed system shows that the overhead is minimal compared to the normal convergent encryption and file upload operations.

A. Hybrid System Architecture for Secure Deduplication

At a high level, our setting of interest is an enterprise network, consisting of a group of affiliated clients who will use the S-CSP and store data with deduplication technique. In this setting, deduplication can be frequently used in these settings for data backup and disaster recovery applications while greatly reducing storage space. Such systems are widespread and are often more suitable to user file backup and synchronization applications than richer storage abstraction. There are three entities defined in our system, that is, users, private cloud and S-CSP in public cloud as shown in Fig. 2 The S-CSP performs deduplication by checking if the contents of two files are the same and stores only one of them.

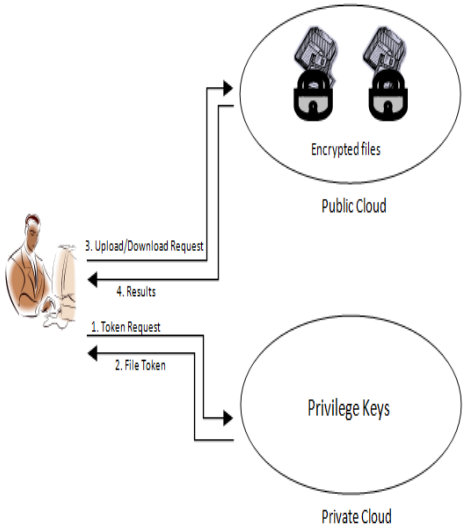

Fig.2 Architecture for Authorized Deduplication

The access right to a file is defined based on a set of privileges. The exact definition of a privilege varies across applications. For example, we may define a role-based privilege according to job positions (e.g. Director, Project Lead and Engineer), or we may define a time-based privilege that specifies a valid time period within which a file can be accessed. A user, say Alice, may be assigned two privileges "Director" and "access right valid on 2014-01-01", so that she can access any file whose access role is "Director" and accessible time period covers 2014-01-01. Each privilege is represented in the form of a short message called token. Each file is associated with some file tokens, which denote the tag with specified privileges. A user computes and sends duplicate-check tokens to the public cloud for authorized duplicate check.

Users have access to the private cloud server, which will aid in performing deduplication encryption by generating file tokens for the requesting users. We will explain further the role of the private cloud server below. Users are also provisioned with per-user encryption key and credentials. (e.g. user certificates). In this system, block level deduplication is considered which eliminates the storage of any redundant files. Each data copy is associated with a token for the duplicate check.

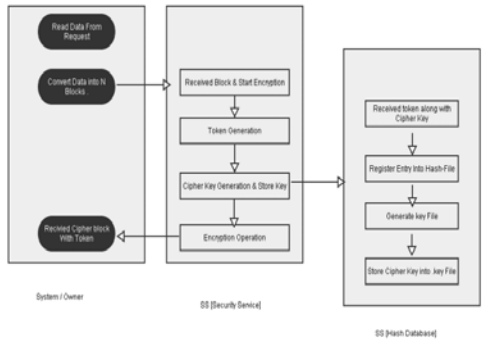

Fig.3 System Workflow

- S-CSP (Storage Management): This is an entity that provides a data storage provider in public cloud. The S-CSP provides the data outsourcing service and stores data on behalf of the users. To reduce the storage cost, the S-CSP eliminates the storage of redundant data via deduplication and keeps only unique data. In this system it is assumed that S-CSP always be online and has abundant storage capacity and computation power.
- Data Users: A user is an entity that wants to outsource data storage to the S-CSP and access the data later. In a storage system supporting deduplication, the user only uploads unique data but does not upload any duplicate data to save the upload bandwidth, which may be owned by the same user or different users. In the authorized deduplication system, each user is issued a set of privileges in the setup of the system. Each file is protected with the convergent encryption key and privilege keys to realize the authorized deduplication with differential privileges.
- Security Service (Private Cloud): Compared with the traditional deduplication architecture in cloud computing, this is a new entity introduced for facilitating users secure usage of cloud service. Specifically, since the computing resources at data user/owner side are restricted and the pubic cloud is not fully trusted in practice, private cloud is able to provide data user/owner with an execution environment and infrastructure working as an interface between user and the public cloud. The private keys for the privileges are managed by the private cloud, who answers the file token requests from the users. The interface offered by the private cloud allows user to submit files and queries to be securely stored and computed respectively.
- Hashmap: HashMap works on the principal of hashing. It stores values in the form of key, value pair and to access a value you need to provide the key. For efficient use of HashMap the 'key' element should implement equals() and hashcode() method. equals() method define that two objects are meaningfully equal. hashcode() helps HashMap to arrange elements separately in a bucket. So elements with same hascode are kept in the same bucket together. So when we want to fetch a element using get(K key), HashMap first identifies the bucket in which all elements of the same hascode as the hashcode of the 'key' passed are present. Than it uses the equals() method to identify the actual object present in the bucket.

B. Dynamic Operations

Below are the dynamic operations present in the proposed system

- Insertion

We have received the request from client to insert file (F). data owner wants to divide the multiple blocks ΣB_{ij} as system as decided that single block (B_i) is 4KB i.e. total no of blocks per file (F) = size (F) / 4096

Once the request has been received from the client file (F) is divided onto the F = {b_1, b_2, b_3, b_4,.....b_n}

For each block (B_i) we perform encryption operation and generate below response.

- ✓ Cipher Text (B_i)
- ✓ Token (Ti Bi) [16-bit, unique token for Block]
- ✓ Private Key (PKi) [Key is used for encryption and decryption mechanism]

After all the information has been generated PK_i is stored into internal database of SS (security service)

The main idea behind to hide PK_i is to provide security to Cipher Text (B_i), so no one else can use the key and try to decrypt the block. System needs to store Cipher Text (B_i) to the CSP along with Token (T_i B_i). System uses the referral data integrity algorithm to associate the B_i -> T_i B_i.

Along with the Cipher Text (B_i) and Token (T_i B_i) system starts the generation of the

metadata. Metadata contains following fields.

- ✓ Logged user info (U-info)
- ✓ File Name (Fname)
- ✓ Token Collection (TC = { T1 B1, T2 B2, T3 B3, …… Tn Bn})

Once all the block (ΣB_{ij}) has been processed successfully metadata stored into CSP and TTP database respectively.

- Data Retrieval

User has received the request for retrieval of a File (F) from CSP database. System sends the request to CSP (CSP-Metadata) to validate the request. i.e. F is present onto CSP or not.

If F is available, system will retrieve the F-Metadata, verify TC != 'TEMPER', which gives assurance that data is not corrupted on CSP.

So the TC contains TC = { T_1 B_1, T_2 B_2, T_3 B_3, …… T_n B_n} as TC is stored into sequential format, system will be able find to find block sequence. System will not start the decryption process for blocks. System will also initialize the buffer to hold the Plaintext (B). i.e. F = Σ Plaintext (B_{ij})

Plaintext (B_{ij}) = SS (Cipher Text(B_i),T_iB_i)

- Access Control Provider

To implement role based system the system uses the access control list for each file being uploaded to the cloud storage. The access control list includes the parameters such as access type, filename, token, userlist. Suppose the system has user u1, u2, u3 of which user u3 is the admin of cloud storage having all the access to the cloud storage. User u1 has file sample.txt to be uploaded to the cloud storage. While uploading file the access control list for file sample.txt is also uploaded. The access control list will look like as below

Access type: Grant or Revoke

Filename: sample.txt

Token: file identifier

Userlist: u2, with which the file sample.txt is been shared

V. FLOW OF IMPLEMENTATION

As shown in Fig 4 whenever user tries to upload a file to cloud storage the file is divided into blocks of 4 kb size and

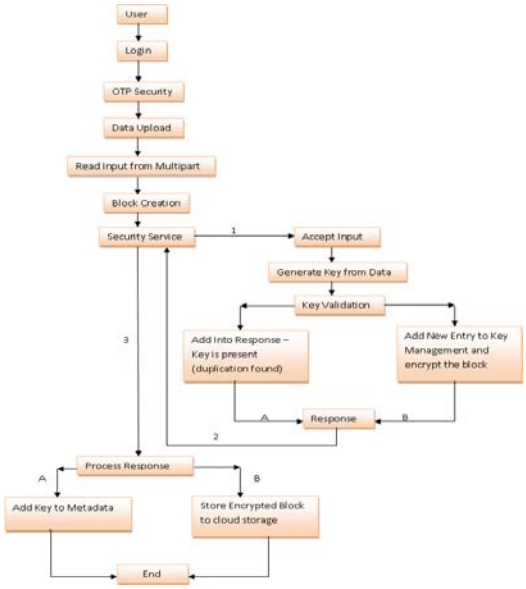

Fig 4: Detailed workflow of the proposed system

sent to security service for creation of public key and data duplication detection. The security service is responsible for generating keys for each block and validates it to see if it exists in the database. If the key exists in the database it just adds that key to the metadata of a file being uploaded and does not store the block to the cloud storage. If a key is not present then security service encrypts the block with the generated key and stores the encrypted block to the cloud storage and adds the key to the metadata of a file. In this way security service is responsible for identifying duplicate data and avoids it storing to cloud storage.

As discussed in chapter IV the use of access control list is to implement a role based system. The security service is responsible for checking access control list for each file and detecting data duplication in a group of users who has permissions to access the file stored on cloud storage

Results:

The implemented system uses block level encryption and data deduplication for effective space utilization. To show that this system really helps in reducing storage space cost the results are compared against the system which uses file level encryption and data deduplication mechanism. This comparison is explained using following example. Let's say user user1 has uploaded

a file f1 containing data "This day is Sunday" using file level encryption mechanism. However another user user2 tries to upload the file f2 containing data "This day is Sunday and it's nice to be here". In this scenario both f1 and f2 are considered to be different files even though the contents are similar up to some extent and two different files will be stored onto cloud storage.

However, using block level encryption and data duplication, the file is divided into blocks such that block b1 contains text "this day" block b2 contains text "is Sunday" and so on. In this case when user1 and user2 tries to upload the file f1 and f2 only one copy of blocks b1, b2 will be saved as both are identical and remaining blocks for text "and it's nice to be here" will be stored onto cloud. So the data deduplication is achieved by storing only one unique copy of redundant data and by maintaining the metadata for each file containing references of its blocks plus the blocks which are stored uniquely onto cloud.

VI. CONCLUSION

In the proposed system, the notion of authorized data deduplication was proposed to protect the data security by including differential privileges of users in the duplicate check. The implementation of this approach shows that better deduplication can be achieved by using block level deduplication mechanism as compared to file level deduplication. This system also achieves confidentiality using convergent encryption. Furthermore, this system shows that the solution proposed here can be easily implemented with existing and widespread technologies. Finally the solution is fully compatible with standard storage APIs and transparent for the cloud storage provider, which does not have to be aware of the running deduplication system.

Currently the system is implemented to support text based block level encryption and deduplication this can be extended to all format like multimedia files, image files etc.

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ANALYSIS OF SERVICE BROKER AND LOAD BALANCING IN CLOUD COMPUTING

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Abstract— Cloud computing can be defined as computing in a remote location or location independent with shared and dynamic resource availability on demand. It typically involves over-the-internet provision of dynamically scalable and often virtualized resources. Many people are moving to cloud because of reduction in cost and dynamic allocation of resources. The infrastructure underlying cloud is hosted and maintained by cloud providers. Cloud Computing is the most wanted technology today but there is much more to come up with. Availability of services, Performance unpredictability, Resource sharing, availability of resources as per requirements, storage capacity, data confidentiality and many more are the problems/Issues faced with cloud. Here in this paper we have given a brief idea about the various existing service broker and load balancing algorithms. Also we have compared these load balancing algorithms and come up with some conclusions. Different simulation tools like cloud Analyst have been devised to test the execution of existing algorithms, using which we can compare their performance based on various metrics.

Keywords—Cloud Computing, Cloud Analyst, Infrastructure Performance, Service Broker and Load Balancing Algorithms.

I. INTRODUCTION

The term ‘Cloud Computing’, is famous for its pay-per-usage basis. As everyone is moving to cloud, performance in cloud computing today is becoming very challenging issue. There are number of performance parameters of concern in cloud like application performance, network performance, infrastructure performance, etc. Network and application performance are not in the sole control of cloud provider. Cloud provider can only manage infrastructure performance. In spite of the research being carried out, cloud computing performance is still an area of concern. Service Brokering and Load Balancing are two key areas where we can focus to improve performance of computation. Various algorithms have been proposed in these areas by researchers to improve performance. Aim of our project is to identify, analyze and compare the existing algorithms and come up with the experimental results of the same.

The remainder of this paper is organized as follows: In section II, we have provided the background knowledge and about routing of user

requests in Cloud Analyst tool. In section III, we have discussed about the need for evaluation of cloud performance. In section IV, we have discussed about related work done in this area. Section V discusses the simulation configuration, results and performance analysis, and finally we have concluded our work.

II. BACKGROUND

Cloud Computing is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. The cloud system is an on demand "just in time" provisioning involving a no upfront cost, pay-as-you-go system having infinite and elastic resource scalability.

Cloud computing is a concept used to describe a variety of computing concepts that involve a large number of computers connected through a real-time communication network such as the Internet. In science, cloud computing is a synonym for distributed computing over a network, and means the ability to run a program or application on many connected computers at the same time. The phrase also more commonly refers to network-based services, which appear to be provided by real server hardware, and are in fact served up by virtual hardware, simulated by software running on one or more real machines.

Presently, many software based algorithms are proposed to improve the overall performance of cloud. Factors governing Cloud performance highly depend on geographical distribution of data centers, number of users, and number of data centers, service broker policy and load balancing algorithms being used. Many changes have been done in the existing algorithms and many new algorithms are proposed to improve the performance.

For experimenting the performance of cloud environment in a repeatable manner, actual deployment of cloud becomes costly and not an easier task, therefore not preferable. For this reason various simulation tools are used to model and analyze cloud computing environment and applications, graphically analyze the results before the actual deployment of clouds. The simulation tools available are Cloud Reports, cloud Analyst, MR-Cloud Sim and Network Cloud Sim etc. The underlying platform for these simulators is Cloud Sim.

III. SIMULATION

It is not easy to perform experimentation in a real cloud environment because,

1. It involves high purchase cost as it requires huge amount of resources for a long period of time.
2. Does not support repetition of experiments.
3. Does not provide the flexibility to reconfigure the parameters easily and quickly.
4. Conditions prevailing in the Cloud-based environments are not in the control of developers of application services [1].

A more viable approach to use cloud simulation tools. It enables the Cloud providers to evaluate the different kinds of resource provisioning scenarios under varying load and pricing distribution [2]. It allows the customers to test their services in a repeatable and controllable environment free of cost and identify the performance issues before actual deployment on real cloud.

A. Cloud Sim [3]:

Different simulators have been proposed for modeling of Grid based environments [6]. Cloud Sim is a self-contained simulation application which enables seamless modelling, simulation, and experimentation of cloud computing and application services. Cloud Sim was developed at the University of Melbourne. The Cloud Sim toolkit supports system and behavior modelling of cloud system components such as data centers, virtual machines (VMs) and resource provisioning policies. It implements generic application provisioning techniques that can be extended with ease and limited efforts. Cloud Sim aids the researchers and developers to focus on specific system design issues without getting concerned about the low level details related to cloud-based infrastructures and services.

Features:

1. Modelling and creating a huge data center, unlimited number of virtual machines, applications, users, computational resources, and policies for management of diverse parts of the system.

2. Availability: open source.
3. Java is being used in Cloud Sim, because of OOP feature
4. Simulation time in seconds.

B. Cloud Analyst [4]:

Cloud Analyst is a graphical toolkit which separates the simulation experiment set-up exercise from a programming activity. The modeller can focus on the simulation parameters rather than technicalities of programming. The simulator is developed using Java SE, Swing, Cloud Sim toolkit and Sim Java framework.

Features:

1. Easy to Use:

The simulator provides an intuitive and comprehensive GUI which facilitates setting up and executing experiments easily.

2. High degree of configurability and flexibility:

It is possible to enter and change the simulation parameters quickly and easily.

3. Graphical output:

The detailed results in the form of tables and graphs summaries the large amount of statistics and also help to identify the important patterns of output parameters.

4. Repeatability:

The simulation is controllable and repetitive execution of the same experiment yields the same results. The configuration can be saved as a .sim file. The results of the experiment can also be saved as a .pdf file.

5. Ease of extension:

The simulator supports extensions with minimal efforts and thus it can evolve continuously.

Components:

1. Region:

The world is geographically divided into 6 Regions (0 to 5) which correspond with the 6 main continents.

2. Internet:

The Internet models the Internet traffic routing around the world by introducing suitable transmission latency and data transfer delay, which can be configured.

3. Cloud Application Service Broker:

The Cloud Application Service Broker determines which data center should service the requests from each user base. Cloud Analyst implements 3 types of Service Brokers:

3.1. Service Proximity based routing
3.2. Performance Optimized routing
3.3. Dynamically reconfiguring routing

4. User Base:

The User Base represents a group of users who are responsible to generate traffic for the simulation.

5. Internet Cloudlet:

A number of requests from the users are grouped into a single Internet Cloudlet based on the 'User Grouping Factor'

6. Data Center Controller:

Data Center Contoller manages VM creation and VM destruction and handles the routing of requests received from User Bases via the Internet to the VMs.

7. VMLoad Balancer:

The Data Center Controller decides which VM should be allocated to a particular Cloudlet using the VMLoad Balancer. Cloud Analyst implements 3 types of VMLoad Balancers:

7.1. Round Robin Load Balancer
7.2. Active Monitoring Load Balancer
7.3. Throttled Load Balancer

8. GUI:

It displays the GUI and acts as a front end controller for the simulator. It enables the user to define the simulation parameters, save and load simulation configuration, execute simulation and save the results of the experiment.

IV. ROUTING OF USER REQUEST IN CLOUD ANALYST

In cloud, from user's end the important factors are cost optimization and provider that provides utility to the user's need. Thus routing of user's request is a very important aspect in cloud. Figure 1 shows the routing of user request in one of the Simulation tools i.e. Cloud-Analyst [5].

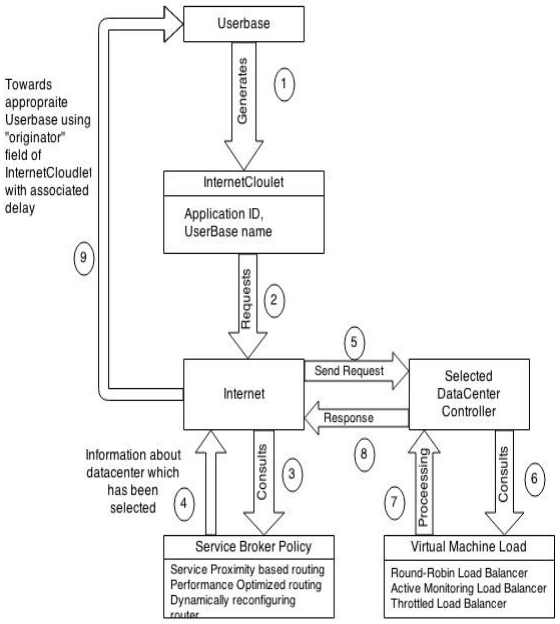


Fig. 1: Routing of User Request in CloudAnalyst

1. User base generates an Internet Cloudlet, with application id for application and also includes name of the user base itself as originator for routing back the RESPONSE.
2. REQUEST is sent to the Internet with zero delay.
3. Internet consults the service broker for the data center selection. The service broker uses any one of the service broker policy based on the REQUEST information.
4. Service broker sends information about selected data center controller to the Internet.
5. Internet adds appropriate network delay with the REQUEST and sends to the selected data center controller.
6. Selected data center controller uses any one of the virtual machines load balancing policy.
7. Virtual machines load balancer assign the virtual machine to the user request.
8. Selected data center sends the RESPONSE to the Internet after processing the REQUEST.
9. Internet uses the originator field of the Cloudlet information and adds appropriate network delay with RESPONSE and sends to the user base.

V. EXISTING ALGORITHMS IN CLOUD ANALYST

A. Service Broker Algorithms:

1. Service Proximity Based Routing:

   It selects the Data Center with least network latency i.e. the closest DC. If two or more closest Data Centers are available then selection is done randomly. It does not take the load and cost into the consideration.

2. Performance Optimized Routing:

   In this routing policy, service broker actively monitors the performance of all data centers, and based on that, routes the traffic to the data center with best response time. It does not take cost into consideration.

3. Dynamically Reconfigurable Router:

   This is an extension to proximity based routing, where the routing logic is similar, but the service broker has additional responsibility of scaling the application deployment based on the load it is facing. This policy increases and decreases the number of virtual machines allocated in the data centers.

B. Load Balancing Algorithms:

1. Round Robin Load Balancer:

   In this algorithm, a queue is maintained and when the request arrives the first Virtual Machine is given request and is correspondingly moved to end of queue. Here no load checking is done, so this method fails in giving the best data processing time Virtual Machine.

2. Active Monitoring Load Balancer:

   In this algorithm, an index table of Virtual Machines is maintained which contains the numbers of requests allocated to each Virtual Machine. Initially all the Virtual Machines have zero allocation. When the request arrives, the index table is parsed and the least loaded Virtual Machine is assigned the request and correspondingly the table is updated regarding new allocation. There is overhead of parsing the index table before assigning the request.

3. Throttled Load Balancer:

This algorithm also prepares an index table as that of previous algorithm but notes whether a particular VM is available or not. When the request arrives the index table is parsed and the first available VM is selected.

VI. EXPERIMENTATION

A. Main Configuration:

1. Simulation Duration: 24 Hours
2. User bases:

Table 1:

Name	Region	Request per User per Hr	Data size per Request (bytes)	Peak Hours Start (GMT)	Peak Hours End (GMT)	Avg Peak Users	Avg Off Peak User
UB1	0	60	100	12	14	5000	500
UB2	1	60	100	14	16	1000	100
UB3	2	60	100	19	21	3500	350
UB4	3	60	100	0	2	1500	150
UB5	4	60	100	20	22	500	50
UB6	5	60	100	10	12	800	80

3. Application Deployment Configuration:

Table 2:

Data Center	#VMs	Image Size	Memory	BW
DC1	5	10000	512	1000
DC2	5	10000	512	1000
DC3	50	10000	512	1000

4. Data center configuration:

Table 3:

Name	Region	Arch	OS	VMM	Cost per VM $/Hr
DC1	0	x86	Linux	Xen	0.1
DC2	1	x86	Linux	Xen	0.1
DC3	2	x86	Linux	Xen	0.1

Table 4:

Name	Memory Cost $/s	Storage Cost $/s	Data Transfer Cost $/Gb	Physical HW Units
DC1	0.05	0.1	0.1	1
DC2	0.05	0.1	0.1	1
DC3	0.05	0.1	0.1	1

5. Physical Hardware Details of individual Data Center:

Table 5:

Id	Memory (Mb)	Storage (Mb)	Available BW	Number of Processor	Processor Speed
0	204800	10000 0K	1000000	4	10000

B. Advanced Configurations:

1. User grouping factor in User Bases (Equivalent to number of simultaneous users from a single user base): 500
2. Request Grouping Factor in Data Centers (Equivalent to number of simultaneous requests a single application server instance can support.): 250
3. Execution instruction length per Request (bytes): 200
4. Select any Load Balancing Policy across VM's in single Data Center

C. Internet Characteristics:

1. Delay Matrix:

The transmission delay between regions. Units in milliseconds.

Table 6:

Region /Region	0	1	2	3	4	5
0	25	100	150	250	250	100
1	100	25	250	500	350	200
2	150	250	25	150	150	200
3	250	500	150	25	500	500
4	250	350	150	500	25	500
5	100	200	200	500	500	25

2. Bandwidth Matrix:

The available bandwidth between regions for the simulated application. Units in Mbps.

Table 7:

Region/Region	0	1	2	3	4	5
0	2000	1000	1000	1000	1000	1000
1	1000	800	1000	1000	1000	1000
2	1000	1000	2500	1000	1000	1000
3	1000	1000	1000	1500	1000	1000
4	1000	1000	1000	1000	500	1000
5	1000	1000	1000	1000	1000	2000

Using the above all configuration the experimentation is done and the result for various combinations of Service broker and Load balancing algorithm is obtained.

The following is the combination of Service broker algorithm and Load Balancing algorithm used to come up to results:

Table 8:

Service Broker Policy	**Load Balancing Algorithm**
Proximity based Routing	Round Robin Load Balancer
Proximity based Routing	Active Monitoring Load Balancer
Proximity based Routing	Throttled Load Balancer
Performance Optimized Routing	Round Robin Load Balancer
Performance Optimized Routing	Active Monitoring Load Balancer
Performance Optimized Routing	Throttled Load Balancer
Dynamically Reconfiguring Router	Round Robin Load Balancer
Dynamically Reconfiguring Router	Active Monitoring Load Balancer
Dynamically Reconfiguring Router	Throttled Load Balancer

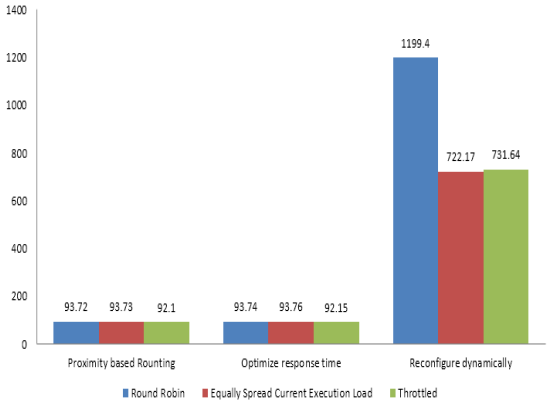
VII. COMPARISON OF RESULTS

We have analyzed and compared the results obtained by executing the above set of algorithms. The metrics on which we have compared the results are Overall Response Time, Data Processing time and Cost.

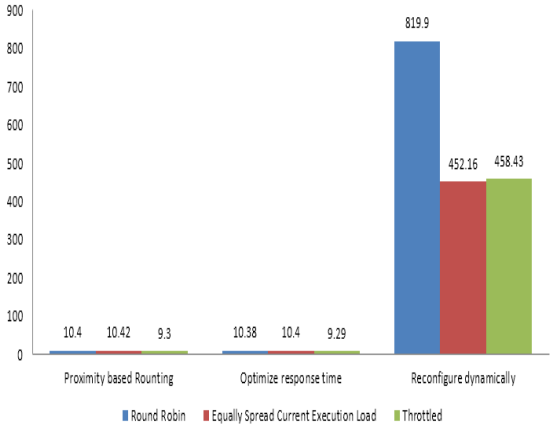
Load Balancing Policy		Proximity based Routing	Optimize response time	Reconfigure dynamically
Round Robin	Overall Response Time	93.72	93.74	1199.40
	Data Center Processing Time	10.40	10.35	819.90
	Cost	173.64	173.64	738.06
Equally Spread Current Execution Load	Overall Response Time	93.73	93.76	722.17
	Data Center Processing Time	10.42	10.40	452.16
	Cost	173.64	173.64	738.06
Throttled	Overall Response Time	92.10	92.15	731.64
	Data Center Processing Time	9.30	9.29	458.43
	Cost	173.64	173.64	738.14

Figure 2: Output Values of various parameters from CloudAnalyst Tool by running all the combinations

Graph 1: Overall Response Time



Graph 2: Data Center Processing Time



Graph 3: Cost

VIII. ANALYSIS

The results compare the three load balancing algorithms by considering the overall cost and average response time for each of the three service broker policies.

Response time:

We observe that the three load balancing algorithms perform almost the same for Proximity based Service broker policy with respect to response time. They produce similar results for Optimized response time based service broker policy; however the values of response times are slightly lower than those of Proximity based Service broker policy. This is because Proximity based policy passes all the requests to the closest data center, while Optimized response time based policy sends most of the requests to the closest data center and selects the data center with the least response time for remaining requests. The dynamically reconfigurable service broker policy involves additional overhead of scaling the VMs up or down depending on the peak load. Thus the values for response time obtained in this scenario are greater than those of the other two service broker policies and they vary significantly for the three load balancing algorithms.

Cost:

From the results of the simulation, we find that the cost for implementing Proximity based and Optimized response time based service broker policies differs by a very small amount for the three load balancing algorithms. However, the cost for implementing the dynamically reconfigurable service broker policy is much higher as the number of VMs used fluctuates.

After a meticulous analysis of the experimentation results, the Optimized response time based service broker policy along with the throttled load balancing algorithm achieves the best response time within a reasonable cost.

IX. CONCLUSION

The major advantage of cloud computing is that the clients are free from the worry of knowing about the underlying hardware that is servicing their requests. In order to maintain this feature, it is necessary to efficiently utilize the available resources. Proper understanding and analysis of existing algorithms and the factors governing the same are highly considered while doing the further research work. The various factors are influenced by different combination of Service broker and Load balancing algorithms.

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CLOUD AV

Cloud On Security Overlay Network

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Abstract— One of the most widely used tools for detecting and removing unwanted files is an antivirus software. Many modern threats and its increasing complexity has resulted in vulnerabilities that are being exploited by malware cannot be detected by antivirus software. A new model for malware detection on end hosts based on providing antivirus as an in-cloud network service can be advocated by this software. Several important benefits including better detection of malicious software is provided by this approach. We are exploring this idea in cloud-based antivirus system named as Cloud-AV.

I. INTRODUCTION

Detecting malicious software is a complex problem. One of the most widely used tools for detecting and removing unwanted files is an antivirus software. Our main objective is to deploy an antivirus software in a cloud and to access that software on the machines that are connected or linked to the cloud. This approach will also analyze whether the system is safe or not. This approach of antivirus software can be vulnerable for long period of time. The end system will be updated according to the updates of antivirus software.

II. DETECTION FUNCTIONALITY

Antivirus act as a service network

The capability of an antivirus software is currently provided as efficiently and effectively by host based antivirus software. We are thinking of doing that each machine independently run a small process for detection of new files and then send that files to the main machine for further analysis .

In general practice we used to install any application on different computer system which has the drawbacks like time consumption, more cost and extra memory utilization.

To overcome these drawbacks and providing more flexibility, effectiveness, we are designing a cloud based antivirus application.

For exploring this new concept of antivirus software, we are proposing a cloud based antivirus system that consists of components like, a host that run on end hosts like desktops, laptops, and that identifies new files for analysis; a network service that receives files from hosts and identifies dangerous or unwanted files and removes it.

CloudAV is deployment and evaluation of a cloud antivirus system. Cloud-AV provides better detection techniques against new threats with respect to the single old technique of an antivirus software.

III. ANTIVIRUS SOFTWARE LIMITATIONS

Most successfully and widely used tools for removing unwanted files is an antivirus software . Antivirus software is deployed on most desktops and workstations in enterprises across the world.

The deployment of antivirus software in a unique way leads to ever expanding malicious software and tools.

As the construction of malicious software has shifted from the work of novices to a commercial and financially lucrative enterprise, antivirus vendors must expand more resources to keep up. The rise of boot nets and targeted malware attacks for the purposes of spam, fraud, and identity theft present an evolving challenge for antivirus companies.

The two important trends is that in case of a unique antivirus software technique, there are no regular updates of a newly formed dangerous viruses in a system where this can be lead to danger for that system on which the software is deployed because it is not aware of newly created viruses and their signatures. Second is that the increasing complexity of antivirus software and services has indirectly resulted in vulnerabilities that can and are being exploited by malware. That is, malware is actually using vulnerabilities in antivirus software as means to infect systems.

IV. APPROACH

Before getting into details of the approach, it is important to understand the environment in which such an architecture is most effective. We propose our approach on the same threat model as present in a host-based antivirus system and assume a cloud based antivirus system would run as an additional layer of protection to augment already existing security systems such as those inside an organizational network like an enterprise.

Some practicable deployment environments include:

Enterprise networks: Enterprise networks are to be used in highly controlled environments in which desktop and server software is controlled by IT administrators. In addition, enterprises typically have good network connectivity with low latencies and high bandwidth between workstations and back office systems.

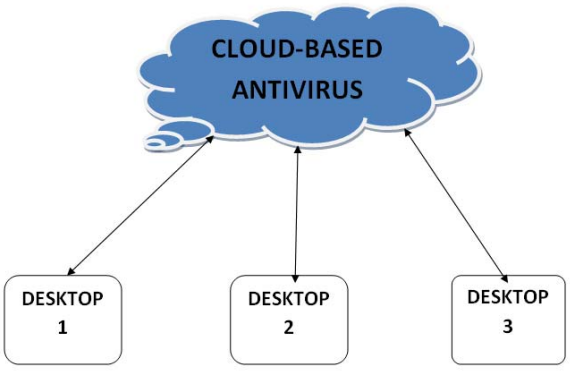
In-Cloud Detection:-

The core of the proposed approach is moving the detection of malicious and unwanted files from end hosts and into the network. This idea was originally introduced and we significantly extend and evaluate the concept in this paper.

There is currently a strong trend toward moving services from end host and monolithic servers into the network cloud. In addition, there have been several attempts to provide network services as overlay networks.

Moving the detection of malicious and unwanted files into the network significantly lowers the complexity of host-based monitoring software. Clients no longer need to continually update their local signature database, reducing administrative cost. Simplifying the host software also decreases the chance that it could contain exploitable vulnerabilities. Eventually, a lightweight host agent allows the service to be extended to mobile and resource-limited devices that lack sufficient processing power but remain an enticing target for malware.

V. ARCHITECTURE



In the above diagram of Cloud-AV we have created an antivirus software which is able to detect and delete a virus from a file or a machine.

This antivirus is later deployed on the cloud where all other systems are linked to the cloud so that they can use this application anywhere anytime with a cloud.

This cloud based approach saves the time as well as money and space. So this method of deployment and detection of virus is an effective way as compared to the old antivirus software system.

CONCLUSION

- We have proposed a new model for antivirus deployment by providing antivirus functionality using a cloud service as CloudAV.
- This particular technique provides notable advantages over traditional host-based antivirus including better detection of malicious software.
- Using this technique is more effective and provides better protection against threats.

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EMPIRICAL MODE DECOMPOSITION FOR EEG SIGNAL ANALYSIS

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***Abstract*— Electroencephalogram (EEG) is used to record electrical activity of brain. Human brain is fascinated by the different idea of thoughts and feelings generated from external and internal stimuli. Feature extraction and classification of EEG signal plays an important role in diagnosis of various brain diseases and mental tasks. In this paper, powerful technique of empirical mode decomposition (EMD) for the EEG signal is proposed. For extracting data from nonlinear and nonstationary process EMD is used in wide variety of applications. Intrinsic mode functions (IMFs) resulting from EMD process are considered as set of amplitude modulation (AM) and frequency modulation (FM) signals. Hilbert Huang transform is used for analytic representation of IMF. Features obtained from IMF can be applied to classifier to show effectiveness of EMD process.**

***Keywords*—** EEG signal analysis, Electroencephalogram (EEG), intrinsic mode function, Hilbert huang transform (HHT)

I) Introduction

Brain controls various activities of our body and it is very active part. Brain functions are analyzed by an observing electrical signals generated by neurons. EEG signal measures changes of these signals in terms of voltage fluctuations of brain within very short time period [1]. In modern biomedical applications EEG signal is investigated as function of human- computer communication. Computers help in recognition of abnormalities in brain from EEG signal. Many neurological disorders can be easily diagnosis with the help of brain rhythms which can be easily recognized by visual inspection of the EEG signal. EEG signal occurs in frequency ranges of delta (0.5-4 Hz), theta (4-8 Hz), alpha (8-13 Hz) and beta greater than 13 Hz.

To record electrical signals, electrodes are arranged on the surface of scalp using 10-20 system of an electrode placement. As name indicates that distance between the adjacent electrodes are either 10% or 20% from total front-back or left-right portion of skull. It uses letters and numbers for placement of electrodes. The electrode site is labeled with a letter which corresponds to the area of the brain, and the number which indicates the right hemisphere even, or the left hemisphere – odd.

Nasion and Inion are the anatomical landmarks. 10-20 system is shown in given in Fig.1.

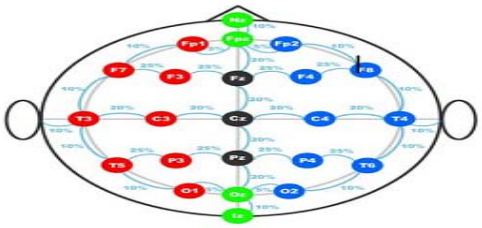


Fig.1 Electrode placement for 10-20 system

Brain Computer Interface (BCI) is an advanced technology that acquires and analyzes signal for achieving communication between brain thoughts, messages and computer [2] [3]. Basic BCI System is shown in Fig.2.

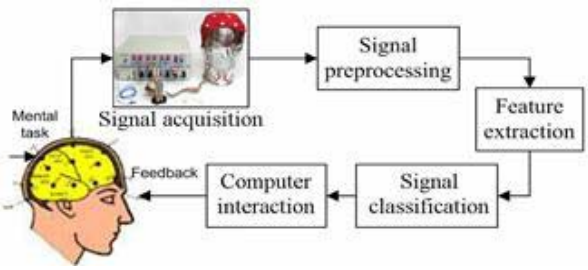


Fig.2.BCI system

EEG signal is acquired by electrodes and sensors. These signals are collected and preprocessed using special filters. Raw EEG signal is input to the feature extraction.EEG features are extracted using several methods. Suitable features characterizing each signal are extracted from each signal. Each EEG signal consists of huge number of samples in it. The feature extraction method employs some characteristic quantities from each input signal. Comparison of different features can be used to identify mental disorder problems [4].

Empirical mode decomposition (EMD) is process of extracting amplitude and frequency related oscillatory pattern from time series of data.EMD decomposes EEG signal into intrinsic mode functions (IMFs).They are based upon local characteristics of time scale data.EMD is particularly well suited for analyzing nonstationary signal such as EEG. It is data adaptive decomposition method. Huang, et al. (1998) has introduced the concept of Empirical Mode Decomposition and application of Hilbert transform, which is called Hilbert-Huang Transform, to extract time-frequency information data from a nonlinear and nonstationary signal. R. Oweis et al. has proposed [5] EMD method for recognition of seizure and Nonseizure detection using Hilbert huang transform. From this intrinsic mode functions are extracted to obtain amplitude and frequency components. In this case EMD method provides fast diagnosis of abnormal activities of brain and high accuracy to classifier about 94%. C.Park et al. [6] describes bivariate extension of EMD facilitates enhanced spectrum estimation for multichannel recordings. Amplitude and frequency components are analyzed locally. BEMD provides stability to the system also BEMD based asymmetry calculation provides higher accuracy over EMD based asymmetry. S.M.Shafiul [7] has proposed EMD-chaos based approach for analysis of healthy and epileptic patients during seizure attacks. EEG signals are discriminated using Lyapunov exponent and correlation dimension. Parameters obtained from this method are able to distinguish EEGs of seizure attacks from other tasks. Bajaj et al. [8] has introduced EMD method for classification of ictal and Interictal part. Amplitude and frequency modulated bandwidth features resulting from IMFs are used along with least square support vector machine (LS-SVM) which increases performance and accuracy of classifier.

II) METHODOLOGY

A. Dataset

An EEG dataset used here is available at http://www.cs.colostate.edu/eeg.[9]. This dataset consist of data recorded from electrodes. Data is a cell array and each individual cell array is made up of a subject string, task string, trial string, and data array. Each data array is 7 rows by 2500 columns. The 7 rows correspond to channels c3, c4, p3, p4, o1, o2, and EOG. Across columns are samples taken at 250 Hz for 10 seconds, for 2500 samples. Data consists of five tasks such as-

(1) Baseline Task- The subjects are asked to relax in this task means they are not performing any mental task.

(2) Multiplication task-In this task subjects are required to solve a multiplication problem without any vocalizing or making any other physical movement.

(3) Letter Composition- The subjects are instructed to mentally compose some letter to other friend or relative without making any vocalizing.

(4) Number Counting-In this task subjects are asked to imagine a blackboard and to visualize numbers which are written on board.

(5) Geometric Figure Rotation- The subjects are asked to visualize a given drawing of complex three dimensional block figure to study and after some particular period it will

removed and instructed to visualize box is being rotated about an axis [10].

B. Empirical Mode Decomposition

EMD is data dependent process. IMFs are derived using basis obtained from EEG data itself. There are two basic conditions for each IMF that (1) the number of extrema and number of zero crossings of signal must be same or they are at most differ by one. (2) at any point mean value of envelope of signal defined by local maxima and envelope of signal defined by local minima is zero [11]. The EMD algorithm for the signal x(t) can be summarized as follows-

1.Detect the extrema (maxima and minima) of the dataset x(t).

2. Generate the upper and lower envelopes $e_m(t)$ and $e_l(t)$ respectively, by connecting maxima and minima separately with cubic spline interpolation.

3. Determine the local mean as,

$$a(t)=[e_m(t)+e_l(t)]/2$$

4. Extract the detail

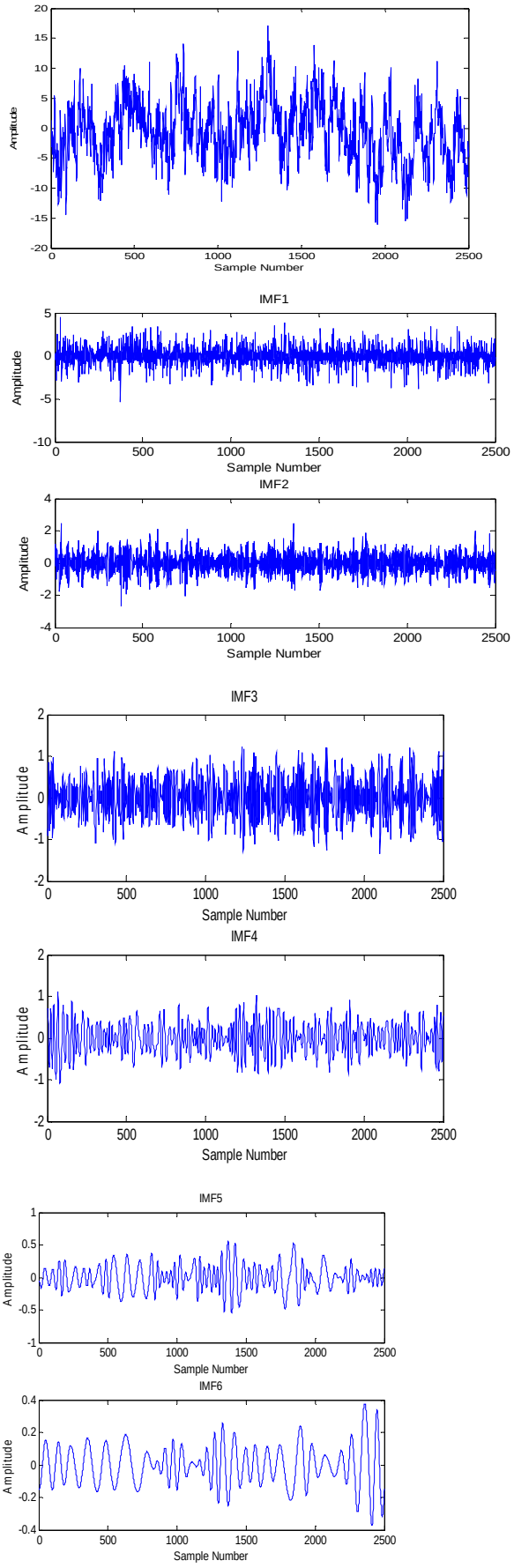
$$h_1(t)=x(t)-a(t)$$

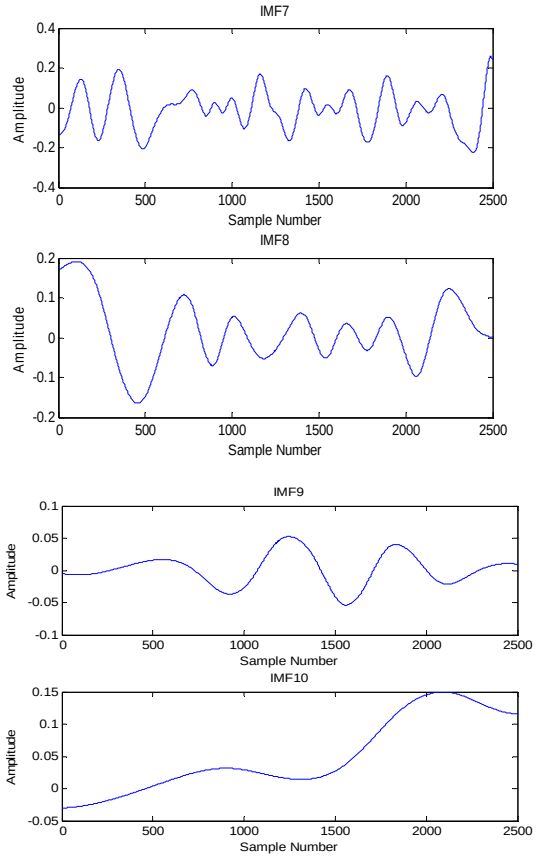
5. Decide whether $h_1(t)$ is an IMF or not by checking the two basic conditions as described above. Repeat the steps (1) to (4) and end when an IMF $h_1(t)$ is obtained .Once the first IMF is derived, define $c_1(t)=h_1(t)$ which is the smallest temporal scale in x(t). To determine the rest of the IMFs, generate the residue $h_1(t)=x(t)-c_1(t)$ the residue can be treated as the new signal and repeat the above illustrated process until the final residue is a constant or a function from which no more IMFs can be derived. At the end of the decomposition, the original signal x(t) is given in Eq.1,

$$x(t)=\sum_{m=1}^{M} Cm(t)+rM(t) \qquad (1)$$

Where M is the number of IMFs, $c_m(t)$ is the m^{th} IMF and $r_M(t)$ is the final residue [12] [13].

IMFs generated by the EMD process are shown in Fig.3





As the number of IMF increases, the corresponding data become smoother. The EMD algorithm is however very sensitive to noise in the recorded signal.

C. Analytic Signal Representation

Hilbert transform is used for each of the IMF obtained by EMD method. HHT mainly consists of EMD technique along with Hilbert spectral analysis. HHT provides local description of oscillating components and computes an instantaneous frequency and amplitude [14] [15]. The analytic signal amplitude by applying Hilbert transform is denoted by,

$$A(t) = \sqrt{\left(C^2(t) + C_H{}^2(t)\right)}$$

(2)

Where $c(t)$ represents IMF of signal and $c_H(t)$ for Hilbert transform of IMF. For each IMF instantaneous phase $\Phi(t)$ is given by Eq.3

$$\phi(t) = \arctan\left[C_H(t)/C(t)\right]$$

(3)

The important conditions for a meaningful definition of instantaneous frequency is based upon the analytic representation of the signal and that signal is symmetric with respect to the local zero mean, and has the same number of extrema and zero crossings[16]. Each order of IMF component contains different energy when the bearing works in different conditions. Energy of IMFs at some orders will decrease and that of the others it will increase. Hence IMF energies are combined as feature vector to realize some disorders in brain.

Energy feature of analytic signal is calculated as in Eq.4

$$Ej = \sum_{i=1}^{N} \left|C_j(t)\right|^2$$

(4)

where E_j represents the energy of the j^{th} IMF component, $c_j(i)$ denotes the i^{th} data point of the

j^{th} IMF component and N denotes the total number of samples present in each IMF [17] [18].

The feature vector gives sum of all energies of IMFs designated in Eq.5

$$E = \left(E_1 + E_2 + E_3 + ... + E_n\right)$$

(5)

IMF feature energy is used to separate normal and disturbed condition of mental tasks. Combining these IMF features and applied to proper classifier may help to increase accuracy.

III)RESULTS AND DISCUSSION

EMD method decomposes nonlinear and nonstationary data of EEG signal into limited set of narrow band AM-FM components which indicates computation of bandwidth due to amplitude and frequency modulation.

The IMFs are arraged from higher to lower frequency components. The complex demodulation decomposes raw EEG signal into 3 designated delta, theta, and alpha bands with complex EEG signal representation at sampled time instant, which enables the extraction of amplitude envelope and phase information.

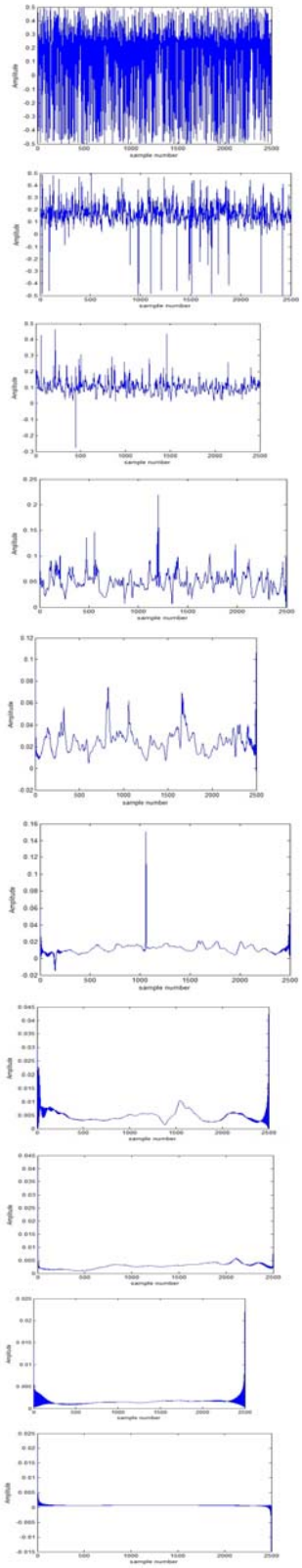


Fig.4A.Instantaneous frequencies of ten IMFs of Baseline data

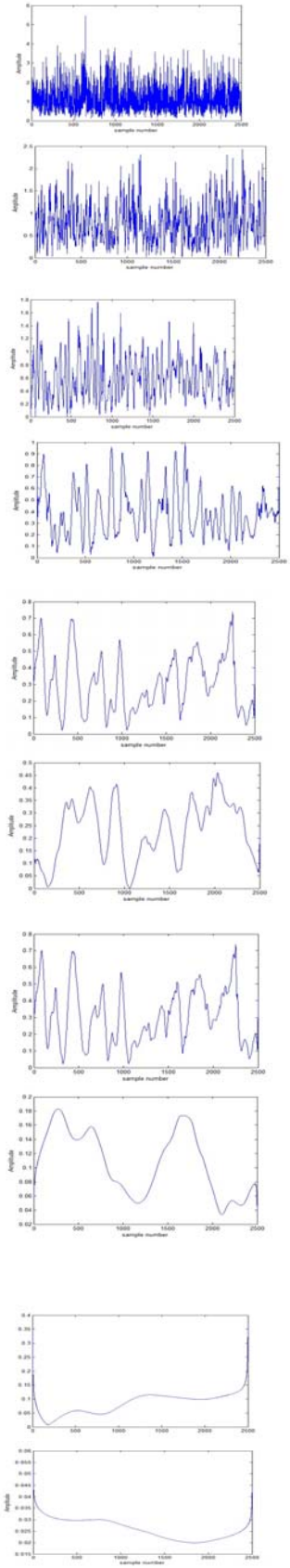


Fig.4.B.Instantaneous amplitudes of ten IMFs of Baseline data

The IMFs are arraged from higher to lower frequency components. The complex

demodulation decomposes raw EEG signal into 3 designated delta, theta, and alpha bands with complex EEG signal representation at sampled time instant, which enables the extraction of amplitude envelope and phase information [19].

V) ACKNOWLEDGEMENT

I express great many thanks to college and department staff, they were a great source of support and encouragement. To my friends and family, for their warm, kind encourages and loves. To every person gave us something too light my pathway, I thanks for believing in me.

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AUTOMATION OF CONVEYOR USING PLC

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Abstract— A programmable logic controller (PLC) is a digital computer used for automation of electromechanical processes, which is a type of computer family and they have commercial and industrial applications. The development of programmable logic controller (PLC) makes it possible to do the required changes to the program without changing the electrical circuit connections. The Siemens s7-300 series programmable logic controller is used to mechanize the system. This paper presents an automation of conveyor belt logic using a programmable logic controller. For this system s7-300 PLC (CPU 313c) used and software for programming used is simatic manager.

***Index Terms*— PLC, conveyor motor, s7-300, function block, functional block diagram.**

I.INTRODUCTION

The PLC has its origin in the motor manufacturing industries. Manufacturing processes were partially automated by the use of rigid control circuits, electrical, hydraulic, pneumatic. It was found that when ever change had made, the system had to be rewired or reconfigured. The use of wiring of boards on which could connections could be changed by unplugging them and changing them around followed. With the development of microcomputers it was realized that if the computer could switch things on or off and respond to a pattern of inputs, then the changes could be made by simply reprogramming the computer and so the PLC was born.PLC is an industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices. Almost any production line, machine function, or process can be greatly enhanced using this type of control system. However, the biggest benefit in using a PLC is the ability to change and replicate the operation or process while collecting and communicating vital information. Another advantage of a PLC system is that it is modular. That is, you can mix and match the types of Input and Output devices to best suit your application.

The PLC hardware is digital electronic devices with memory can be programmed to store commands or Information and the implementation of various operations such as logical operations, arithmetic and timing. There are several companies (PLC's) devices such as Siemens who produced SIMATIC 200, SIMATIC 300, and SIMATIC 400.
Allen Bradley Inc., Mitsubishi and many others. Each company has its own software, but

all accomplish the required job of the (PLC's)

II.Block diagram of PLC.

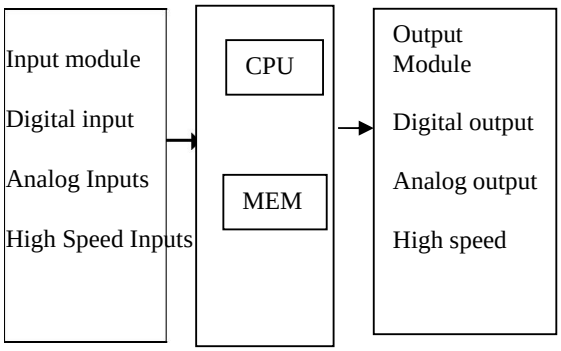

Fig.1

III. How does a PLC operate?

There are four basic steps in the operation of all PLCs; Input Scan, Program Scan, Output Scan, and Housekeeping. These steps continually take place in a repeating loop.

Four Steps In The PLC Operations

1.) Input Scan

Detects the state of all input devices that are connected to the PLC

2.) Program Scan

Executes the user created program logic

3.) Output Scan

Energizes or de-energize all output devices that are connected to the PLC.

4.) Housekeeping

This step includes communications with programming terminals, internal diagnostics,etc.

Styles

Unitary –The unitary PLC contains every feature of a basic system in one box. They are attached to machine being controlled.

Modular-These use range of modules that slot together to build up system. The basic modules are power supply ,cpu, input and output module. Other modules can be added such as ADC, DAC.The main advantage is no of input and outputs can be expanded.

Rack mounting-This is similar concept to modular design but modules are on standard card that slot into a standard rack inside a cabinet. These are flexible and allow expansion of system.

Siemens S7-300 PLC Programmable Logic Controller or PLC is an intelligent system of modules, which was introduced in the control, & instrumentation industry for replacing relay based logic . Over a period of time, better I/O handling capabilities and more programming elements have been added along with improvement in communication.

IV.Advantages of PLC over Relay Logic

1- Flexible control, change any industrial process by modifying the program.

2- Maintenance and the discovery of faults in the PLC system are easily seen on the PLC screen.

3- Small size.

4-Has characteristics that are not available in normal computer.

5-Ability to engaged with other PLC devices or other computers.

6. Instant monitoring system.

7. Low cost

8. Durability, it is designed to withstand moisture, vibration and noise.

9. PLCs can be used in commercial and residential to solve the complex switching requirements.

V.Siemens s7-300

Following photograph shows details of cpu 313c[6]

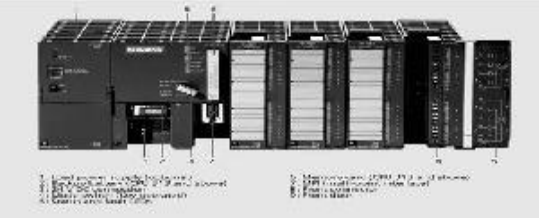

Fig.2

The modular mini PLC system for the low-end and mid performance ranges With a comprehensive range of modules for optimum adaptation to the automation task Flexible usage through the easy implementation of distributed structures and versatile networking capability User-friendly handling and uncomplicated,

fan-free design Trouble-free expansion when your task grow Powerful thanks to a large number of integrated functions.

VI.FLOW CHART

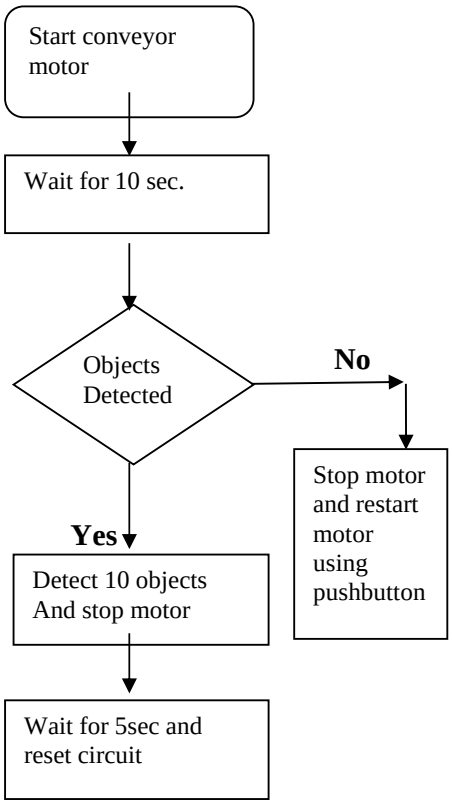

Fig.3

VII. Program in Simatic Manager software

Here to make program faster and save memory function block used. Following pictures shows program to control conveyor motor in function block. Here programming language used is functional block diagram.

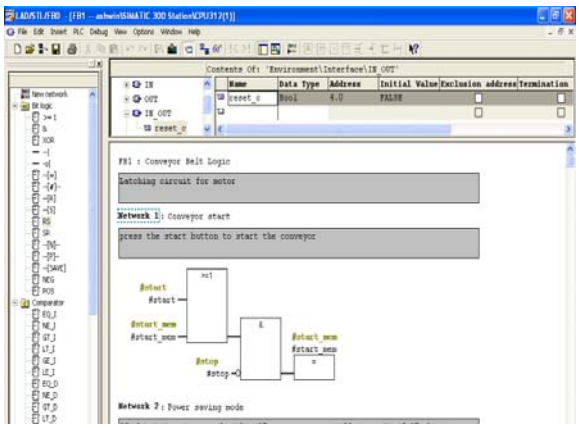

Fig.4

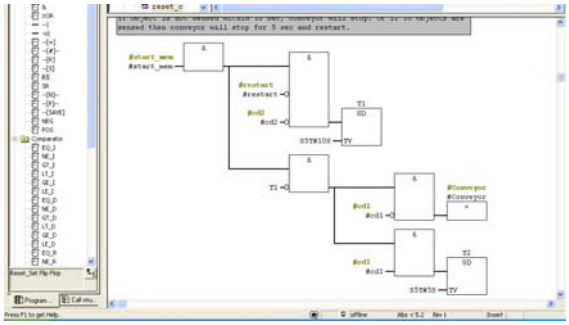

Fig.5

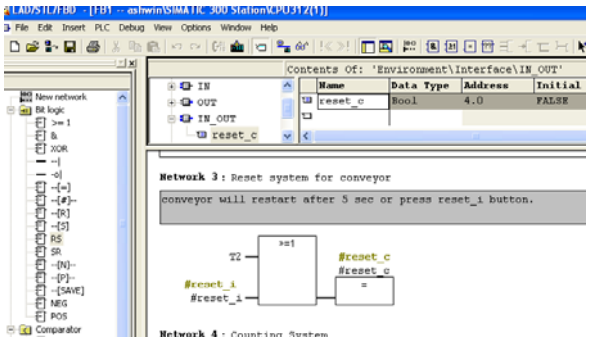

Fig.6

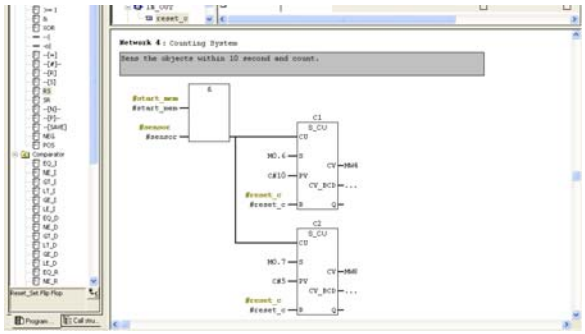

Fig.7

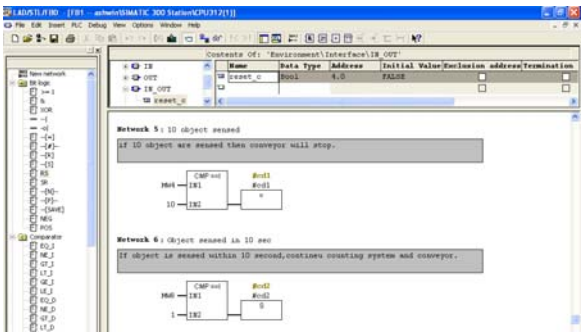

Fig.8

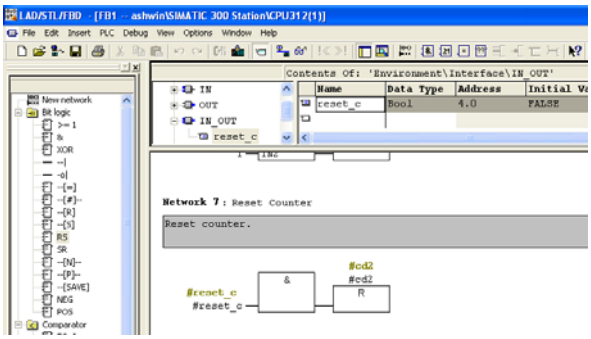

Fig.9

Conclusion

This Project idea when implemented commercially will result in efficient monitoring and control of industrial automation i.e monitoring and controlling of conveyor belt. There will be immense control and monitoring capabilities once this product is launched in industries. In future, further development is envisaged that may lead to a commercially available product.

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SEGMENTATION OF CUP AND DISC FOR GLAUCOMA DETECTION

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Abstract - Automatic analysis of retina images is becoming an important screening tool now days. This technique helps to detect various kind of risks and diseases of eyes. One of the most common diseases which cause blindness is Glaucoma. This disease happens due to the increase of Intraocular Pressure (IOP). Early detection of this disease is essential to prevent the permanent blindness. Screenings of glaucoma based on digital images of the retina have been performed in the past few years. Several techniques are there to detect the abnormality of retina due to glaucoma. The key image processing techniques are image registration, image fusion, image segmentation, feature extraction, image enhancement, morphology, pattern matching, image classification, analysis and statistical measurements. The An optic disc and optic cup segmentation is Used to identify the glaucoma disease in time. In this paper optic disc and optic cup segmentation, Super pixel classification for glaucoma screening is proposed. In optic disc segmentation, Histograms and centre surround statistics are used to classify each super pixel as disc or non-Disc. A self assessment reliability score is computed to evaluate the quality of the automated optic disc segmentation .In optic cup segmentation, The location information is also included into the feature space for better performance in addition to The histogram and centre surround statistics. The segmented optic cup and optic disc is then used to compute the cup to disc ratio for glaucoma screening. From the cup to disc ratio, Analysis Is performed to Identify Whether the given image is glaucomatous or not. The segmentation can be analyzed using the matlab .

Keywords – optic disc segmentation , optic cup segmentation ,glaucoma screening ,macula ,bit plane decomposition, mathematical morphology.

INTRODUCTION-One of the second leading causes of blindness is glaucoma, which is a chronic eye disease in which the optic nerve is progressively damaged. Progression of the disease leads to loss of vision, which occurs gradually over a long period of time. As the symptoms only occur when the disease is quite advanced, glaucoma is c a l l e d the silent thief of sight. Glaucoma cannot be cured, but its progression can be slowed down by treatment. Therefore, detecting glaucoma in time is critical. There are three methods to detect glaucoma:1) assessment of raised intraocular pressure (IOP), 2) assessment of abnormal visual field, 3) assessment of damaged optic nerve head. The IOP measurement using non contact tonometry is neither specific nor sensitive enough to be an effective screening tool because, glaucoma can be present with or without increased IOP. Assessment of the damaged optic nerve head is both more promising and superior to IOP measurement or visual field testing for glaucoma screening. Optic nerve head assessment can be

done by a trained professional. However, manual assessment is subjective, time consuming and expensive. Many glaucoma patients are unaware of the disease until it has reached its advanced stage. In Singapore, more than90% of patients are unaware that they have this condition.

In Australia, about 50% of people with glaucoma are un- diagnosed. Since glaucoma progresses with few signs or symptoms and the vision loss from glaucoma is irreversible, screening of people at high risk for the disease is vital One strategy for automatic optic nerve head assessment is to use image features for a binary classification between glaucomatous and healthy subjects . These features are normally computed at the image-level. In these methods, selection of features and classification strategy is difficult and challenging. Many glaucoma risk factors are considered, such as the vertical cup to disc ratio (CDR) , disc diameter , peripapillary atrophy (PPA) , notching etc. Although different ophthalmologists have different opinions on the usefulness of these factors, CDR is well accepted and commonly used.

The optic nerve head or the optic disc (in short, disc) is the location where ganglion cell axons exit the eye to form the optic nerve, through which visual information of the photo-receptors is transmitted to the brain. In 2-D images, the disc can be divided into two distinct zones; namely, a central bright zone called the optic cup (in short ,cup) and a peripheral region called the neuroretinal rim. Fig. 1 shows the major structures of the disc. The CDR is computed as the ratio of the vertical cup diameter (VCD) to vertical disc diameter (VDD) clinically. Accurate segmentations of disc and cup are essential for CDR measurement. Several method have been proposed for automatic CDR measurement from 2-D fundus images This focus on automatic glaucoma screening using CDR from 2-D fundus images. It includes a super pixel classification based disc and cup segmentations for glaucoma screening and also introduce super pixel classification based OD segmentation including the generation of super pixels, the extraction of features from super pixels for the classification and the computation of the self-assessment reliability score and also super pixel classification based cup segmentation, where the procedure is similar to that in disc segmentation

II. OPTIC DISC SEGMENTATION

A. INTRODUCTION

Localization and segmentation of disc are very important in many computer aided diagnosis systems, including glaucoma screening. The localization focuses on finding a disc pixel, very often the centre. Our work focuses on the segmentation problem and the disc is located by our earlier method ,which works well in our data set for glaucoma screening .The segmentation estimates the disc boundary, which is a challenging task due to blood vessel occlusions, pathological changes around disc, variable imaging conditions, etc. Some approaches have been proposed for disc segmentation, which can be generally classified as template based methods ,deformable model based methods and pixel classification based methods. Both the template and deformable model based methods are based on the edge characteristics. The performance of these methods very much depends on the differentiation of edges from the disc and other structures ,especially the PPA. The PPA region is often confused as part of disc for two reasons:1) it looks similar to the disc2) Its crescent shape makes it t o form another ellipse (often stronger) together with the disc. Deformable models are sensitive to poor initialization. To overcome the problem, a template based approach with PPA elimination is proposed. This method reduces the chance of mistaking PPA as part of the disc. However, the approach does not work well when the PPA area is small, or when the texture is not significantly predominant .Pixel classification based methods use various features such as intensity, texture, etc. from each pixel and its surroundings to find the disc. The number of pixels is high even at moderate resolutions, which makes the optimization on the level of pixels intractable. To overcome the limitations of pixel classification based methods and deformable model based methods, a super pixel classification based method and combine it with the deformable model based methods is used.In the proposed method, super pixel classification is used for an initialization of disc boundary and the deformable model is used to fine tune the disc boundary, i.e., a super pixel classification based disc initialization for deformable models.. The segmentation comprises: a super pixel

generation step to divide the image into super pixels; a feature extraction step to compute features from each super pixel; a classification step to determine each super pixel as a disc or non-disc super pixel to estimate the boundary; a deformation step using deformable models to fine tune the disc boundary.

B SUPERPIXEL GENERATION

Super pixels are local, coherent and provide a convenient primitive to compute local image features. They capture redundancy in the image and reduce the complexity of subsequent processing. A super pixel generation step is used to divide the image into super pixels. Many algorithms have been proposed for super pixel classification .The simple linear iterative clustering algorithm (SLIC) is used to aggregate nearby pixels into super pixels in retinal fundus images. SLIC is fast, memory efficient and has excellent boundary adherence. SLIC is also simple to use with only one parameter, i.e., the number of desired super pixels SLIC ALGORITHM SLIC is a simple and efficient method to decompose an image in visually homogeneous regions. It is based on a spatially localized version of k-means clustering. Similar to mean shift or quick shift, each pixel is associated to a feature vector SLIC takes two parameters: the nominal size of the regions (super pixels) region Size and the strength of the spatial regularization regularizer. The image is first divided into a grid with step region Size. The centre of each grid tile is then used to initialize a corresponding k-means (up to a small shift to avoid image edges). Finally, the k-means centres and clusters are refined, yielding the segmented image. As a further restriction and simplification, during the k-means iterations each pixel can be assigned to only the *2 x 2* centres corresponding to grid tiles adjacent to the pixel. After the k-means step, SLIC optionally removes any segment whose area is smaller than a threshold min Region Size by merging them into larger ones. In SLIC, k initial cluster centres Ck are sampled on a regular grid spaced by pixels apart from the image with N pixels. The centres are first moved towards the lowest gradient position in a 3 × 3 neighbourhood. Clustering is then applied. For each Ck, SLIC iteratively searches for its best matching pixel from the neighborhood around Ck based on colour and spatial proximity and then compute the new cluster centre based on the found pixel. The iteration continues until the distance between the new centres and previous ones is small enough.

C. FEATURE EXTRACTION

This is used to compute features from each super pixel .Many features such as colour, appearance, location and texture can be extracted from super pixels for classification using contrast enhanced histogram, centre surround statistics and texture as the features.

CONTRAST ENHANCED HISTOGRAM**:**

Many features such as colour, appearance, gist, location and texture can be extracted from super pixels for classification. Since colour is one of the main differences between disc and non-disc region, colour histogram from super pixels is an intuitive choice .Motivated by the large contrast variation between images and the use of histogram equalization in biological neural networks, histogram equalization is applied to red , green , and blue channels from RGB colour spaces individually to enhance the contrast for easier analysis. Thus, hue and saturation from HSV colour space are also included to form five channel maps. This is computed for the jth super pixel SPj, where HE (.) denotes the function of histogram equalization and hj (.)denotes the function to compute histogram from SPj.

CENTER SURROUND STATISTICS

It is important to include features that reflect the difference between the PPA region and the disc region. The super pixels from the two regions often appear similar except for the texture: the PPA region contains blob-like structures while the disc region is relatively more homogeneous. The histogram of each super pixel does not work well as the texture variation in the PPA region is often from a larger area than the super pixel . This is because the super- pixel often consists of a group of pixels with similar colors. Inspired by these observations, centre surround statistics (CSS) from super pixels as a texture feature can be included. To compute CSS, nine spatial scale dyadic pyramids are generated. The dyadic Gaussian pyramid is a hierarchy of low-pass filtered versions of an image channel, so that successive levels correspond to lower frequencies. It is accomplished by convolution

with a linearly separable Gaussian filter and decimation by a factor of two. Then centre surround operation between centre (finer) levels and surround levels (coarser) is performed. Denote the feature map in centre level c as I(c) and the feature map in surround level s as I(s) and the interpolated map is denoted as I(c) , where, fs-c(I(s) denotes the interpolation from the surround level to the centre level . The centre surround difference is then computed as /I(c)-fs-c(I(s)/ .All the difference maps are resized to be the same size as the original.

FINAL FEATURE

The features from neighboring super pixels are also considered in the classification of current super pixel. Search for four neighboring super pixels for SPj and denote as SPj1, SPj2, SPj3, SPj4. SPj1 is determined as first super pixel by moving out by the current super pixel horizontal to left from its center. Simiarly, SPj2,SPj3 and SPj4 are determined by moving right, up and down.CSS feature is then computed as CSSj= [CSSj CSSj1 CSSj2 CSSj3 CSSj4].we combine the HISTj and CSSj to form proposed feature.

D. INITIALIZATION AND DEFORMATION

In this, a classification step to determine each super pixel as disc or non-disc super pixel to estimate the boundary and a deformation step to fine tune the disc boundary is used. A support vector machine is used as the classifier. The LIBSVM with linear kernel is used. The output value for each super pixel is used as the decision values for all pixels in the super pixel, .A smoothing filter is then applied on the decision values to achieve smoothed decision values. In this implementation, mean filter, and Gaussian filter are tested and the mean filter is found to be a better choice. The smoothed decision values are then used to obtain the binary decisions for all pixels with a threshold. In the experiments, assign +1 and-1 to positive (disc) and negative (non-disc) samples, and the threshold is the average of them .i.e., 0.After getting the binary decisions for all pixels have a matrix with binary values with 1 as object and 0 as background. The largest connected object, i.e., the connected component with largest number of pixels, is obtained through morphological operation and its boundary is used as the raw estimation of the disc boundary.The best fitted ellipse using elliptical Hough transform is computed as the fitted estimation. The active shape model employed in is used to fine tune the disc boundary.

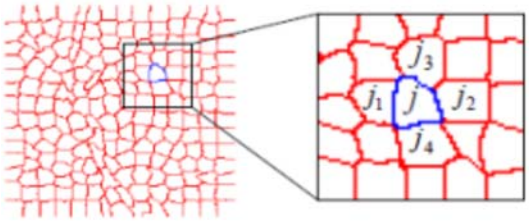

Fig 1. Illustration of neighbouring super pixel

III. OPTIC CUP SEGMENTATION

A. INTRODUCTION

Detecting the cup boundary from 2-D fundus images without depth information is a challenging task, as depth is the primary indicator for the cup boundary. In 2-D fundus images, one land- mark to determine the cup region is the pallor, defined as the area of maximum colour contrast inside the disc. The main challenge in cup segmentation is to determine the cup boundary when the pallor is non obvious or weak. In such scenarios, we lack landmarks, such as intensity changes or edges to estimate the cup boundary reliably. Although vessel bends are potential landmarks, they can occur at many places within the disc region and only one subset of these points defines the cup boundary. Besides the challenges to obtain these points, it is also difficult to differentiate the vessel bends that mark the cup boundary from other vessel bends without obvious pallor information. A super pixel classification based method for cup segmentation incorporates prior knowledge into the training of super pixel classification.

B. FEATURE EXTRACTION

The feature extraction process can be summarized as below. After obtaining the disc, the minimum bounding box of the disc is used for cup segmentation. The histogram feature is computed similarly to that for disc segmentation, except that the histogram from the red channel is no longer used. This is because there is little information about the cup in the red channel. Denote it as HISTjc to be differentiated from that for disc segmentation

C. SUPERPIXEL CLASSIFICATION FOR OPTIC CUP ESTIMATION

The LIBSVM with linear kernel is used for the classification. Randomly obtain the same number of super pixels from the cup and non-cup regions in the training step from a set of training images with manual cup boundary. Similarly, the output values from the LIBSVM decision function are used. As illustrated, the output value for each super pixel is used as the decision values for all pixels in the super pixel. A mean filter is applied on the decision values to compute smoothed decision values. Then the smoothed decision values are used to obtain the binary decisions for all pixels. The largest connected object is obtained and its boundary is used as the raw estimation. The best fitted ellipse is computed as the cup boundary. The ellipse fitting here is beneficial for overcoming the noise introduced by vessels especially from the inferior and superior sector of the cup. Do not apply contour deformation after obtain the estimated cup boundary from super pixel classification, because many cases do not have an obvious/strong contrast between the cup and the rim for the deformable models. A deformation in these cases often leads to an overestimated cup.

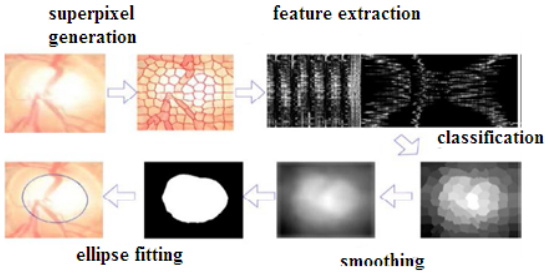

Fig 2:Super pixel based optic cup segmentation.

Each disc image is divided into super pixels. The features are used to classify the super pixels as cup or non-cup. The decision values from SVM output are smoothed to determine cup boundary.

D.CUP TO DISC RATIO

After obtaining the disc and cup, various features can be computed. The clinical convention is used to compute the CDR. as CDR is an important indicator for glaucoma screening. . The hole represents the cup and the surrounding area the disc. If the cup fills 1/10 of the disc, the ratio will be 0.1. If it fills 7/10 of the disc, the ratio is 0.7. The normal cup-to-disc ratio is 0.3. A large cup-to-disc ratio may imply glaucoma .After obtaining the disc and cup, various features can be computed. Then follow the clinical convention to compute the CDR., CDR can be computed as

CDR=CD/DD

Where,

CD-Cup Diameter

DD- Disc Diameter

CDR-Cup-to-Disc Ratio

The computed CDR is used for glaucoma screening .When CDR is greater than threshold, it is glaucomatous.

IV. RESULTS AND DISCUSSIONS

For optic cup and optic disc segmentation, images testing and also manual disc testing are used. This is to isolate the errors from the disc and cup. The overlapping error E is computed as evaluation metric. μE is the mean overlapping error. It shows that HISTj alone work poorly because it is very sensitive

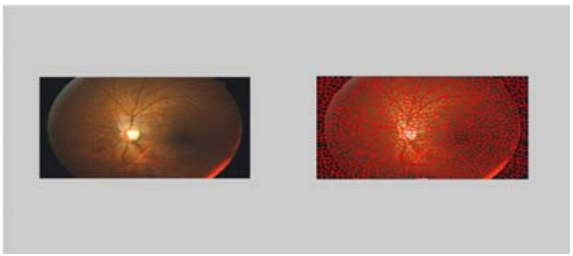

Fig 3 Super pixel Generation

From the fig, it can be observed that the input image is divided into super pixels by use of a simple linear iterative clustering algorithm .Super pixel often consists of group of pixels with similar color.The histogram of each superpixel does not work well as texture variation in PPA regions is from a larger area than superpixel .So center surround statistics is used as one of the feature for differentiating disc region and PPA region

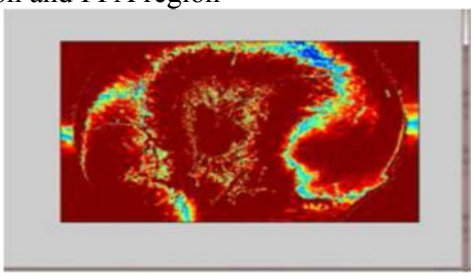

Fig 4 Texture

The other feature that can be considered in the optic disc segmentation is the texture. In this, the features from neighbouring super pixels can also be considered in the classification of current super pixel. The proposed feature is obtained by combining the other two features like histogram and centre surround statistics.

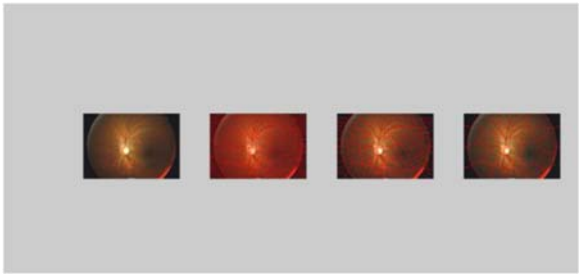

Fig 5: Estimation of Disc Boundary

From the fig, the disc boundary can be obtained by taking the decision values from the super pixel. The raw and fitted estimation is also performed for the initialization of disc boundary. The decision values from the support vector machine are used for segmentation. Output of each super pixel is used as the decision values. Each image is divided into super pixels. The features are used to classify each super pixel as cup or non- cup. The decision values from the SVM output are smoothed to determine the cup boundary. The cup can be located at the centre section of the disc.

V. CONCLUSIONS

In this project a super pixel classification based methods for disc and cup segmentations for glaucoma screening is presented. It has been demonstrated that CSS is beneficial for both disc and cup segmentation. In disc segmentation, HIST and CSS are complement to each other. CSS responds to blobs and provides better differentiation between PPA and discs compared with histograms. Histograms with the contrast enhancement overcome the limitation of CSS due to contrast variations. Reliability score is an important indicator of the automated results. In cup segmentation, the benefit of CSS is even larger than that in disc segmentation, because the colour change from cup to neuro retinal rim is much smaller. The segmentation is presented using the MATLAB coding.

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UNDERWATER SHIP RADIATED NOISE MODEL

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Abstract— An Underwater noise becomes a field of growing concern because of the possible interaction with sound vocalization of marine mammals. An ambient noise may have different non- electrical origins which are generated due to natural and anthropogenic noise sources. The low frequency radiated noise is the type of an ambient noise which masks the original sound signals transmitted in the ocean and hence it widely affects the detection capabilities of wide range of underwater sensors and SONAR. To improve the system performance significantly, the modeling of radiated noise is necessary which may give the better prediction of the noise. In this paper, the radiated ship noise model is used for analyzing the noise level for the frequencies varying from 100 Hz to 5 kHz. The result shows that noise level is dominant at low frequencies.

Index Terms—Modeling, Radiated ship noise spectrum, underwater radiated noise sources

I. INTRODUCTION

By ambient noise we mean the prevailing, sustained unwanted background of sound at some spot in the ocean [1]. There are varieties of natural and anthropogenic ambient noise sources and they are dominant in each of three frequency bands: low (10 to 500 Hz), medium (500 Hz to 25 kHz) and high (>25 KHz). Anthropogenic sources are dominant at low frequency in which shipping traffic and distant shipping is included. The low-frequency sound experiences little attenuation, allowing for long-range propagation due to shipping noise sources contribute to ambient noise across ocean basins [2].

The sound generated by a ship is broadband component which is originates from propellers, shafts, propulsion machinery and auxiliary machinery [3]. This paper attempt to describe the underwater radiated noise sources, spectrum of ship radiated noise and model of ship radiated noise.

A. Underwater Radiated Noise

Ship, submarines and torpedoes are significant sources of underwater sound. Radiated noise is of particular importance for passive sonar, which is designed to exploit the peculiarities of this form of noise in which it is normally observed.

The sources of the noise on ships, submarines and torpedoes can be grouped into the three major classes such as machinery noise, propeller noise and hydrodynamic noise.

1. Machinery noise:

Machinery noise comprises that part of the tonal noise of the vessel cause by the ship machinery. Machinery noise originates as mechanical vibrations of the many and diverse parts of the moving vessel. Machine noise is independent of speed, main frequency of

machine noise are usually accompanied by their harmonics. The manner of mounting of the machine and the resulting vibration of the hull are determining the factors in the radiation of sound. Because of this various effects, the harmonic structure of radiated noise is complex.

2. Propeller noise:

Propeller noise is hybrid form of noise having features and an origin common to both machinery and hydrodynamic noise. The source of the propeller noise is principally the noise of cavitations induced by the rotating propellers. The production and the collapse of the cavities formed by the action of the propeller is called propeller cavitation. Propeller cavitation may be subdivided into tip-vortex cavitation and blade surface cavitation shown in Fig.(1a) and (1b).

Fig.1 (a) Tip vortex cavitation (b) Blade surface cavitation

Because cavitation noise consists of large number of random small burst caused by bubble collapse, it has a continuous spectrum and it is a non linear phenomenon.

3. Hydrodynamic noise:

Hydrodynamic noise originates in the irregular and fluctuating flow of fluid past the moving vessel. The pressure fluctuations associated with the irregular flow may be radiated directly as sound to a distance or more importantly, may excite portions of the vessel into vibration. The noise created by the turbulent boundary layer is sometimes called flow noise. The excitation and re-radiation of sound by various structures of the vessel are an important source of hydrodynamic noise.

Of the three major classes of the noise just described, machinery noise and propeller noise dominates the spectra of radiated noise under most conditions.

B. SPECTRUM OF RADIATED NOISE

The summary of characterization of each component is presented by the spectrum. At high frequencies, its spectrum level decreases with frequencies at the rate of about 6dB/octave, or about 20dB/decade. At low frequencies, the spectrum level of cavitation noise increase with frequency [4]. The peak in the spectrum of cavitation noise which is for ship and submarines usually occurs within the frequency decade 100to1000 Hz. Fig (2) shows diagrammatically cavitation noise spectra for three combinations of speeds and depth for a hypothetical submarine.

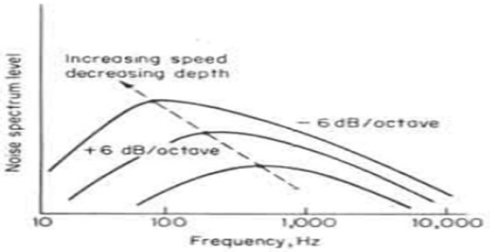


Fig. (2) Variation of the spectrum of cavitation noise with speed and depth

The behavior of the spectra peak is associated with the generation of larger cavitation bubbles at the grater speeds and the lesser depths and with the resulting production of greater amount of low frequency sound. At low frequency at the end of the spectrum, propeller noise contains discrete spectra blade rate components occurring at multiples of the rate at which any irregularity in the flow pattern into or about the propeller is intercepted by the propeller blades.

Fig.3, which shows the characteristics of the spectrum of submarine noise at two speeds one is low speed and other is high speed.

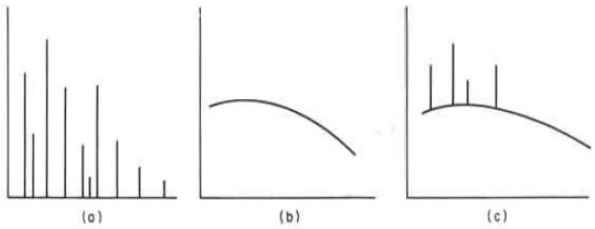


Fig.(3) Spectra of submarine noise

Fig 3 (a) and 3 (b) are diagrammatic spectrum at a speed when propeller cavitations have just begun to appear. Machinery lines, together with the blade rate lines of the propeller, dominate the low frequency end of the spectrum. At a higher speeds Fig. 1.3(c), the spectrum of propeller noise increases and shifts to lower frequencies. At the same time some of the line component increases in both level and frequency.

II. MODELING

Modeling is a method for systematize the knowledge build up through observations or deduced from underlying principles also modeling is a mechanism by which researchers and analyst can simulate sonar performance in laboratory conditions. Modeling is necessary to analyze the data collected in field experiments and forecast acoustic conditions for planning at sea experiment [5]. The modeling is distinguished into physical modeling and mathematical modeling. Physical modeling associated to theoretical or conceptual representation the physical processes occurring within the ocean and the term analytical model is sometimes used synonymously. Mathematical models include both empirical models (those based on observations) and numerical models (those based on mathematical representations of the foremost physics).

Mathematical models of noise in the ocean involve ambient noise models. Ambient noise models forecast the mean levels sensed by an acoustical receiver when the noise sources include surface weather, biologics and such commercial activities as shipping and oil drilling.

So in this paper we are dealing with empirical model which is the type of mathematical model for modeling of underwater ship radiated noise.

A. SHIP RADIATED NOISE MODEL

A continuous broadband background is presented by the spectrum of the ship radiated noise, the level of which increases with ship speed [6]. The Fig 4 shows the spectrum of ship radiated noise, it is maximum around 100 Hz.

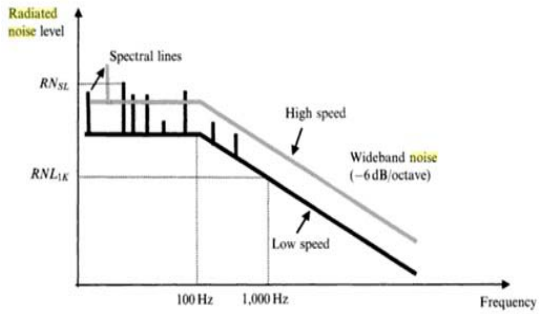


Fig.4 spectrum of ship- radiated noise

The radiated noise level RNL_{1K} at 1 KHz is know then the noise at the other frequencies is calculated from the below equation;

$$RNL(f) = RNL_{1K} - 20 * \log(f/1000) \qquad (1)$$

III. RESULTS

From the audio library of web resource DOSITS[7], the real time samples of radiated noise for large commercial ship, merchant vessel and tug boat was collected. The spectral analyses of all these samples were carried out in matlab the results are shown below

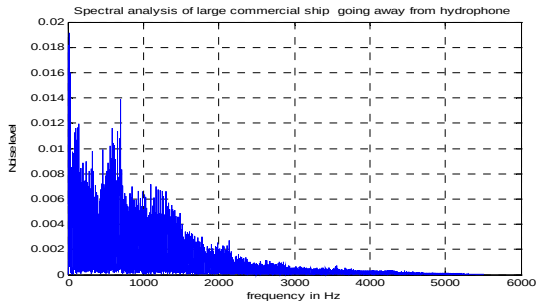


Fig 5.1 Spectrum of radiated noise by large commercial ship

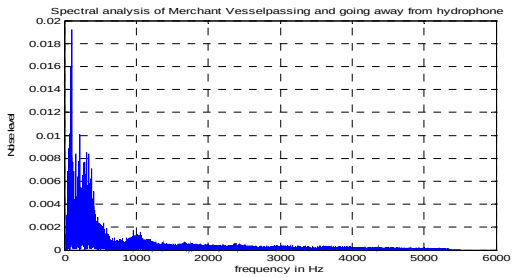
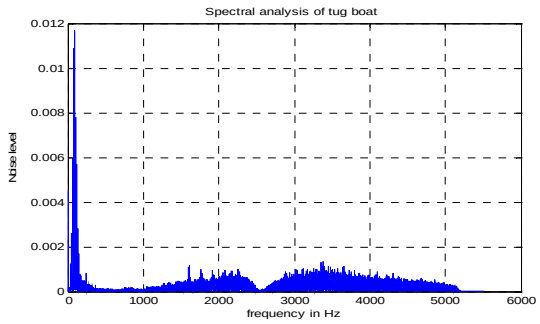


Fig 5.2 Spectrum of radiated noise by Merchant Vessel



5.3 Spectrum of radiated noise by tug boat

The Table 5 shows the values for radiated noise level at 1K for different types of submarines [6] and one tug boat,

Type	RNL_{1K}
Recent SSBN	100
Modern submarine electric	80
Submarine electric	120
Tug boat	170

Table 5 Noise radiated by different types of submarines and a tug boat

The significance from the Table 3.1 was used to estimate the noise radiated by the individual type of submarines and a tug boat at various frequencies using the equation (1), the modeled plots are as shown in Fig. (5.4, 5.5, 5.6, 5.7)

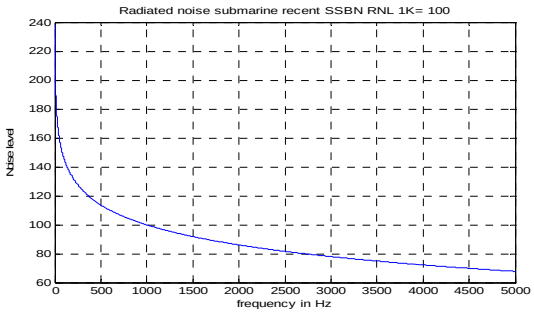


Fig 5.4 Estimated radiated noise for recent SSBN

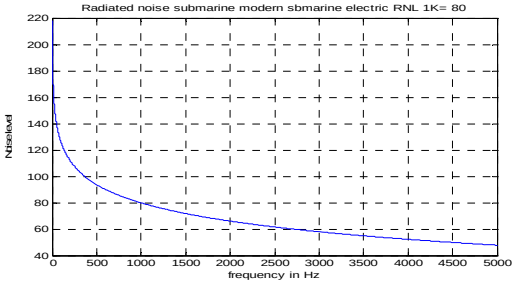


Fig 5.5 Estimated radiated noise for modern submarine electric

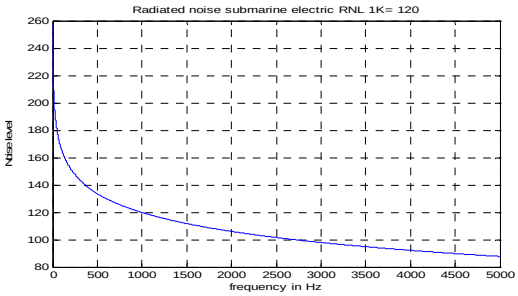


Fig 5.6 Estimated radiated noise for submarine electric

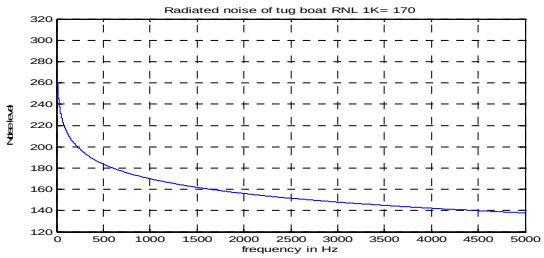


Fig 5.7 Estimated radiated noise for tug boat

IV. CONCLUSION

Using the mathematical Radiated noise model, if RNL_1K is known then we can easily estimate the component of noise at other frequencies as shown in Fig (5.4, 5.5, 5.6, and 5.7). The spectral analysis (Fig 5.1, 5.2 and 5.3) shows that the radiated noise is dominant in the frequency range upto 5 KHz. This spectral analysis using real time data shows that noise is dominant at low frequencies and at higher frequencies noise level decreases.

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TRANSMISSION RISK REDUCTION USING LSB REPLACEMENT ALGORITHM

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Abstract— This paper gives idea about for sharing the secret information without affecting its privacy. Steganography is a technique that hiding confidential information in such a way that no one, apart from the sender and intended recipient, suspects the existence of the message. Steganography has a number of applications. It is used for transmitting financial documents, banking applications, remote electronic voting applications, sharing secret information, authentication & validation. In day to day life information is increasingly important and gets more value when shared with others. To provide security for sharing information various techniques proposed for the Steganography. In this paper proposed a new technique of image steganography i.e. LSB replacement and Image encryption for providing more security to data as well as our data hiding method. In LSB replacement steganography replaces the last bit of each of the data values to reflect the message that needs to be hidden.

IndexTerms—Cryptography, Steganography, LSB, Encryption, Data hiding.

I. INTRODUCTION

Nowadays, information gets more value when shared with others. Due to internet, it is possible to share information like audio, video, images easily. Everyone wants to keep the secret information of work to be safe. But at certain level security related issues are there. Hackers access unauthorized data. Steganography and Image encryption are used to solve this problem.

Steganography is a technique that hiding confidential information in such a way that no one, apart from the sender and intended recipient, suspects the existence of the message. Generally this can be done by encoding the secret information. In this the secret message is made to hide in the cover image so that it couldn't be identify to any person that whether there is any message hidden in the information being shared. Steganography word is the combination of two Greek word "stegos" and "graphie". For the Greek word Stego means "cover" and graphie means "writing". Steganography is the art and science of secret communication. In practice it is encoding/embedding secret information in such a way that the existence of the information is invisible.

In this paper develop a LSB replacement algorithm for hiding data into the image. In LSB replacement steganography replaces the last bit

of each of the data values to reflect the message that needs to be hidden.

II. PROPOSED SCHEME

The block diagram of the Natural image based visual secret sharing using steganography is as follows. The block diagram consists of three modules such as feature extraction, encryption and hide-noise like share. The three meaningful shares can be of different types of images. These images can be of any type such as printed images, digital images, hand printed pictures, even flysheet etc.

A. Feature Extraction Module

Gray scaling includes black, white and also some shades of gray. Thresholding is the simplest method of image segmentation. From a gray scale image, thresholding can be used to create binary images In Password generation, calculate the number of black and white pixels. Then generate one key. This key is used for the encryption. When a large amount of noise clusters together, the image is severely disrupted; this makes it impossible for the naked eye to identify it. The pixels-swapping process is used to cope with this problem.

B. Encryption

Input: 3 natural images and one secret image.
Output: Noise-like share.

C. Hide the Noise-like Share

To reduce the transmission risk of share S, the share is concealed behind cover media by the data hiding process like Steganography. Steganography is art of concealing of message on a file within another message, word or file.

Input: Generated noisy share.

Process: The dimension of the cover image must be larger than that of the secret image. Least Significant Bit (LSB) embedding is a simple strategy to implement steganography.

Output: Stego Image.

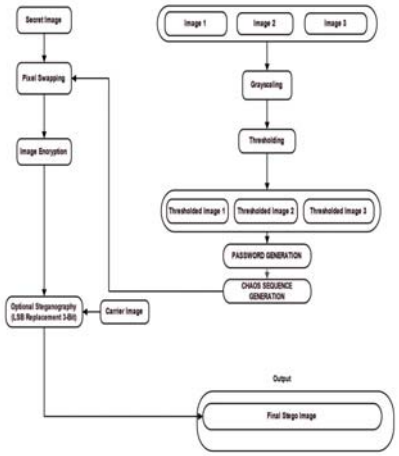


Fig .1

III. IMPLEMENTATION

A. Image encryption

1. Read the three images
2. Convert these three colour images into the gray scale.
3. Then convert into the thresholding.
4. Assume the initial value of the password is zero.
5. If x=y=0 then calculate black pixels.
6. If x=y=1 then calculate white pixels.
7. Add password value into the black and white pixels. Then we get the first password value.
8. In this way calculate the black and white pixels of the second and third image.
8. Then add the calculated black and white pixels in the first password value.
9. Then the password is generated using the three images.

B. LSB Replacement Algorithm

1. Read the carrier image.
2. Load the file path.
3. If not load the file then it shows that the file path is empty.
3. Initial value of key is 1.
4. If not written the key then default value of key is 1.
5. Otherwise written the key.
6. Read the file path and read the file size.
7. Calculate required length bits.
8. Hide the data serially.
9. Actual file data write
10. Then stego image is seen.

11. Load the stego image.
12. Enter the same key that used in steganography
13. Then performing the desteganography the data is hide in the image.

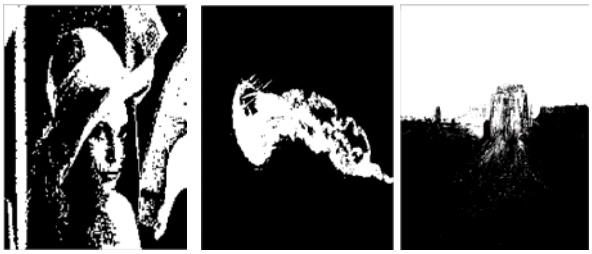
IV. EXPERIMENT AND RESULT

A. Image Password Generation

(a) (b) (c)

Fig.2 Original Images

We have implemented Image password generation algorithm on an images using MATLAB. First we have to take the original images figure (2) (a),(b),(c) . Then color to grey scale image conversion figure (3).



(a) (b) (c)

Fig. 3 Thresholding Images

Calculate the black and white pixel values using these 3 images. Initial value of the password is zero. This password
value is added in the calculated black and white pixel values .Then generates one key is 155408.

B. Result for the LSB replacement

Fig. 4 Carrier Image

Fig. 5 Secret Image

First we have taken the carrier image. Then take the secret image and enter the password. After applying the LSB replacement algorithm we get the stego image.

Fig. 5 Stego Image

V. CONCLUSION

We have implemented Image password generation algorithm and LSB replacement algorithm in MATLAB. Key is generated using Image password generation algorithm. This is used only for the encryption. Data is hiding using LSB replacement algorithm. This algorithm provides an easy way to hide secret information in images. Stego image is seen. In this image the data is hide so that it couldn't be identify to any person that whether there is any message hidden in the information being shared.

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TEST RIG DESIGN AND TESTING PERFORMANCE OF LINEAR BALL BEARING

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Abstract— over the past few years there have been advances in the improvement of bearings, in various engineering applications. In this paper experimental study has done to test the performance of linear ball bearings. These bearings are extensively used in automobiles, considering its application test rigs developed to carry out the endurance test and the hysteresis test of the linear ball bearing. These bearings are used to trim down the efforts of drivers in gear shifting mechanism. It is important that friction should be lesser in rolling element and selector rod as these bearings partially rotate and displace. This paper describes the test rig design and compares performance of the linear ball bearing under various significant parameters.

Keywords— (test rig, linear ball bearing,endurace, hysteresis)

INTRODUCTION

Now days the bearing behavior and performance analysis has been mainly based on few major aspects i.e. vibration analysis and endurance test. Each sample bearing is tested on the test rig regarding endurance test and vibration spectrum analysis under given operational spectrum analysis under given operational manner and from the test results most favorable bearing selection is made. Bearing life is also assessed by the accelerated speed tests.

Anti friction bearings, while in operation, are subjected to damage, which lead to decline in material strength of the bearing or to weakening of the qualities of the bearing. Vibration signature analysis is used on the test rig to identify the state of bearings without dismantling it and their conditions are assessed in accordance with requirements of the operating conditions and to minimize the effect of the intervening elements on the final received signal, the transducer is kept directly on the bearing outer race in test rig. Provision is also made to monitor vibration signature from the bearing housing.

On the bearing test rig high frequency resonance technique, a highly sensitive and accurate procedure for easily identification of impeding bearing failure can be used successfully. The technique can be used primarily for the smallest defect detection in the antifriction bearing [1].The vibration monitoring method is employed to examine various faults in bearing and it also give away prior information in case of progressive defects[1].

The following defect can be identified in bearings [2]

1) Distributed defects
2) Localized defects

Distributed defects generally happen due to manufacturing faults, poor installation or mounting and abrasive wear [3]. Distributed defects comprises of surface roughness, waviness, misaligned races and irregular diameter of rolling elements [4] - [5]. The variation in contact force among roiling elements and raceways due to distributed defects create an increased level of vibration. Hence, the study of vibrations generated by distributed defects is mostly for quality inspection of bearings and for condition monitoring [6].Localized defects consists of cracks, pits and spalls on rolling surfaces due to fatigue [7]. Localized defects speed up when the bearing is overloaded or subjected to shock (impact) loads during their functioning and also boost with the rotational speed [2]. Spalling can occur on the inner ring, outer ring, or rolling elements [2]

In automobiles especially in four wheelers driver requires more efforts in gear shifting mechanism. In recent years few technologies have come into the existence. Out of those linear bush ball bearing is considered as the economical as well as convenient. These machine elements are used to reduce the friction in the bearings which gives the ease to drivers while in shifting the gears [8]. In general these bearings are consists of balls cage and shell. The cage separates the group of balls in different rows and holds them within the inner and outer race. Inner race is shaft on which bearing is placed and it allows them to rotate freely. Bearings life is depend on the applied load and rpm. As these bearing are used in selector rods so it is difficult to lubricate. In this paper study has been done on the bearing without lubrications. The friction in a rolling bearing is depend on several factors I.e. magnitude and direction of load, speed and lubrication condition. Friction of any magnitude represents energy loss and causes retardation of motion [9].

Endurance testing refers to tests typically done to find out whether an application can bear up the processing load it is expected to have to endure for a long period. En- durance testing is a global employed technique to evaluate RCF of the bearing[10].In case of bearings to carry out the endurance test bearings are run to the L_{10} life in hours or in revolution and find out whether they can withstand for that specific load and rpm. Bearing endurance testing is performed to set up life ratings, conduct quality auditing, and evaluate material, heat treatment, internal geometry, and surface finish improvements. Great variation can be expected despite the fact that bearings are run under identical condition.

2. EXPERIMENTAL TEST

After studying the different test rig arrangements available with the world leading bearing manufacturers few antifriction test rigs are developed.

1) Endurance test

Before designing the actual test rigs some layouts are drawn for linear, angular and combined endurance test rigs. Angular (fig.1), linear (fig.2) and combined (fig.3) Specialty of this test rig is that from one test rig we can convert into three test set ups with little changes.

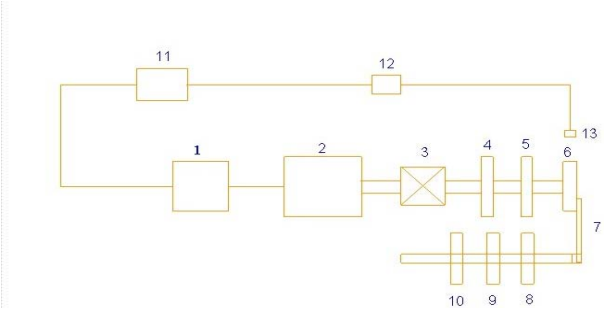

Fig.1 Angular test rig set up layout

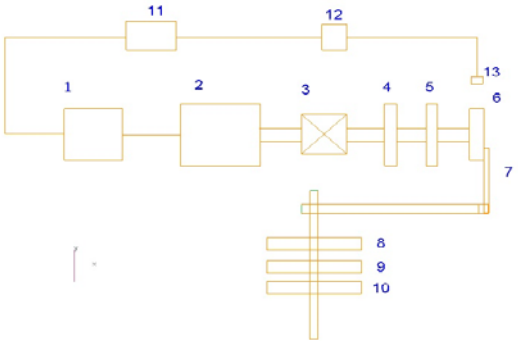

Fig .2 linear test rig set up layout

For Fig. 1&2

1-Drive

2-Motor

3-Coupling

4&5-Supporting ball bearing
6-T-Nut
7-mechanism
8&10-Supporting linear ball bearing
9-Test bearing (linear ball bearing) with accelerometer
11-Main supply
12-Digital counter
13-Sensor

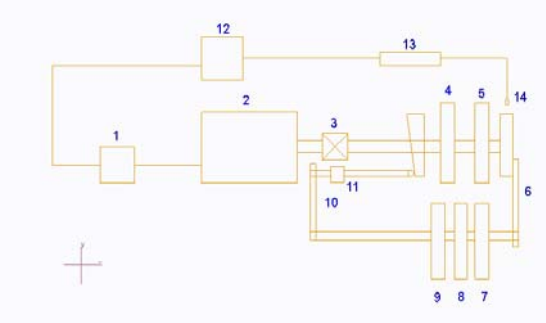

Fig.3 combine linear and angular test rig test set up

For Fig.3
1-Drive
2-Motor
3-Coupling
4&5-Supporting ball bearing
6-mechanism
7& 9-Supporting linear ball bearing
8-Test bearing (linear ball bearing) with accelerometer
10-link
11-Spring loaded cam and followe
12-Main supply
13-Digital counter
14-Sensor

RCF (rolling contact fatigue) life of bearings is relied on many factors such as bearing materials, material processing variables, lubricant system, elasto hydrodynamic (EHD) film thickness, contact stress levels and other environmental and operational effects [10]. The aim to carry out endurance tests on linear ball bearings, a laboratory test-rig has been designed and realized. The implemented test rigs as shown in Figure 4, 5 and 6 are composed by a 0.75 kW ac motor able to reach a maximum rotational speed of 1300 rpm, speed control performed by means of drive. The motor is rigidly fixed. The rotating shaft, connected to the motor is supported by two bearings with single row deep groove ball bearing, lodged in two housing fixed on the external structure. End of the shaft. Four bar mechanism has been used to carry out the angular motion test. In the same test changing the position of four bar mechanism with the help of end rod linear motion has been achieved. Two support bearings are used to support the test bearing. The load has been applied on the test bearing. Proximity sensor has used to count the revolution of shaft (rpm).In the same set up with little alteration oscillation and displacement has been achieved. For achieving it spring loaded roller cam and follower mechanism is used.

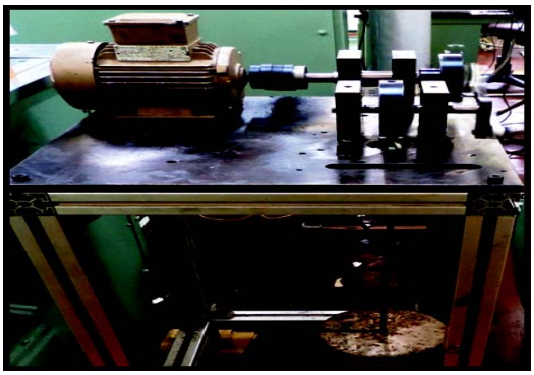

Fig.4. Endurance test set up for angular test

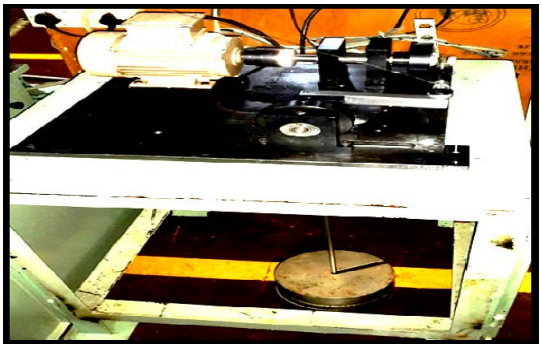

Fig.5. Endurance test set up for linear test

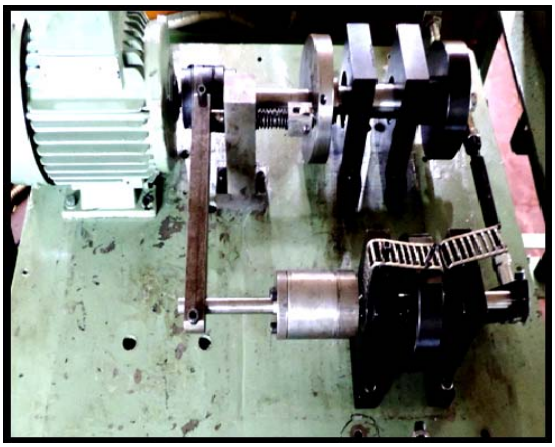

Fig.6. Endurance test set up for combined angular and linear

2) Hysteresis test set up

Hysteresis test set up has been developed to find the friction resistance of the linear ball bearing. In this set up displacement sensor has been used to find out the displacement of the shaft and force sensor is used to measure the force required for to and fro motion of the shaft in test bearing. For giving the motion to shaft scotch yoke mechanism has been used. This gives smooth motion to the shaft. Considering the application of the linear ball bearing speed of the shaft is maintained.

Fig.7. Hysteresis test set up

3. RESULT AND DISCUSSION

The average chemical composition (in wt %) of steel (from Spectra analysis) was found to be Fe: 95.91%, C: 1.12%, Mn: 0.43%, Si: 0.36%, Cr: 1.6%, S: 0.027%, P: 0.024%, Ni: 0.24%, Cu: 0.26%, Mo: 0.04%. It can be seen that the compositions are reasonably close to the nominal composition of SAE 52100 steel [11]. Since the aim of the experimental campaign is the testing performance of linear ball bearing the first endurance test is performed with a light load. Then eventually load increased 100N, 150N, 200N and 250N load. After every endurance test, bearings visual and geometrical parameters checked.

In fig.8 it's described that in first case 50N load is applied and the set up is run for 120 rpm for 2.5 million revolutions. This test is carried out for all the three motions of bearing: linear, angular and combined (linear and angular) then the test bearing is removed from the test rig. And test bearings visual inspection (spalling, indentation marks, and cracks) and geometrical inspection (ID, OD, width of the bearing, cage, shell, ball and shaft) is done. No deformation was observed in the bearing and all the dimension were within the tolerance of the bearing so it is considered as 0% deformation. Fresh bearing is used for the new loads 100N, 150N, 200N and 250N and the test is carried out for 120 rpm. Each load bearing passed the test and no deformation observed. Bearing passed the endurance test for 120 rpm.

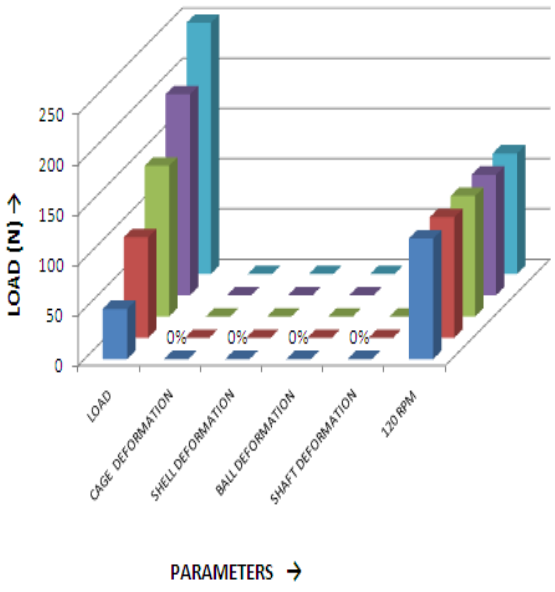

Fig.8 Endurance test for 120 rpm

In fig.9 it's described that in first case 50N load is applied and the test rig is run for 300 rpm and after completion of test, bearing is removed from the test rig. Test bearings visual

inspection (spalling, indentation marks, and cracks) and geometrical inspection (ID, OD, width of the bearing, cage, shell, ball and shaft) is done. No deformation was observed in the bearing parts and all the dimension were within the tolerance of the bearing. Fresh bearing is used for the new loads 100N, 150N, 200N and 250N and the same test is carried out for 300 rpm. Each load, bearing passed the test and no deformation observed. Bearing passed the endurance test for 300 rpm of linear angular and combined (linear and angular).

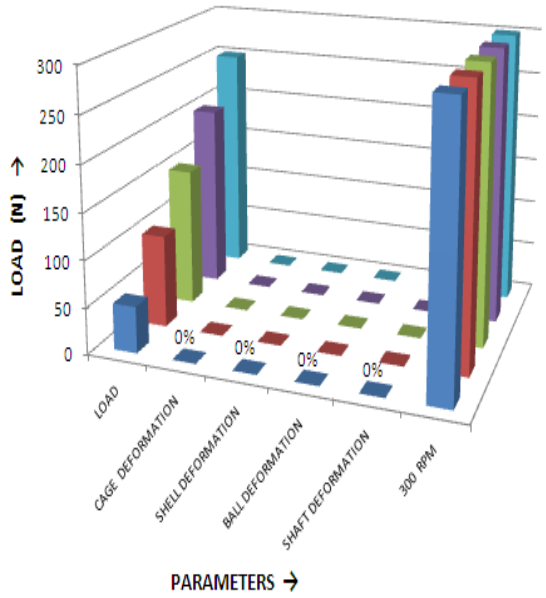

Fig.9 Endurance test for 300 rpm

In fig.10 it's described that in this case rpm is increased to 600 rpm. Initially 50N load is applied and the test rig is run for 600 rpm and after completion of test, the test bearing is removed from the test rig. Its visual inspection (spalling, indentation marks, and cracks) and geometrical inspection (ID, OD, width of the bearing, cage, shell, ball and shaft) is done. No deformation was observed in the bearing parts and all the dimension were within the tolerance of the bearing. Fresh bearing is used for the new loads 100N, 150N, 200N and 250N and the same test is carried out for 600 rpm for each load bearing passed the test and no deformation observed. In loading zone rubbing marks observed in combined test. Bearing passed the endurance test for 600 rpm

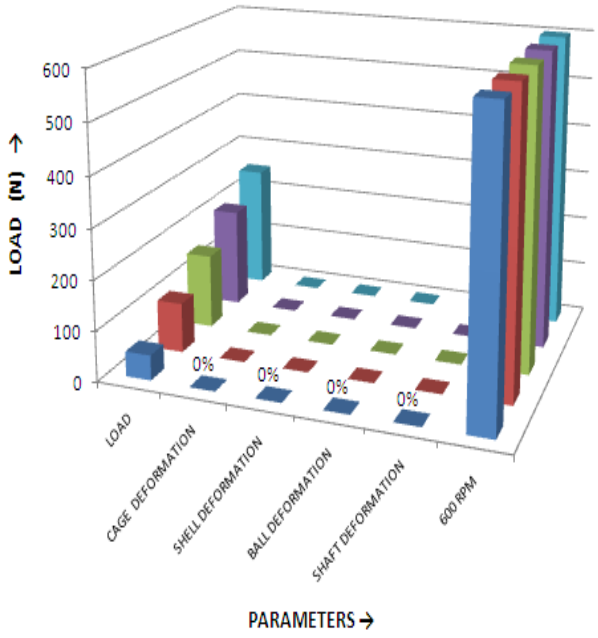

Fig.10 Endurance test for 600 rpm

Hysteresis test (Ref.Fig.11) is carried out for load 50N and 250 N for constant speed of 8 mm/s for cage stroke (mm). It requires less amount of friction force for displacement of shaft in case of 50N load as compare to that of 250N load.

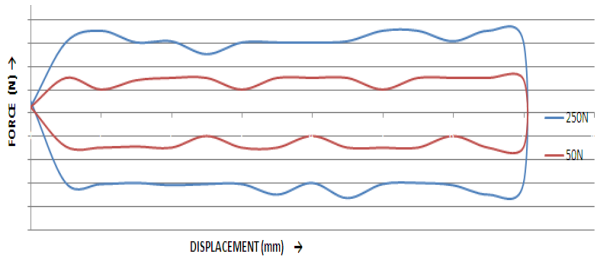

Fig.11 Hysteresis graph for 8 mm/s (exaggerated view)

In fig.12 speed of the set up increased to 14 mm/s for cage stroke and friction force required was less compare to friction force required for 8mm/s.

The Friction force depends on the applied load, speed of shaft and the surface finish of the balls.

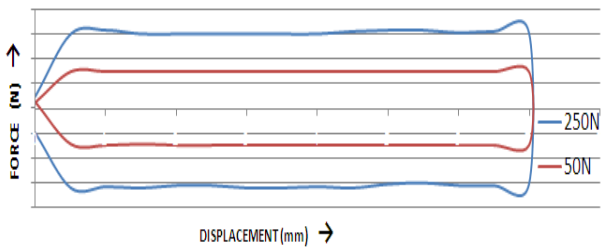

Fig.12 Hysteresis graph for 14 mm/s (exaggerated view)

4. CONCLUSIONS

In this paper discussion of test rig design has been done. This paper describes the endurance test and hysteresis test for various load, rpm, and speed. This research is started because in real life application driver require more force while shifting the gears, in this paper various loads has been used to check the endurance life of the bearings for 2.5 million revolutions. Considering the exact application in automobile same motions given to the bearings and test successfully passed for load 50N, 100N, 150N, 200N and 250N and rpm 120 rpm,300 rpm and 600 rpm. In hysteresis test bearing speed is varied from 8mm/s to 14 mm/s for low speed friction was more, compare to high speed. As speed increased friction force reduced. In this test it's observed that for low load friction force required was less compare to high load. And for high speed friction force was low compare to low speed.

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MIGRATING TOWARDS DATA AS SERVICE IN CLOUD COMPUTING

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Abstract—Cloud Computing is growing rapidly and clients are demanding more services and better results, it has become a very interesting and important research area for resource, platform, infrastructure and data management . Many technologies are suggested to provide and implement various components of an organization as a service. The purpose of this paper is to elucidate the idea of the cloud and to identify the benefits of data as a service in private cloud. Data as a service (DaaS) is essential service model in cloud environment.

Keywords: Cloud Computing, DaaS.

I.INTRODUCTION

Cloud computing is a result of evolutionary computing changes over the years

A. Mainframe Computing

In the past companies used to rely on mainframe architec- ture (in one location, computer stored data and ran appli- cations) to store their information. All software applications used to run on the mainframe hardware. In mainframe it was relatively easy to assist multiple applications, the problem was maintaining the huge chunk of hardware which was costly and inefficient. The major issue with mainframe is the maintenance. Maintaining the hardware and software requires a lot of resources like physical space, power supply, man- power, technology and cooling mechanisms. Also since the mainframe is situated in one location the efficiency degrades when coupled with networked architecture

B. Distributed Computing

With lower computing costs and ease of access to high powerful applications, people started switching to distributed computing. In distributed computing the mainframe was re-placed with cheaper computers each with data storage and application executing capabilities. This computing solution was relatively easier to manage as each computer works independently. However it is difficult to coordinate between computers in distributed computing.

C. Grid Computing

At the elementary level, grid computing can be defined as a network of computers where each computer can have an access of every other computer's resources. The users can access pro-cessing power, storage and memory of other computers in the given network for specific tasks. A grid computing system is basically an agglomeration of identical tasks executing on the

Same operating system. In grid computing, CPU scavenging and shared computing create a grid from unused resources in a network. This makes use of desktop computer instruction cycles which are unused when no execution work is done[2].

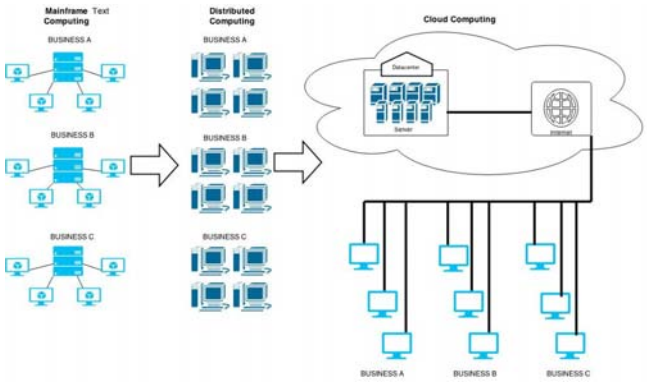
D.Cloud Computing

Cloud computing has become very prominent in the con- temporary years. The Cloud provides a variety of services for its users such as Software As A Service, Platform As A Service, Infrastructure As A Service which provides Hardware As A Service and also Data As A Service. One of the main advantages of cloud is that it provides ease and convenience in accessing the data[9]. Recently, there has been an increase in the number of private organizations making use of private cloud for smart and efficient data access and usage. But along with these, there exist many problems in the Cloud which needs to be improved such as security of the Cloud, compatibility issues, compliance of the cloud etc. However, there still lies a problem with those clouds offering Data As A Service which is improving the techniques to make the data accessible easily and quickly. At, the same time, it should be taken care that only the authorized and permitted users are allowed to view, modify and delete the files[10].

II. CLOUD PRELIMINARIES

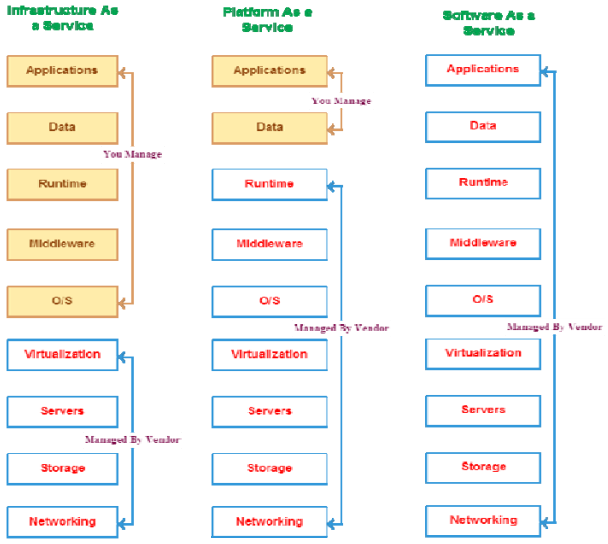
A. Evolution of Cloud

Cloud computing luckily for us, today we have the cloud, which offers a slew of advantages to the computing world. As a very general definition, the cloud is a shared network of computers through which people and companies store data and run software. At the hub, the cloud is actually a data center, which is a physical building consisting of hardware (computers) and software running on that hardware, connected by a channel of pipes and routed to many, many computers[1]. Cloud service providers, who maintain and manage these networks, offer services rather than products in that clients are allowed to access and use the cloud, but they do not own any part of it; there is no hardware or software installation[12].



Fig(1): Evolution of Cloud.

Levels of Cloud Services Cloud providers offer multiple levels of services, depending on the client's needs.



Fig(2): Types of Services offered by cloud

Level 1: Infrastructure as a Service (IaaS) The elementary level of cloud services is cloud infrastructure. Clients using cloud infrastructure basically buy an operating system the cloud provider manages the systems CPU, memory and pro- cessing. Everything else is up to the client to configure and maintain. This type of cloud service is known as Infrastructure as a Service (IaaS)[7].

Level 2: Platform as a Service (PaaS) The next level of cloud services is cloud platform. Providers of cloud platform deliver a more comprehensive environment in which the client can develop and deploy applications. The client only needs to worry about designing and implementing software specifically for the application. This branch of cloud computing is called Platform as a Service (PaaS) [7].

Level 3: Software as a Service (SaaS) The third level of cloud services is cloud applications. The cloud provider hosts the application, so the client is simply a user of the application. The data associated with this software is stored in the cloud, so the client can interact with the application (also known as a web app) through their web browser. This type of cloud computing is called Software as a Service (SaaS)[7].

B. Data as Service

Data as a Service (DaaS) helps to access data which is critical for business in a secure, cost-effective and timely manner. DaaS works on the lines that important and meaningful data can be transported to consumers on demand without the interference of institutional and geographical boundaries between customers and service providers. DaaS removes redundancy and lowers affiliated expenses. It stores significant data in a single location and permits multiple users to use/modify data using a single point of update. First DaaS was used in web mashups, now this strategy is used by commercial and corporate organizations

C. Benefits of Data as Service

Agility: The movement of customers is not restricted because data access is simple plus one doesn't need vast knowledge of the concealed data. The changes are minimal for implementation of different data structures and location requirements.

Cost-Effectiveness: The service providers can construct the base with data professional and the presentation layer can be outsourced. This makes the user interface cost-effective and the requests of changes at the presentation layer very easy to implement.

Data Quality: The control of data access is done with data services which help to improve data quality by using the single point of updates. First these services are tested comprehensively and then they undergo regression testing.

D. Drawbacks of DaaS

The drawback is that the customers will have to rely on the service providers for privacy, security and server downtime avoidance. In DaaS the data operations are restricted READ operations and data is not allowed for download. The other operations like create, update and delete cannot be performed

E. Pricing models of DaaS

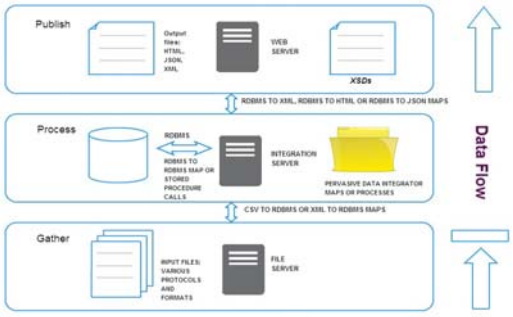
The DaaS providers demand payment from their customers based on two pricing models.

Volume based models: The providers charge on basis of the quantity of data the customers want to use or the number of calls the customer makes to the API.

Data type based Model: The providers charge depending on the type of data used. Example: financial, geographical, historical data.

F. Architecture of DaaS

DaaS gathers all the input files through different formats and protocols. It then processes all the files with the help of RDBMS. After processing it then publishes the HTML, JSON or XML file through the web server. The file transfer server and integration server forms the intermediary.



Fig(3): Architecture Of DaaS

Types of Cloud

Public Cloud: Public cloud services are available for public users where users from all over the internet can access the resources. They are very highly scalable and have moderate reliability. The security of the public cloud totally depends on the service provider and this could be a disadvantage sometimes with all people accessing the same resources. The performance is low to medium and it is cheaper than the IT infrastructure which was traditionally used.

Private Cloud: Private cloud is build up with existing priv-ate infrastructure. This type of cloud has some authentic users who can dynamically provision the resources. Scalability is limited but reliability is very high. There is very high class security. Performance of private cloud is better than public cloud. Owning a private cloud is expensive compared to public cloud.

Hybrid Cloud: Whenever private cloud resources are un-able to meet user's quality-of-service requirements, these systems partially composed of public cloud resources and privately owned infrastructures, are created to serve the or-ganizations needs. These are often referred as hybrid clouds, which are becoming a common way for many associates to start examining the possibilities offered.

Community Cloud: Different types of cloud integrated together to meet a common or particular need for some organization is called as a community cloud. Scalability is limited and reliability is very high. Security offered is high and performance is very good. Owning a community cloud is more expensive than owning a private cloud.

H. Benefits of Cloud

Cloud requires low investment where customer does not need to purchase the resources, that's why it's the favorite of startup companies as they do not need heavy investment in setting up an IT firm. It removes IT infrastructure management overhead and provides immediate access to a wide variety of applications and services. Elasticity plays an important role in the popularity of cloud where the computing demand grows and reduces dynamically according to the present resource requirements. Cloud leads to green computing as it results in reduction of power consumption.

I. Concerns Regarding Cloud

The blocks in the path of cloud transformation in com- panies are lack of control, security, reliability and interoper- ability which the cloud provider must address. Solutions are needed to solve these problems in accordance to the needs of the users. The cloud infrastructure to be used should be secure, security must be up to date and must be backed up for recovery[6].

J. Cloud Computing Architecture

Cloud computing architecture consists of the elements and sub-elements required for cloud computing. These ele- ments typically consist of a front end platform (for eg. thick client, thin client, mobile device), back end platforms (for eg: servers, storage), a cloud based delivery, and a network (for eg.: Internet, Intranet, Intercloud). When these elements are put together, cloud computing architecture is made[4]. Thick Client: It is a computer (client) in clientserver architecture or networks that typically provides rich functionality independent of the central server. It is also known as a fat client or heavy, rich, or thick client

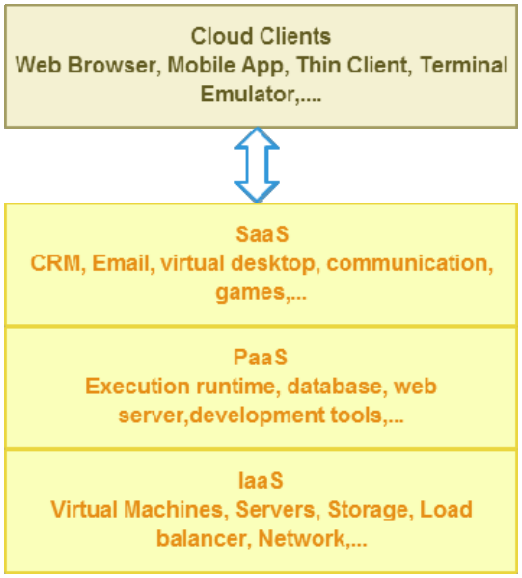
Thin Client: It is a computer or a computer program that depends heavily on another computer (its server) to fulfill its computational roles.

Mobile device: It is basically any handheld computer which is enabled with mobility. It is designed to be extremely portable, often fitting in the palm of your hand or in your pocket. This portable computer will have same services as given by any non portable device. These devices are popular nowadays

Servers: It is a running instance of an application which is capable of accepting requests from the client and giving responses

accordingly. Servers can run on any computer including dedicated computers, which individually are also often referred to as "the server".

Storage: Computer data storage, often called storage or memory, is a technology consisting of computer components and recording media used to retain digital data. It is a core function and fundamental component of computers. Data can be stored using different technologies and devices.



Fig(4): Architecture Of Cloud.

III. CONCLUSION

Cloud Computing is in vogue today. It is being used in various commercial organizations for reduced cost of com- puting, scalability and flexibility. Cloud providers offer various services in the form of applications, platforms and infrastruc- ture. Cloud also has its classification into public, private, hybrid and community cloud according to the nature of services being implemented. Cloud facilitates its users to store data and install applications in its store which can be accessed and update from anywhere. Cloud Computing also leads to reduced carbon footprints as the infrastructure otherwise required is minimal. The main obstruction in the way of cloud computing is security and privacy problems. Efforts are being made to resolve these issues so that one can have a carefree cloud experience. DaaS is now fast coming into the cloud business with its distinctive advantages over others.

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STUDY OF SAND COMPOSITION ON MOULD PROPERTIES AND SELECTION OF TAGUCHI ORTHOGONAL ARRAY FOR DESIGN OF EXPERIMENTS

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ABSTRACT

The quality of castings in green sand mould is influenced by its properties such as green compression strength, green shear strength, permeability etc. The relations of these properties with the input parameters like sand grains size, shape, binder, clay is complex in nature. Binders play a vital role on green sand mould to enhance specific mould properties. The mould properties such as compression strength, permeability, hardness & shear strength have been studied & comparison have made with different binders. As per the study, for steel casting, we require 3% to 5% moisture content and 7% to 9% clay content respectively. Cause and effect diagram has been used to identify the different caused for casting defects. For optimizing the mould properties, Taguchi parametric design is studied and L9 orthogonal array is selected to find out optimal solution.

Key words: Permeability, Green compression strength, Taguchi parametric design, Cause and effect diagram

1. INTRODUCTION

Casting is one of the important and versatile processes of manufacturing. Its prime purpose is to form solid or hollow objects, parts, etc. of desired shapes, sizes, etc. Incorrect sand condition result in the production of scrap. It is for this reason that majority of foundries today require costly laboratories for controlling existing foundry sands and for testing new sands to discover their foundry suitability. Foundry sand control can only by testing of all the raw materials; sands, binders, and additives prior to the preparation of the sand mix. Sands found in different locations can have wide variations in surface, physical, and chemical characteristics due to environmental, ecological, climatic and geological factors. Different sands have different foundry properties. One cannot therefore be sure of the suitability of a sand for casting a given metal until standard necessary laboratory tests are properly carried out on it.

Permeability is defined by the AFS as the physical property of molded sand, which allows

the gases to pass through it. It is determined by measuring the rate of flow of air (2000 cm^3) through the metric standard rammed specimen (Ø50 mm×50 mm in height) under a standard pressure (10 g/cm^2). The amount of clay and moisture content has a significant role in improving the strength and permeability of green sand mould and it should be controlled to get defect free castings. For example, green sand properties for a mould prepared by using a jolt /squeeze machine are water (3-4%), live clay (5.5%) and permeability (80-110) while for the mould prepared by using a high pressure are water (2.5-3.2%), live clay (6-10%) and permeability (80-100) .

Clay (Bentonite) act as a binder, mixes with water to bind the sand particles and can be maintained in the range 5-7% to produce mould with better refractoriness and higher permeability If the clay content is higher in the sand mixture, the permeability is lowered due to fine clay particles occupied in the available spaces between the sand grains.

Water content in the mixture of 1.5% to 8%, activates the clay in the sand, causes the aggregate to develop plasticity and mold strength. Without water addition, no strength would be achieved, as the sand and clay would be just two different dry materials Too little water fails to develop adequate strength and plasticity where sands and clays grains are combined together apart thus the permeability is very poor. The clay adsorbs the water up to a limiting amount. Only the water rigidly held (adsorb) by the clay appears to be effective in developing strength and permeability. The development of bond strength between the grains depends upon on the hydration of clay. The green strength and permeability of a moulding mixture increases with water content up to an optimum value determined by the proportion of clay. Above this value, an additional % of water causes the permeability to diminish due to the increasing of the thickness of the water films. So, the clay becomes soft, lose its bonding power and less stiff and the sand grains are held further apart thus decrease the strength. Therefore, excess moisture must be avoided since it lowers the permeability and increases the chance of a blown casting. At the same time, plasticity and deformation of the mould will occur. Low permeability and green compression strength encourage the entrapment of gases and the washing away of sand by molten metal.

Figure 1 shows the effect of increasing the water content and the comparison between the sand mixtures bonded with 4% and 6% clay on the permeability of the moulding sand.

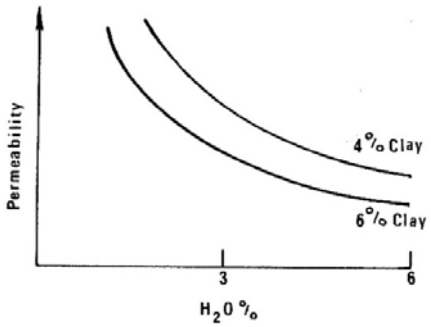

Figure 1: Effect of moisture content and clay on permeability

2. TAGUCHI METHODOLOGY

The Taguchi method involves reducing the variation in a process through robust design of experiments. The Taguchi method was developed by Dr. Genichi Taguchi of Japan who maintained that variation. The experimental design proposed by Taguchi involves using orthogonal arrays to organize the parameters affecting the process and the levels at which they should be varies. This allows for the collection of the necessary data to determine which factors most affect product quality with a minimum amount of experimentation, thus saving time and resources.

2.1 The Taguchi process

- Problem identification
- Brainstorming Session (identify: factors, factor settings, possible interactions, objectives)

- Experimental Design (Choose orthogonal arrays, design experiment)
- Run Experiment-Analyze Results
- Confirmation Runs

2.2 Parameters and level selection:

Cause and effect diagram is constructed as shown in Fig. 2 to identify the casting process parameters that may influence green sand casting defects. The process parameters can be listed in five categories as follows:

- Mould-machine related parameters
- Cast-metal related parameters
- Green-sand-related parameters
- Mould-related parameters
- Shake-out-related parameters

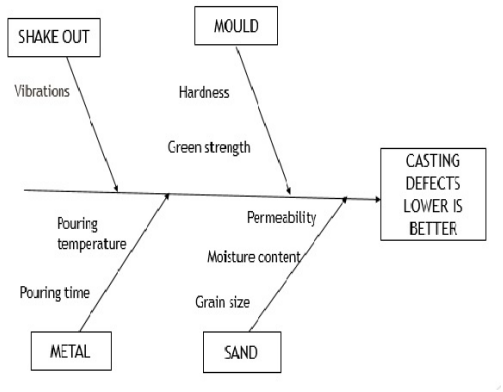

Figure 2: Cause and effect diagram for casting defect

From Fig. 2, we observe that sand related and mould related parameters are selected because, they have major impact on occurrence of selected casting defects. The selected casting process parameters, along with their ranges, are presented in Table 1.

Table 1: Parameters and their levels

Parameters	Level 1	Level 2	Level 3
Silica grains	Type 1	Type 2	Type 3
Clay %	7	8	9
Moisture %	3	4	5

Cause and effect diagram is a quality control tool that enables one to a systematic listing of causes (factors) that may lead to performance deviation or poor quality (effect). It is also called as fish bone diagram because of its appearance. This approach defines the problem clearly and lists all the possible factors contributing to the problem. It must be prepared after a brainstorming session and after gathering the opinion of as many people as possible in order to identify all the relevant factors (or causes). From Figure 2 it is clear that for this case the Signal to Noise ratio required is lower is better.

For lower-is-better characteristic, we use following equation:

$$\frac{S}{N} = -10log10\sum_i \frac{y_i^2}{n} \quad (1)$$

2.3 Selection of orthogonal array

Once the problem is identified and the factors contributing to the problems are listed in the form of Cause and effect diagram, the next step is to identify the appropriate number of variables and the range (treatment levels) over which these variables would be tested. A design matrix is then constructed between the number of variables and the range over which they are tested. This type of specially designed matrix is called Orthogonal Array (OA).

Table 2: Rules for selecting orthogonal array

(When level and parameters are same)		(When level and parameters are not same)	
Number of Factors	**OA to be Used**	**Number of Factors**	**OA to be Used**
2-4	L_9	2-3	L_4
5-7	L_{27}	4-7	L_8
		8-11	L_{12}
		12-15	L_{16}

A Taguchi OA is denoted by $L_N(S^m)$, where 'N' is the number of experiments/test to be conducted, 'S' is the levels at which these experiments is to be conducted, 'm' is the number of variables/factors chosen in an N×m matrix, whose columns are mutually orthogonal.

That is, for any pair of column, all possible combinations of factor levels appear equal number of times. For example, if a process is identified which consists of three variables and each variable has to be run at three different levels, then the actual number of experiments to be conducted will be 27 experiments have to be performed for optimizing a process. This design is called full factorial design. However, in many practical situations it is sufficient to run only a fraction of these full factorial experiments. This helps conserve both time and other valuable resources; therefore, for three factors running at three levels, one may obtain much information by conducting only 9 experiments using L9 (3^3) OA of 9×3 matrix (as given by Taguchi's standard OA) rather than conducting 27 full factorial experiments as shown in Table 3. The various OAs can be obtained from Taguchi's standard catalogue which is widely used.

Table 3: L_9 Orthogonal array

Experiment run	Level 1	Level 2	Level 3
1	1	1	3
2	1	2	2
3	1	3	1
4	2	1	2
5	2	2	1
6	2	3	3
7	3	1	1
8	3	2	3
9	3	3	2

CONCLUSION:

For improving the quality of casting we have to select the sand properties in appropriate range. For this we have to optimize the process parameters like silica grains, moisture and clay content. For this the knowledge of sand properties and effects should be known. The authors have investigated the desired ranges of process parameter for improving the quality by Taguchi. The L_9 orthogonal array was selected to carry out the further experimentation.

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MODELING AND STRESS ANALYSIS OF COMPOSITE MATERIAL FOR SPUR GEAR UNDER STATIC LOADING CONDITION

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Abstract-
Spur gear is the simplest & widely used in power transmission system. A spur Gear is generally subjected to bending stress which causes teeth failure. However it is observed that performance of the spur gear is not satisfactory in certain applications and therefore it is required to explore some alternate materials to improve the performance of the spur gears. Composite materials provide adequate strength with weight reduction and they are emerging as a better alternative for replacing metallic gears. In this work, A metallic gear of Alloy Steel is replaced by the composite gear of 30% Glass filled Poly-ether-ether- Ketone (PEEK). Such Composites material provides much improved mechanical properties such as better strength to weight ratio, more hardness, and hence less chances of failure. In this work, an analysis is made with replacing metallic gear with composite material such as PEEK so as to increase the working life of the gears to improve overall performance of machine. Finally the Modeling of spur gear is carried out using SOLID WORK and bending stress analysis of spur gear is carried out using ANSYS V14.

Keywords- Composite Material, Modeling, Bending stress, Static Load, Finite element analysis.

INTRODUCTION

Composite materials are engineered materials made from two or more constituent materials with significantly different physical or chemical properties which remain separate and distinct on a macroscopic level within the finished structure. The upcoming requirement of power saving and efficiency of mechanical parts during the past few years increased the use of composite materials.

Composite materials are preferred in place where lighter materials are desired or required without sacrificing strength. nowadays, composite materials are used in large volume in various engineering structures including spacecrafts, airplanes,automobiles, boats, sports' equipments, bridges and buildings. Widespread use of composite materials in industry is due to the good characteristics of its strength to density and hardness to density

Parameters	GF 30 PEEK	NICKEL CHROME STEEL
DENSITY	1320 kg/m^3	7800 kg/m^3
MODULUS OF ELASTICITY	4000-4200 Mpa	200000 Mpa
TENSILE STRENGTH	90-100 N/mm^2	413.61 N/mm^2

Table 1. Properties of Materials

BACKGROUND

The spur gear transmits mechanical energy from a prime mover to an output device. The spur gears are used in heavy and low duty mechanical devices. But in this study we have emphasized on the low duty application like Textile machines, Printing press machines, Robotic mechanism etc. The major problems observed with existing metallic Spur gear are

- Existing gear is made of metal component provides poor weight to strength ratio.
- Metallic parts lead to corrosion so need to properly shielded.
- More wear in between the gears so required proper lubrication.
- Gears are getting costly due to increasing metal prices.
- Due to poor weight to strength ratio power losses in gear are higher.

Thus gear needs to be redesigned providing energy saving by weight reduction, providing internal damping, reducing lubrication requirements without increasing cost. Such a scope is provided by application of composite material providing solution to other existing problems in current gears available. Therefore this work is concerned with the replacement of existing metallic gear with composite material gear in order to make it lighter and increasing the efficiency of mechanical machines

LITERATURE REVIEW

R. Yakut et al. The purpose of the paper is to examine the load capacity of PC/ABS spur gears and investigation of gear damage. Further in this study usability of PC/ABS composite plastic material as spur gear was investigated and was defined that PC/ABS gears were tested by applying three different loading at two different numbers of revolutions on the FZG experiment set.The experiment result summarized that the usage of PC/ABS materials brings an advantage in many industrial area because such materials are durable against flame, air, ultraviolet lights and holding lower moister than PA66 GFR 30 materials. The another result of this study was that good operating condition are comprised at low numbers of revolution and the tooth loads. Further the suitable environmental condition must be revolutions and the tooth load for gears. PC/ABS gear should be preferred at low tooth and unwanted high power transmission.[1]

V. Siva Prasad et al. This paper describes design and analysis of spur gear and it is proposed to substitute the metallic gears of sugarcane juice machine with polymer gears to reduce the weight and noise. A virtual model of spur gear was created in PRO-E, Model is imported in ANSYS 10.0 for analysis by applying normal load condition. The main purpose of this paper to analysis the different polymer gears namely nylon, polycarbonate and their viability checked

with counterpart metallic gear like as cast iron. Concluding the study using the FEA methodology, it can be proved that the composite gears, if well designed and analysed, will give the useful properties like as a low cost, noise, Weight, vibration and perform its operation similar to the metallic gears. Based on the static analysis Nylon gear are suitable for the application of sugarcane juice machine under limited load condition in comparison with cast iron spur gears.[2]

Vivek Karaveer et al. This paper presents the stress analysis of mating teeth of the spur gear to find maximum contact stress in the gear tooth. The results obtained from finite element analysis are compared with theoretical Hertz equation values. The spur gear are modeled and assembled in ANSYS DESIGN MODELER and stress analysis of Spur gear tooth is done by the ANSYS 14.5 software. It was found that the results from both Hertz equation and Finite Element Analysis are comparable. From the deformation pattern of steel and grey cast iron, it could be concluded that difference between the maximum values of steel and grey CI gear deformation is very less.[3]

Mahebub Vohra et al. In this paper, Metallic material Cast iron and Non Metallic material Nylon are investigated. The stress analysis of the lathe machine headstock gear box are analyzed by finite element analysis. Analytical bending stress is calculate by two formula Lewis formula and AGMA formula. Analytical results is compared with the finite element method result for validation. Concluding the study, we observed that finite element method software ANSYS have values of stress distribution were in good agreement with the theoretical results. Besides non metallic material can be used instead of metallic material because non metallic material provide extra benefits like as less cost, self lubricating, low noise, low vibration and easy manufacturing.[4]

M. Patil et al. The objective of this paper is to study the free vibration behavior of composite spur gear using finite element method which is also known as first order shear deformation plate theory (FSDT). The finite element analysis has been carried out for composite gear as a 4 nodded and 8 nodded quadrilateral element with each nodes has five degree of freedom. Finite element formulation of composite gear is modeled and coded using MATLAB. Based on the numerical analysis which is carried out for of spur gear the following important conclusion can be drawn. The developed MATLAB code is validated with the available result and it can be concluded that the present FE code result are in good agreement with those of reference. Fundamental frequencies obtained for composite spur gear using MATLAB are presented. It is found that natural frequency increases with increase in fiber orientation.[5]

Nitin Kapoor et al. In this paper the parametric model of differential gear box is developed using some parameters i.e. (number of teeth, Pressure angle, helix angle, tooth thickness, module) in CATIA-V5 and weight analysis of differential gear box for different

material (aluminium alloy, alloy steel, cast iron, Glass filled Polyamide) under static loading condition using FEA. The case study shows that the composite material can be used effectively in place of metallic material because the weight of Glass filled Polyamide composite material of differential is reduced by 60% Comparing with the traditional materials (Aluminium alloy, Alloy Steel, Cast iron). So, we conclude that Glass filled Polyamide Composite material is selected as a best material for differential gear box.[6]

A.D. Dighe et al. In this study the comparative performance spur gear of 30% Glass filled PA66 and 30% Glass filled PEEK was investigated at different torque and speed. Wear test of the spur gear pairs and the experiment spur gear tooth were performed on a FZG test machine. A weight loss is measured by 0.0001g sensitive weighing machine and the tooth temperature of gear is measured by Impact infrared thermometer. After summarized the experimental result of PA66 GF30 gears and PEEK GF30 gears are at different torque and speeds. The tooth temperature increases with increase in torque and increased temperature resulted into thermal softening of gear tooth which further increases specific wear rate. The comparative results of PA66 GF30 and PEEK GF30 gears show that the specific wear rate of PA66 GF30 is much higher than PEEK GF30 at all torque and speeds. Therefore the torque transmission capacity of PEEK GF30 is higher than PA66 GF30.[7]

Pradeep Kumar singh et al. In this paper using ANSYS workbench software, bending stress, contact stress and static load on the tooth of spur gear drive is found. The Hertz theory and Lewis formula also are used for theoretical calculation of contact stress and bending stress of spur gear. We observed that Theoretically results obtained by Lewis formula and Hertz equation are comparable with finite element analysis of spur gear, keeping in mind the comparison we can conclude that the finite element analytical result can be better as a problem solving software and used for other analyzing purpose.[8]

MODELING OF THE SPUR GEAR

By the design calculation, the modeling of the spur gear is done using SOLID WORK premium 2013.

The input parameter for modeling of spur gear are given in Table 2.

Description	Symbol	Values
Number of teeth	Z	17
Pressure angle	α	20°
Module	m	10mm
Pitch circle diameter	d	170mm
Face width	b	100mm
Addendum circle dia.	d_a	190mm
Dedendum circle dia.	d_f	145mm

Table 2. Geometry of spur gear

SOLID MODEL OF SPUR GEAR

FIG 1. 2-D Part design of Spur Gear

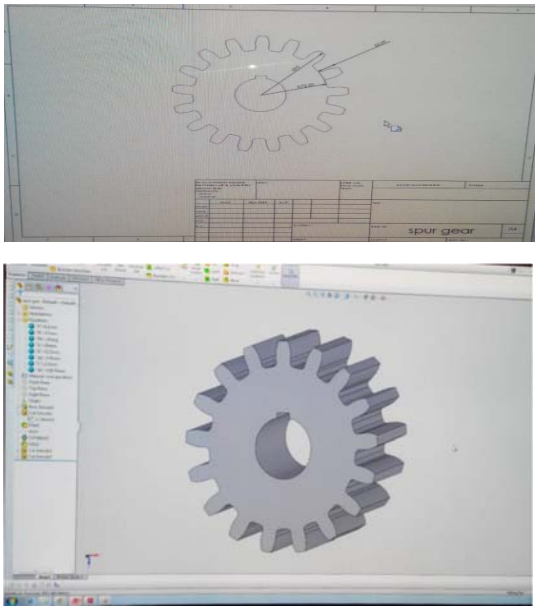

Fig 2. Part design of Spur Gear

FINITE ELEMENT ANALYSIS OF SPUR GEAR

Bending stress of spur gear teeth is generally calculated by analytically and finite element method. In this chapter, static finite element method is applied on the spur gear teeth for a different material of a spur gear. Analytical bending stress is calculated by AGMA formula. Analytical result is compared with the finite element method result for validation

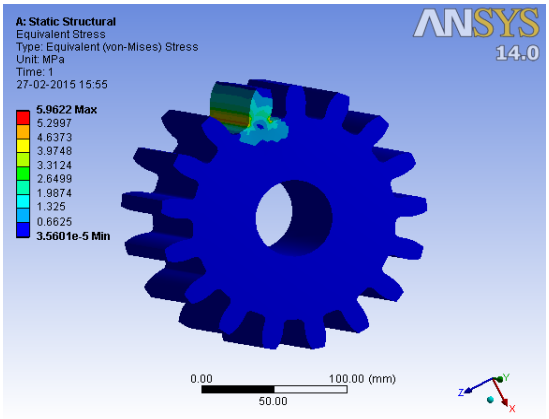

Fig 3. von-Mises stress for GF 30 PEEK

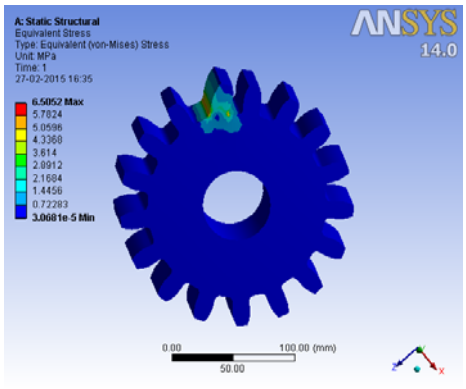

Fig 4. von-Mises stress for ALLOY STEEL

RESULT

Material	Maximum stress induced(MPa)	
	Analytical Procedure	FEM Procedure
Alloy Steel	2.77	6.5052
GF 30 PEEK	2.77	5.9622

CONCLUSION

The objective of current work is to replace the alloy steel spur gear with GF 30 PEEK composite spur gear. For that, analytical and finite element method are applied for determining bending stress of gear tooth. The obtained FEA result is compared with the analytical result and found that both result are comparable. Result shows that by stress analysis the strength of the GF 30 PEEK spur gear is more when compared with alloy steel spur gear.

Also the density of the GF 30 PEEK is very less when compared with alloy steel. So we can conclude that the alloy steel spur gear canbe replaced by GF 30 PEEK(composite) spur gear due to its high strength, low weight and damping characteristics.

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STRUCTURAL ANALYSIS AND PERFORMANCE EVALUATION OF MULTI PURPOSE AGRICULTURAL EQUIPMENT

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Abstract— A Study has been carried out on structural analysis and performance evaluation of multi purpose agricultural equipment, which performs major agricultural operations like goods carrying, pesticide spraying, laddering, inter-cultivating and digging operations of sandy loam deep soils, to increase the efficiency and reduce the production and handling cost. the analysis was first fallowed by an solid works model fallowed by meshing using hyper mesh software and anal sizing it by ansys software, it was found that the stresses produced was 150Mpa and deformation was 20 mm under 800 kg's load ,it is proved to be safe when compare to allowable stresses of material. This paper also gives the information regarding performance evaluation of NCET kissan all in one.

NCET kissan all in one-agricultural equipment name

I. INTRODUCTION

FINITE ELEMENT ANALYSIS (FEA) IS A FAIRLY RECENT DISCIPLINE CROSSING THE BOUNDARIES OF MATHEMATICS, PHYSICS, AND ENGINEERING AND COMPUTER SCIENCE. THE METHOD HAS WIDE APPLICATION AND ENJOYS EXTENSIVE UTILIZATION IN THE STRUCTURAL, THERMAL AND FLUID ANALYSIS AREAS. THE ADVANTAGES OF FEA ARE NUMEROUS AND IMPORTANT. A NEW DESIGN CONCEPT MAY BE MODELED TO DETERMINE ITS REAL WORLD BEHAVIOR UNDER VARIOUS LOAD ENVIRONMENTS, AND MAY THEREFORE BE REFINED PRIOR TO THE CREATION OF DRAWINGS, WHEN FEW DOLLARS HAVE BEEN COMMITTED AND CHANGES ARE INEXPENSIVE. ONCE A DETAILED CAD MODEL HAS BEEN DEVELOPED, FEA CAN ANALYZE THE DESIGN IN DETAIL, SAVING TIME AND MONEY BY REDUCING THE NUMBER OF PROTOTYPES REQUIRED. AN EXISTING PRODUCT WHICH IS EXPERIENCING A FIELD PROBLEM, OR IS SIMPLY BEING IMPROVED, CAN BE ANALYZED TO SPEED AN ENGINEERING CHANGE AND REDUCE ITS COST.

Preprocessing,

In which the analyst develops a finite element mesh to divide the subject geometry into sub-domains for mathematical analysis, and applies material properties and boundary conditions. There are different types of Preprocessing packages in market

- Hyper mesh
- Ansa
- Msc.Patran
- Gambit

Hyper mesh

Altair Hyper Mesh is a high-performance finite element pre-processor to prepare even the largest models, starting from import of CAD geometry to exporting an analysis run for various

As long list of CAD formats ensures a high level

of CAD interoperability. Altair's connector technology automatically assembles individual parts with their Finite Element representation. Hyper Mesh is entirely customizable. An extensive API library can be used to automate repeating tasks or do complicated math operations or modal generation.

With a focus on engineering productivity, Hyper Mesh is the user-preferred environment for

- Sold geometry modeling
- Surface geometry modeling
- Shell meshing
- Solid mesh generation
- Automatic Mid-surface generation
- Detailed model setup

Benefits of Hyper mesh:

- Open-Architecture Design

With the broadest set of direct CAD and CAE interfaces coupled with user defined integrations, Hyper Mesh fits seamlessly within any simulation environment.

- High-Speed, High-Quality Meshing

With both automatic and semi-automatic shell, tetra- and hexa-meshing capabilities, Hyper Mesh simplifies the modeling process of complex geometries.

- Advanced Model Morphing

A flexible set of morphing tools allows users to modify existing meshes to meet new designs and reduce model development costs.

- Increases End-User Modeling Efficiency

Batch Masher technology eliminates the need to perform manual geometry clean-up and meshing, thus accelerating the model development process.

- Reduces Training Time and Cost Through Elimination of Redundant Tools

An easy-to-use, intuitive graphical user interface makes it simple for anyone to learn the software, which further increases modeling efficiency and reduces training cost.

- Closes the Loop Between CAD and FEA

Create surfaces from finite elements enabling analysis engineers to communicate results and design modifications back into the design environment.

- Reduces Model Assembly Time

Leverage highly automated methods for rapid model assembly that create connections such as bolts spot welds, adhesives and seam welds.

Methodology

The overall process comprises of four main components namely Geometrical Design, Finite Element Modeling, Modal and Static Structural Analysis, Geometrical Design is the CAD part of work, where 3D structure of Agricultural Equipment is designed using Solid works software. After completing the geometrical design part, the Agricultural Equipment geometry is discretized to Finite Element model known as meshing, the Agricultural Equipment is meshed using tetrahedral elements and this can be achieved by using Hyper mesh tool. Finite Element model is then exported for analysis. Loads and Boundary conditions are applied and the structure is solved for given load

Condition using Ansys Workbench for Modal & Static structural analysis.

Geometry details of Agricultural Equipment

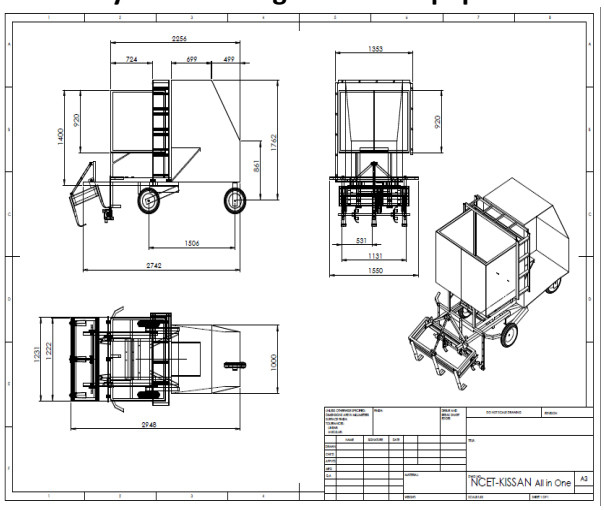


Fig 1 Detailed 2D drawing of Agricultural Equipment

Figure 1 shows the detailed dimensions of NCET kissan all in one

Fig 2 The 3D model for the Agricultural Equipment

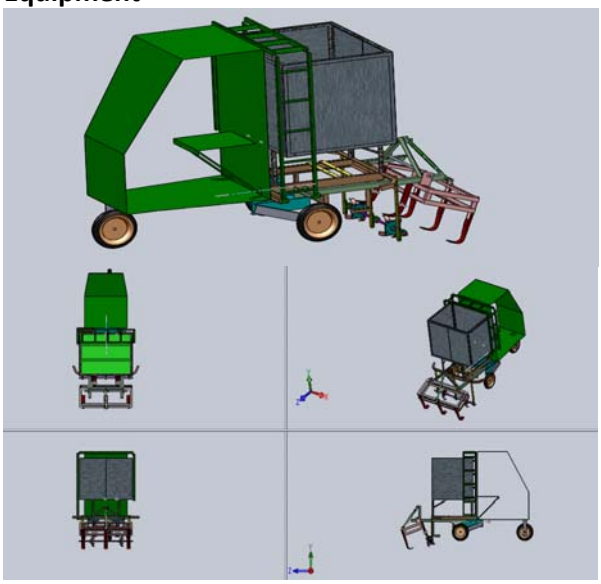
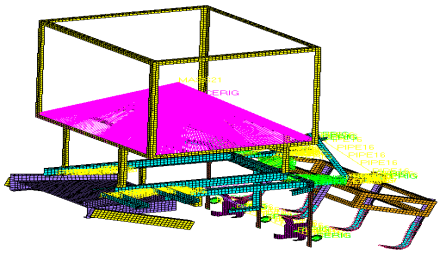
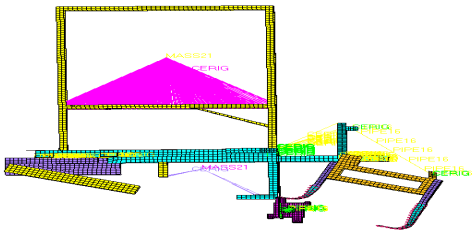


Figure 2 shows the 3D model of NCET kissan all in one

Meshing of overall agricultural equipment assembly



Meshing of overall agricultural equipment assembly (side view)



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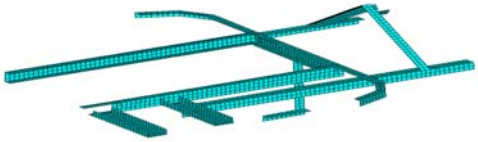
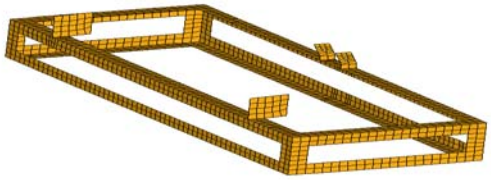
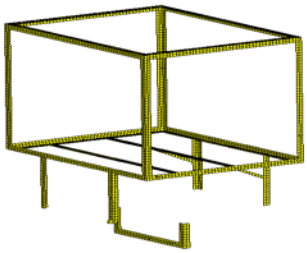
Meshing of rear engine main frame



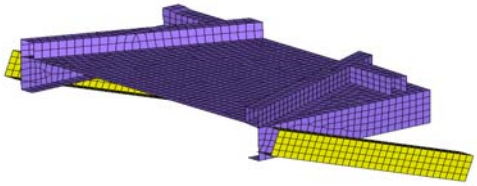
Meshing of plough main frame



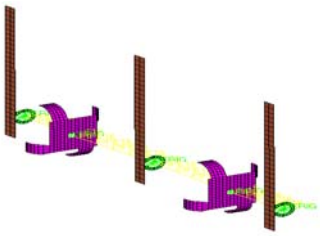
Meshing of goods carrying container main frame



Meshing of front cabin main frame



Meshing of inter-cultivator assembly



Element Details

SL NO	TYPE OF ELEMENT	NUMBER OF NODES	NUMBER OF ELEMENTS
1	SHELL 63	12816	10870
2	PIPE 16	31	29
3	MASS-21	2	2

Table 1 shows the type of element used. Material Properties, Boundary and Loading Conditions Material Properties

Base material of the Agricultural Equipments Mild Steel and cast iron. Table 2 shows material properties of Mild Steel .

Table 2 Material property of Mild Steel

SL NO	MATERIAL	DENSITY KG/M^3	YOUNGS MODULES	YIELD STRESS	ALLOWABLE STRESS
1	MILD STEEL	7850	210000	250 MPA	160 MPA

Boundary Condition

Structural Boundary conditions are in the form of zero displacements, Boundary conditions specify to act on all directions (X, Y and Z) or in certain directions only. In this case, Boundary conditions (BC) are applied on the Main bed of Chassis of Agricultural Equipments show in fig 3 allowing the modal deformation as a whole.

Loading Condition

Loading condition is defined to be forces distributed on the surfaces of the Agricultural Equipments shown in fig 5 .An engine mass of 23 kg's, load on cabin (goods carrying) 400 kg's ,load on plough (each blade) 90 kg's has been imposed on to the equipment.

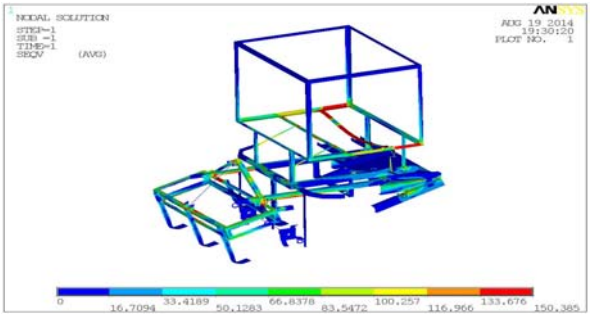


Fig-3, stresses of entire assembly under 800 kg's load

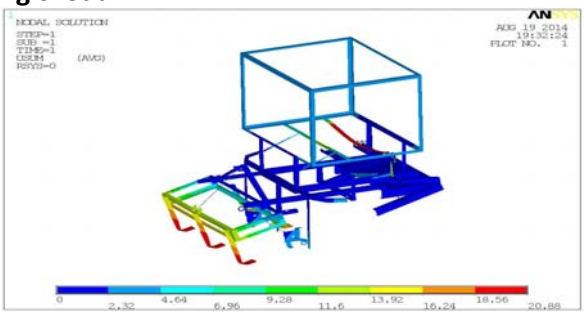


Fig-4, displacement of entire assembly under 800 kg's load

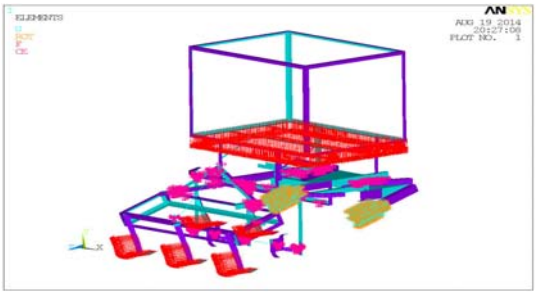
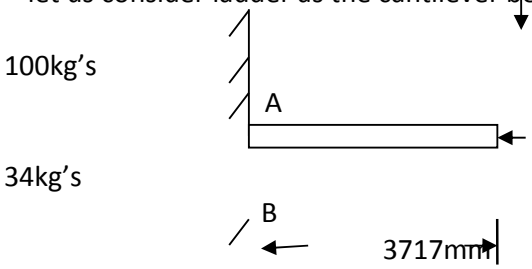


Fig-5, loads of entire assembly

Design of ladder

The ladder is fixed (hinged) on one end, and supported on the other end, hence let us consider ladder as the cantilever beam.



Here , the overall length of ladder is 3717mm from the vehicle base, and an 100 kg's of load is applied in tensile direction considering the weight of human body, and 34 kg's of load is applied in compressive directions considering the weight of ladder.

The ladder is subjected to both axial and bending load, hence the critical points are A&B. Direct stresses due to axial load.

$$\sigma_1 = \frac{F}{A} = \frac{-333.44}{159960} = -2.09 * 10^{-3}$$

$$\sigma_b = \frac{Mb}{I}.C$$

Where $I = \frac{bd^3}{12} - \frac{360*20^3}{12} = 240000mm^4$

$$= \frac{991*371.7}{240000} * \frac{20}{2}$$

$$\sigma_b = 151.93\ N/mm^2$$

Now, considering at point A,

$$\sigma = \sigma_1 + \sigma_b$$

$$= -2.09 * 10^{-3} + 151.93$$

$$= 151.927\ (tensile).$$

Maximum normal stress at A

$$\sigma_{max} = 151.927\ \frac{N}{mm^2}.$$

Minimum normal stress at A

$$\sigma_{min} = 0\ (compressive).$$

Maximum shear stress at A

$$\tau_{max} = \frac{\sigma_{max}}{2}$$

$$= \frac{151.927}{2}$$

$$\tau_{max} = 75.96\ \frac{N}{mm^2}.$$

Now, considering at point B,

$$\sigma = \sigma_1 - \sigma_b$$
$$= -2.09 * 10^{-3} - 151.93$$
$$= -151.927 (tensile).$$

Maximum normal stress at B

$$\sigma_{max} = 0 \ (tensile).$$

Minimum normal stress at A

$$\sigma_{min} = 151.927 \ N/mm^2 (compressive).$$

Maximum shear stress at B

$$\tau_{max} = \frac{\sigma_{max}}{2}$$
$$= \frac{-151.927}{2}$$
$$\tau_{max} = -75.96 \ N/mm^2.$$

Hook's law states that stress is directly propositional to strain

$$E = \frac{\sigma}{\epsilon}$$

From DHB the material properties of mild steel where E (young's modulus)=210Gpa

$$= \epsilon = \frac{\sigma}{E}$$
$$= \frac{151927}{210000}$$
$$\epsilon = 0.0007234.$$

We know that,

$$\epsilon = \frac{change \ in \ length}{orginal \ length}$$
$$= \frac{\Delta l}{l}$$
$$= \Delta l = \epsilon * l$$
$$= 0.0007234 * 3717$$
$$\Delta l = 2.6888mm.$$

Results and discussions

Performance evaluation

Abstract

To determine the efficiency of two stroke Bajaj Re auto rickshaw engine with help of brake drum dynamometer.

Introduction

A two stroke petrol engine performs only two strokes to complete one working cycle this works on theoretically Otto cycle it consists of a cylinder with one end fitted with the cover ,on the other end it is fitted with a sealed crank case3 so that it can function as a pump in conjunction with piston two openings known as inlet port and exhaust port are provided in below and on circumference of cylinder. The lower one adjusts the petrol engine and air mixture in the crank case and through upper one spent gases are expelled out of cylinder.

A transfer of the port provided diametrically opposite to the exhaust port. Serves as passage for the transfer of petrol and mixture from crankcase to cylinder

First stroke

At the beginning piston is at lower end spark plug initiates the compressed petrol and air mixture. The combustion of petrol will release the hot gases which increases the pressure to the cylinder.

Second stroke

In this stroke piston ascends when it covers the transfer port the supply of petrol and air mixture is cut off and when it further moves upward covers the exhaust port.

Methodology

- First check fuel level in the tank if necessary fill it.
- Start the engine and keep the rpm as constant for desired rpm.
- Apply the load on the engine and set the rpm to the initial level speed.
- Now measure the fuel consumption for 10cc speed and spring balance volume
- Repeat the same for different loads and calculate the efficiencies.

Technical specifications

DIAMETER OF BORE (D)	57MM
STROKE LENGTH (L)	57MM
COMPRESSION RATIO	0.7:1
NUMBER OF CYLINDERS	1
RATED SPEED	5200
RADIUS OF BRAKE DRUM	0.125M
CALORIFIC VALVE OF FUEL (CV)	48070 KJ/KG
DENSITY OF PETROL	720 KG/M^3
SPECIFIC GRAVITY OF OIL	0.72

Table 3, shows technical specifications of engine used in NCET kissan all in one.

Formulas

$S=S_1-S_2$= load acting on a brake drum in kg's.

Where S_1 and S_2 are spring balance reading in kg's

t=time taken to consume 10cc of petrol in seconds

m_f =mass of fuel consume 10cc of petrol in seconds

v_f =volume of petrol consumed in m^3/sec

h_w = monometer reading in m of H_2o

N_e = speed of engine

N_b = speed of brake drum = Ne/G.R

$m_f = v_f*S_g*1000/10^6*t$

T = torque =S*Db* 9.81/2 in Nm

Db=dia of brake drum

BSFC = brake specific fuel consumption in kJ/kw hr

$\eta_{bt}=BP*100/m_f*Cv$

$BSFC=m_f*3600/Bp$ in kg/kw hr

η_v =Va/Vs

Where Va=actual volume of air supplied

Vs=stroke volume

$Va= C_d*aov2000*g*h_w/\rho_a$

$Vs=\pi*D^2*l*Ne/4*60$

Cd of orifice =0.62

Where D = dia of engine cylinder in m

L =stroke length in m

Ne =speed of engine

ρ_a = atmosphere pressure = 1.013*100 KN/m^2

T=room temperature in Kelvin

Air fuel ratio =m_a/m_f

Where m_a =loss of air in kg/sec=$v_a*\rho_a$

Graphs

BP v/s BSFC

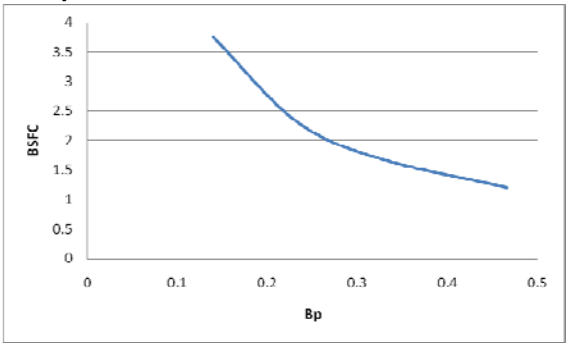


Fig 6, graph of BP v/s BSFC

The above graph shows as the brake power produce is increased the amount of fuel is consumption is less and vice versa.

Air fuel ratio v/s η volumetric

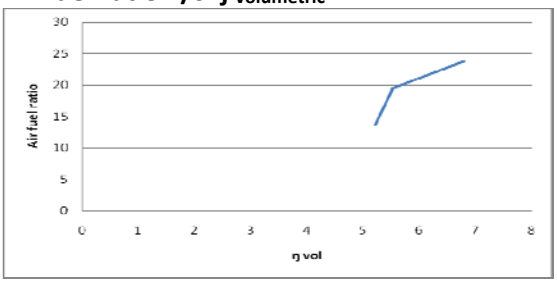


Fig 7, graph of Air fuel ratio v/s η volumetric

The above graph shows that as air fuel ratio is increased the volumetric efficiency is also increased and vice versa

Speed v/s BP

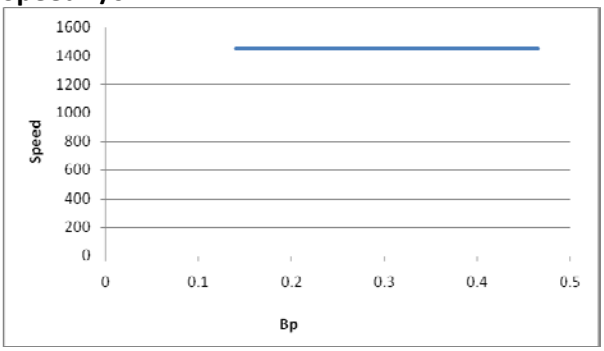


Fig 8, graph of speed v/s Bp

Fig 6.3 shows the graph of speed v/s Bp where as the speed is increased relatively the Bp is also increased and the graph fallows an straight line as shown the graph.

5.17 performance evaluation by field test

- Amount of fuel consumed per distance travelled (millage) =25 km/ltr.
- Maximum speed of vehicle in up gradient = 28 km/hr
- Maximum speed of vehicle in down gradient = 44 km/hr
- Maximum speed of vehicle in level roads = 36 km/hr
- Gross weight of goods carrying container = 90 kg's
- Gross weight of ploughing assembly = 55 kg's
- Gross weight of inter-cultivator assembly = 25 kg's
- Gross weight of two engines = 46 kg's
- Gross weight of water pump assembly = 8 kg's

- Gross weight of ladder = 34 kg's
- Gross weight of vehicle body and other upholstery attachments = 90 kg's
- Gross weight of vehicle including all attachments =348 kg's
- Net load can be carried through the vehicle (FOS 2) = 400 kg's
- Overall length of vehicle =2948 mm
- Overall width of vehicle = 1550 mm

Conclusion

The induced stress was σ =151.927(tensile).

The deformation Δl = 2.6888mm

Hence, the allowable stress is 160 Mpa; since the induced stress is 151 Mpa the design is safe

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