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P.Ramesh [1] ,U.Keerthana[2]

[1]*Professor, Vivekanandha college of Engineering for Women, India*
[2]*PG Scholar, Vivekanandha college of Engineering for Women, India*

E-Mail-ID: ukeerthana31@gmail.com

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ABSTRACT:

Cloud storage is a platform where we can store and access the data through internet. Mobile Cloud Computing (MCC) method provides various features in healthcare such as sharing the patient's data, processing, and analysing from mobile applications to cloud resources, ensuring quality of service demands of end users. In this paper, we propose a method based on MCC which enables the users to ensure their healthcare details through their mobile. Security and privacy are of the major concerns for using cloud-based healthcare services. Resource migration also termed virtual machine migration, for data transferring between users. An Ant Colony Optimization (ACO) based joint VM migration model be effective in MCC based healthcare system. This system includes access control over files to enhance the security. It also reduces the storage space and increase the security of user data.

Keywords: Smart Health Care (SHC), Smart City(SC), Big Data(BD), Quality Of Service (QOS), Virtual Machine Migration(VMM, Ant Colony Optimization(ACO)**.**

1.INTRODUCTION

Healthcare organizations are building their IT infrastructures to be more flexible and scalable to meet the growing data demand. With value-based incentives for data analytics and the increased number of connected medical devices constantly collecting data, organizations are challenged with storing clinical data in a way that is both HIPAA (Health Insurance Portability and Accountability Act)-compliant and easy for authorized users to access. Cloud data storage options offer a flexible and scalable environment at a lower cost than on-premise deployments, which is appealing to covered entities. Organizations exploring data analytics are expecting their storage requirements to steadily increase as Internet of Things (IoT) and mobile devices collect data that needs to be stored. In healthcare organizations, there are enormous amounts of data collected and stored daily. These data are important and vital for decision making and for delivering the appropriate treatment.

Healthcare organizations need to have EHRs to be able to exchange data using cloud computing systems where patient's data are stored, retrieved and shared with other healthcare providers. Since the number of the healthcare data is continuously increasing, it will eventually affect the storage capacity of healthcare data servers and cause slowness in data retrieval. It provides unlimited storage resources and facilitates the process of sharing patient's data between healthcare organizations

2. LITERATURE SURVEY

1.Enabling Communication Technologies For Smart Cities

Ibrar Yaqoob et al (2017) discussed the enabling communication and networking technologies used in smart cities. Tremendous advancements in heterogeneous communication technologies have enabled smart cities objects to interact with each other while ensuring network connectivity. However, these communication

technologies cannot provide flawless connectivity in smart cities due to the coexistence of thousands of devices, which brings about several problems.

2. Healthcare Big Data Voice Pathology Assessment Framework

M. S. Hossain and G. Muhammad (2016) proposed healthcare big data framework using Voice Pathology Assessment (VPA) system, two robust features, MPEG-7 low-level audio and the interlaced derivative pattern, are used for processing the voice or speech signals. The fast-growing healthcare big data plays an important role in healthcare service providing. Healthcare big data comprise data from different structured, semi-structured, and unstructured sources. These data sources vary in terms of heterogeneity, volume, variety, velocity, and value that traditional frameworks, algorithms, tools, and techniques are not fully capable of handling

3. Security and Privacy Issues and Requirements for Healthcare Cloud Computing

Goce Gavrilov and Vladimir Trajkovik (2012) presented current state of the art research in this field. Main focus is on several shortcomings of current healthcare solutions and standards, particularly for platform security, privacy aspect and requirements which is a crucial aspect for the overall security of healthcare IT systems. Cloud computing paradigm is one of the popular health IT infrastructure for facilitating EHR sharing and EHR integration. Healthcare clouds offer new possibilities, such as easy and ubiquitous access to medical data, and opportunities for new business models.

4. Cloud based solution for mobile healthcare application

Ling Cong et al (2015) presented a cloud computing based remote healthcare service system. The promising potential of cloud computing and its convergence with technologies such as cloud storage, cloud push, mobile computing leads to new developments for divers application domains, which provides a strong technical support for remote healthcare service as well. Experts and researchers believe that cloud computing technology can greatly improve the level of healthcare services. The system mainly consists of three parts: Portable medical devices, intelligent terminals (phones, tablets, etc.), cloud services platform. Portable medical acquisition devices transmit physiological signal to the intelligent terminal via wireless way (Bluetooth/WiFi). Monitoring software in smart terminal responses for data display, storage, and push the measurement results to the cloud service platform.

5. A Survey of Mobile Cloud Computing: Architecture, Applications, and Approaches

Hoang T. Dinh et al. surveyed on MCC, which helps general readers have an overview of the MCC including the definition, architecture, and applications. Together with an explosive growth of the mobile applications and emerging of cloud computing concept, mobile cloud computing (MCC) has been introduced to be a potential technology for mobile services. MCC integrates the cloud computing into the mobile environment and overcomes obstacles related to the performance (e.g., battery life, storage, and bandwidth),

6. Federated Internet of Things and Cloud Computing Pervasive Patient Health Monitoring System

Jemal H. Abawajy and Mohammad Mehedi Hassan, (2017), presented an article on pervasive patient health monitoring (PPHM) system infrastructure. The exponentially growing healthcare costs coupled with the increasing interest of patients in receiving care in the comfort of their own homes have prompted a serious need to revolutionize healthcare systems. This has prompted active research in the development of solutions that enable healthcare providers to remotely monitor and evaluate the health of patients in the comfort of their residences. However, existing works lack flexibility, scalability, and energy efficiency. PPHM is based on integrated cloud computing and Internet of Things technologies.

7 . Big Data Analytics in Healthcare

Ashwin Belle et al (2015) discussed some of the major challenges with a focus on three upcoming and promising areas of medical research: image, signal, and genomics based analytics. The rapidly expanding field of big data analytics has started to play a pivotal role in the evolution of healthcare practices and research. It has provided tools to accumulate, manage, analyze, and assimilate large volumes of disparate, structured, and unstructured data produced by current healthcare systems. Big data analytics has been recently applied towards aiding the process of care delivery and disease exploration.

8 . Smart City Solution for Sustainable Urban Development

Mostafa Basiri et al (2017), investigated concepts and principles of Smart City and sustainable urban development, components and urban planners' role. The intention of the 21st century we entered a strong global growth in the multitude of comparatively few in number, large cities. Large, dense cities can be highly efficient. It is most desirable that side, by the heads of the green, and the future porticos. To accumulate the benefits, with a positive, as well as a dense fog, in one state, to measure the informal are the negative aspects of the development of equal, traffic congestion, waste, wealth management approach is wrong. The demand for services is immediate, tribute, and custom, that you might found after them

9. Big Data Analytics in Healthcare: Promise and Potential

Wullianallur Raghupathi and Viju Raghupathi (2014) explained the nascent field of big data analytics in healthcare, discusses the benefits, outlines an architectural framework and methodology, describes examples reported in the literature, briefly discusses the challenges, and offers conclusions.

10. Cloud Computing and Healthcare Services

Aziz HA and Guled, A (2016), undergone detailed analysis on cloud computing and healthcare data management system. There is a significant volume of healthcare data generated daily. The data are important and vital for decision making and delivering the best care for patients. Cloud computing is a cost effective method that facilitates real-time data collection, data storage and exchange between healthcare organizations. Cloud infrastructure is characterized with a high throughput and a high volume storage; two important factors for efficient data analysis of large patients' population. Security and privacy are of the major concerns for using cloud-based healthcare services

3. PROPOSED METHOD

Mobile Cloud Computing (MCC)

Mobile cloud computing (MCC) is an integration of cloud computing (CC) into the applications of mobile devices. New advances in CC and mobile technology have inspired different patterns of cloud health care services and devices. In the cloud system, health-data can be stored and transmitted to medical caregivers from everywhere and response can be returned to patients through web service network. In this article, we present an MCC solution through a healthcare web service.

Mobile devices are connected to the mobile networks via base stations that establish and control the connections and functional interfaces between the networks and mobile devices. Mobile user's requests and information is transmitted to the central processors that are connected to servers providing mobile network services. The subscriber's requests are delivered to a cloud through the Internet. In the cloud, cloud controllers process the requests to provide mobile users with the corresponding cloud services.

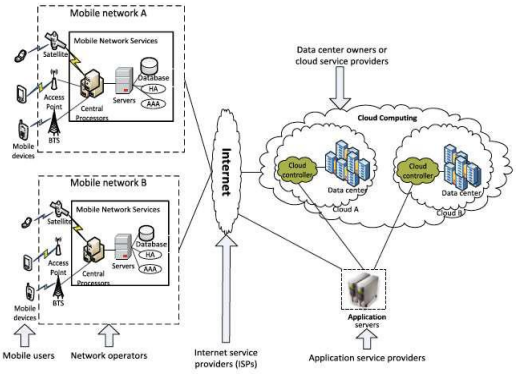


Fig 3. 1 Architecture of MCC

4. MODULES DESCRIPTION

4.1 Cloud computing mainly offers 3 types of modules or Services.

- **SaaS (Software as a Service)**
- **IaaS (Infrastructure as a Service)**
- **Paas (Platform as a Service)**

Software as a Service (SaaS)

In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud & multiple end users are serviced. On the customers‟ side, there is no need for upfront investment in servers or software licenses, while for the provider, the costs are lowered, since only a single application needs to be hosted & maintained. Today SaaS is offered by companies such as Google, Salesforce, Microsoft, Zoho, etc.

Platform as a Service (Paas):

Here, a layer of software, or development environment is encapsulated & offered as a service, upon which other higher levels of service can be built. The customer has the freedom to build his own applications, which run on the provider's infrastructure. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySql and PHP), restricted J2EE, Ruby etc. Google's App Engine, Force.com, etc are some of the popular PaaS examples.

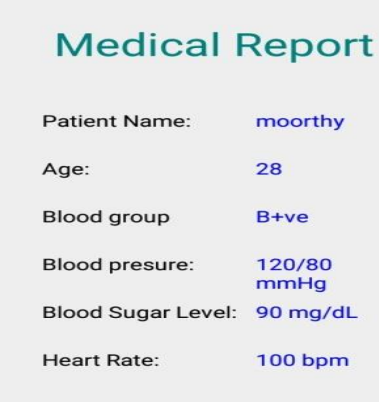
Infrastructure as a Service (Iaas):

IaaS provides basic storage and computing capabilities as standardized services over the network. Servers, storage systems, networking equipment, data centre space etc. are pooled and made available to handle workloads. The customer would typically deploy his own software on the infrastructure. Some common examples are Amazon, GoGrid, 3 Tera, etc.

4. 2INPUT:

Patient Details
Medical Report

OUTPUT:



5. PERFORMANCE ANALYSIS

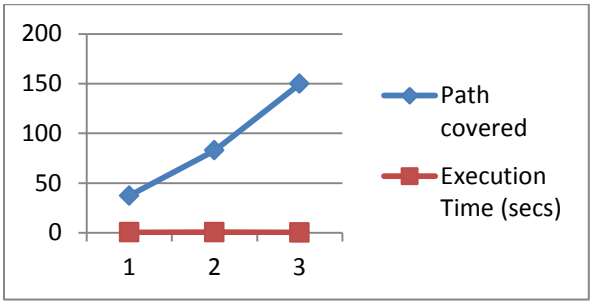
Comparison between Genetic Algorithm (GA) and Ant Colony Optimization (ACO) based on Total Distance Travelled / path covered with Execution Time

	Path covered	Execution Time (secs)
GA	37.2355	0.4471
	82.868	0.6884
	149.7629	0.2850

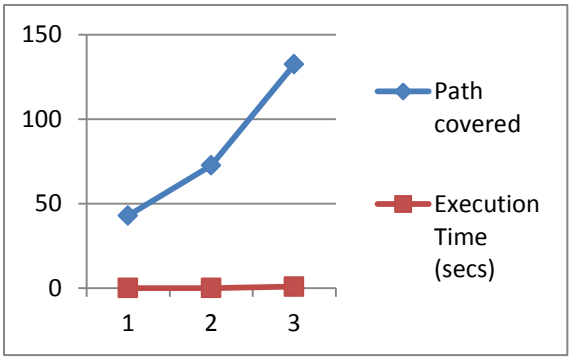
	Path covered	Execution Time (secs)
ACO	42.9517	0.0992
	72.543	0.1504
	132.3835	1.0105

Graphical Representation for Genetic Algorithm (GA) method;

We implemented the ACO algorithm and investigated their relative strengths and weaknesses by experimentation. We also use the time in the cloudSim to record the makespan.



Graphical Representation for Ant Colony Optimization (ACO) method



6. CONCLUSION

MCC in healthcare systems is a potential trend for the development of medical information systems. MCC can recover health services providing access data anywhere, anytime and cost effective solutions for healthcare.

Healthcare and patient care are very important applications to be adapted via mobile cloud computing approach. The shifting from traditional healthcare model to consumer driven healthcare model is a very important aspect in this approach in which is moving forward to establish a direct private connection to the user model. This approach achieves a respectable performance of healthcare services anytime anywhere for both privacy and security of protecting confidential information of the user. This issue opens a new future field of computing that lacks resources, including flexible architecture, adapted protocols, real time processing, huge storage, online services, privacy and security.

Multi-tenancy:

Providers of service can share the resources to support a variety of applications and large number of users.

Ease of Integration:

Several services from diverse service providers can be integrated simply through the cloud.

Five key mobile applications in the pervasive healthcare environment are follows;

- Comprehensive health monitoring services enable patients to be monitored at anytime, anywhere.
- Intelligent emergency management system can manage the large call volume received from accidents or incidents.
- Health-aware mobile devices which detect blood pressure, pulse-rate and level of alcohol.
- Pervasive access to healthcare information allows caregivers and patients to access medical data.

- Pervasive lifestyle incentive management can be used for paying healthcare expenses and other healthcare charge.

REFERENCE

[1] Raj Kumari, Sakshi Kaushal and Roopali 2017, 'Application Offloading Using Data Aggregation in Mobile Cloud Computing Environment', Springer Proceedings International Conference on Leadership, Innovation and Entrepreneurship, pp.17-29.

[2] M. Shamim Hossain and Ghulam Muhammad, 2016, 'Healthcare Big Data Voice Pathology Assessment Framework', IEEE Healthcare Big Data, vol. 4, pp.7806-7815.

[3] E. Ekonomou, L. Fan, W. Buchanan, C. Thuemmler, 2011, 'An Integrated Cloud-based Healthcare Infrastructure', IEEE International Conference on Cloud Computing Technology and Science, CloudCom, vol.3, pp.1-5.

[4] Pankaj Deep Kaur and Inderveer Chana, 2014, 'Cloud Based Intelligent System for Delivering Health Care as a Service', ELSEVIER Computer Methods and Programs in Biomedicine, vol.113, pp.346-359.

[5] Poonam S. Sharma and Sneha U. Bohra, 2015, 'Mobile Cloud Computing: Its Challenges and Solutions', International Journal of Computer Science and Mobile Computing, vol. 4, no.5, pg.287-293.

[6] Jemal H. Abawajy and Mohammad Mehedi Hassan, 2017, 'Federated Internet of Things and Cloud Computing Pervasive Patient Health Monitoring System', IEEE Communications Magazine-Impact of Next-Generation Mobile Technologies on IoT: Cloud Convergence, vol.55, no.1, pp.48-53.

[7] Ashwin Belle, Raghuram Thiagarajan, Reza Soroushmehr, Fatemeh Navidi, Daniel A. Beard and Kayvan Najarian, 2015, 'Big Data Analytics in Healthcare', Hindawi Bio-Medical Research International, vol.2015, pp.1-16.

[8] Mostafa Basiri, Ali Zeynali Azim and Mina Farrokhi, 2017, 'Smart City Solution for Sustainable Urban Development', European Journal of Sustainable Development, vol.6, no.1, pp.71-84.

[9] Wullianallur Raghupathi and Viju Raghupathi, 2014, 'Big Data Analytics in Healthcare: Promise and Potential', Health Information Science and Systems, vol.2, no.3, pp.1-10.

[10] Aziz H and Guled, 2016, 'Cloud Computing and Healthcare Services', Journal of Biosensors & Bioelectronics, vol.7, no.3, PP.1-44.