An Impact of Digitalized Technologies Transformation in Healthcare Using Mobile Cloud Computing

Rahul Sharma* and Prateek Jain
School of Computer Application, Lovely Professional University, Jalandhar-Delhi, G.T. Road, National Highway 1, Phagwara - 144411, Punjab, India; rahul.sharma@gravitycodelab.com, prateekjain2010@gmail.com

Abstract

Objectives: Smart Device with Open Source Platform, cloud tools and technologies are at the key point of healthcare variation. E-Devices replacing on manual basis or automated medical reports/graphs, private or secure clouds provide private access to automated healthcare records and device based device collaboration tools are reforming information share among medical experts. Methods/Analysis: In proposed Work, We are using Open Source API like Google API within system for automatic improvement of the entire system rather than deploy each time system after new version of implemented platform. According to below mentioned Proposed Work, We are encrypt word with current timestamp middle number using sampling method and every time system will auto decrypt private data with same TIMESATMP technique on receiver side panel. Findings: All the findings are mentioned in the form of statements given below: Statement1: Existing System: MICROSOFT <Voice Recognizer /Speech Recognizer Tools, Media Tools> [Working on Only WINDOWS based platform] Statement2: Existing System: PREBUILD ALGORITHM <AES/DES/CRYPT5/MD5> [Easy to Decrypt with predefined decryption methods]. Novelty/Improvement: Smart Devices based healthcare applications will more advance with Open Source Based API and Private data will more secure.

Keywords: EWSEA, Health Cloud Server, Healthcare Routes, Mobile Cloud Server, Portable Computing

1. Introduction

Cloud computing often referred as high standard computing to deliver computing resources on demand to users. Now, the reality of this computing power is low cost growing popularity among number of different businesses, specifically small, medium size and government based organisations are utilizing the strength of cloud based models.

Mobile Based Cloud platforms are advanced computing platforms, where business managers outsourcing computing tools including application programs services to a second party specific business and when they want to utilize the computing functionalities or employees need to use the number of application resources like storage models, business mails and editor tools, they access these resources using internet1. Portable Smart Device technology had grown quickly around the world wide network.

With the help of New 4th Generation (4G) technology, these worldwide hi-fi networks have had a huge impact on our daily life. Therefore video conferencing used by doctors for patient checkups, to give instructions to patients and clinic staff at remote location. The New Generation Technology enabled ambulances to improve survival rate of serious patients.

e-health care systems focus the availability of e-medical applications and medical healthcare information anywhere and anytime and the disappearance of computing2.

Mobile Cloud based health care system has become an essential part of this Immortally-connected world in
which physicians and patients alike are automated prolific mobile adopters.

The idea behind retrieving health information via smart portable device like mobile is impressive. It is say the least, but the key takeaway is the huge chance to benefit an all around population with a limitless variety of healthcare requirements.

Mobile healthcare tools can help with number of advanced application services including multiple services like mobile telemedicine, location tracking GPS medical services, emergency on the spot output, comprehensive access to healthcare information to provide huge benefits to both users either serious patients or medical personnel.

People are using smart mobile devices makes devices ubiquitous or a big bet as Cloud providers. With Medical Cloud Computing being used in mobile, it elaborate new way to think and to do things. Cloud platform permits customers to utilize cloud services on the fly in pay-as-you-go form via internet.

Comprehensive and ubiquitous accesses to healthcare database for computing medical data are considered the essential for the proper diagnosis treatment procedure. The major characteristics of Mobile Cloud Computing are given below:

I. **On-the-spot self-service:** A client can compute cloud computing strength like cloud based e-medical server computing time or networking among elements and storage, needed automatically without demanding human interfering with each service's provider.

II. **Broad-Multi network access:** Various resources are available over the world wide network and accessed via general mechanisms that upgrade and utilize by distinct client platforms that are portable devices (smart phones).

III. **Resource/Instrument pooling:** Instrument pooling allows service providers to pool large-scale resources to serve multiple cloud consumers. A number of physical and virtual resources are dynamically allocated and reallocated according to cloud consumer demand, typically follow by implementing through statistical multiplexing. For Example cloud storage, cloud processing, cloud memory, cloud network bandwidth and cloud based virtual systems or machines.

According to our related work, the cloud based portable healthcare services are provided by the cloud based medical service providers. The provider provides the facility of medical checking according to patient’s comfort with use of smart portable device as mobile device. The client who wants to utilize this smart program is registering through the mobile interface or shortcut. The providers approved registration request after validate information. Cloud platform provides the facility to use shared resources and compatible infrastructure in pervasive manner.

For example, it is crucial that patients find blood glucose range and take insulin to control glucose range. Patients visiting on medical lab and wait to get report for result were precious, time-consuming and disadvantageous for all-involved. Today, “Gluco Phones” that control and transmit glucose information are useful for caregivers while also reminding users when they need to undertake glucose checkups.

### 2. Proposed Work

The aim of proposed work is to execute cloud based smart device application within more advanced cloud based environment for healthcare management system on the basis of health applications in which patients can install cloud based health management application, able to set appointments through electronic form interface to the corresponding doctors and able to view report of basic symptoms and immediate first aids to be taken.

In this paper, we have decided to give Online Interaction between patients and doctors whenever they required. In this proposed system we linked MCC integration with health care services. We integrate open source Google API for better output either in present or in future whenever Google improves such tools API further. Every time whenever Google improves quality of existing tools either in Google android platform or for any other open source platform, deploy existing health care application will automatically synchronize with new add-ons.

The main goal to implement smart device cloud computing in healthcare applications are to reduce existing limitations of traditional healthcare system like less system storage, less securing models and number of health system bugs.

**The Proposed Interface Architecture is given below**

Following figure 1 shows the proposed system architecture to publishing the cloud based mobile healthcare computing application. Within cloud based services, client consist the number of modules. The e-Health computing smart application delivers and display patient records in
cloud based database. The Cloud Database Storage tools or elements manage the physical infrastructure and maintaining several operations like backup data on the basis on time interval set by administrator and restoring data operation on moment when data crash on cloud. It will automatically recover from cloud backup points.

3. Experimental Result Using Methods and Implementations

Today, the all grouping of this medical healthcare data are completely legal. It is follow that organizations want to automate auto access to these types of collected records in group to enable “On Cloud” based tools to the clients like patients, doctors and medical institutions.

In proposed Interface, We suggested one algorithm for more security in Cloud based health services to ensure high security on each character on every action. We named this algorithm is EWSEA. It means each word secure on each action. From initial login stage to logout stage, every word will convert or encrypt according to predefined cloud based encryption method that is purely developed by us through this paper. A basic architecture of EWSEA is given below as figure 2.

![Figure 1. Proposed Interface Architecture.](image1)

![Figure 2. Working Model of EWSEA (New Proposed Algorithm).](image2)

**Working of this algorithm:**

I. Method for Encryption:

\[
\text{ASCII (System.currentTimeMillis(Mid[Number]))} + \text{ASCII (Word)} = \text{Final Word}
\]

II. Method for Decryption:

\[
\text{Final Word} - \text{ASCII (System.currentTimeMillis(Mid[Number]))} = \text{ASCII (Word)}
\]
4. Conclusion and Future Work

In this paper we discussed, Smart Device Cloud Computing has huge potential to improve the capacity and reliability of healthcare systems. We have considered the automated Mobile Cloud Computing application in a part of healthcare system known as Health Care Routes. All the Mobile Cloud Computing Frameworks like Care Routes automated Computational Tasks are elaborate and designed is proposed.

In this paper, we elaborate overall description of new algorithm to implement more security on mobile server to prevent doctor/patient confidentially information between outer unauthorized sources.

In future, we will plan to implement each automated computational task with suitable Mobile Cloud Computing frameworks or architecture and compare its execution.

The main fact that Microsoft and Google are invested too much “in the cloud” platform to extend new tools and elements for health services such as Microsoft Vault and Google Health.

5. References

1. Parameswari R, Prabakaran N. An Enhanced Mobile Health Care Monitoring System in Mobile Cloud Computing. International Journal of Advanced Research in Computer and Communication Engineering. 2012 December; 1(10).
2. Varshney Upkar. Pervasive Healthcare. IEEE Computer Magazine. 2003; 36(12):138-40.
3. Ferreira Andre Lopes, da Silva Alberto Rodrigues. Mobile Cloud Computing. Open Journal of Mobile Computing and Cloud Computing. 2014; 1(2).
4. Khan AN, Mat Kiah M, Khan SU and Madani SA. Towards secure mobile cloud computing: a survey. Future Generation Computer Systems. 2013; 29(5):1278–99.
5. Reese George. O’Reilly Media, Paperback: Cloud Application Architectures: Building Applications and Infrastructure in the Cloud. 2009 April 17; ISBN: 0596156367.
6. Doukas Charalampos. Mobile Healthcare Information Management utilizing Cloud Computing and Android OS. Buenos Aires, Argentina: 32nd Annual International Conference of the IEEE EMBS. 2010 August 31 - September 4.
7. West Darrell. How Mobile Devices are Transforming Healthcare.
8. Kohn LT, Corrigan JM and Donaldson S. Washington: National Academy Press: To Err Is Human: Building a Safer Health System. 1999.
9. Kopec D, Kabir MH, Reinhart D, Rothschild O and Castiglione JA. Human Errors in Medical Practice: Systematic Classification and Reduction with Automated Information Systems. Journal of Medical Systems. 2003 August; 27(4):297-313.
10. Varshney U. Pervasive healthcare and wireless health monitoring. Journal on Mobile Networks and Applications. 2007 March; 12(2-3):113-27.
11. Sabiyath Fatima N, Jahira Begam S, Muneera NS. Reverse Auction to Trade Unused Cloud Computing Resources. Indian Journal of Science and Technology. 2016 August.