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# Risk predictor & Health-care information manager using Android and Cloud

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Abstract: ***This android application creates updates, deletes and retrieves records on the cloud database.Google's android OS provides great amount of flexibility to the implementation of an android application that is as pervasive as that. The given information can be of any format like DICOM image or data file in text. The system can be evaluated using any cloud service. Users are entities like administrator and normal patient. Cloud computing makes us to use out data in pervasively, ubiquitously and in distributive manner. The app stores and retrieves the data using above principles of cloud computing. The patient health record management can be done using these capabilities of Google Android and we can also store DICOM images. This app gives prediction of risk of occurrence of a disease.***

**Keywords:** Ubiquitous computing, Mobile computing, Smart phones, Maximum likelihood estimation, Ubiquitous and mobile devices, Cloud Computing, Location-Based Services**.**

## 1. Introduction

Health-care has been studied by the humans since many years and yet we find more space to improve the quality of the health-care that we have. We, as being living things, do always have physical and biological disabilities. This relates to the thing that we all are liable to diseases and also we are not immortals. In an attempt to make self an immortal, human has gone forward with the policy of eliminating diseases. The process of elimination of diseases has an important tool to go with. This tool Mobile Health-care (shortly known as m-Health Care) prevention continues to be better than any sort of cure. So we need our health-care technologies to be more proactive than just reacting to the situation clumsily. Ubiquitous health-care has the potential to become cost effective and to improve quality of service. Mobile health-care system has two primary goals: the readiness of e-health applications and pervasive medical information with the invisibility of computing. In this system, in addition to the regular storage, retrieval and update processes, this system predicts the risk of occurrence of a particular disease to the patient. This risk prediction will be done on basis of the symptoms that user will select during user updates user profile. Health care Information Management & Risk Predictor System focuses on analyzing the medical history of the patient. This particular system is step towards combining mobile tele-medicine, patient monitoring. Location independent access to medical information management into one simple application is possible. This application proves to be best when we take Emergency response situation in consideration. This application deals with challenges encountered like data storage and data management. It is important to make data available on demand and also application takes care of maintenance of data. Application uses the cloud as storage the cloud services ensure the facility of access of shared resources and common infrastructure in a pervasive and ubiquitous manner. Cloud offers services on demand which fulfill the dynamic needs of user.

## 2. Literature Survey

The research conducted so far in development of mobile healthcare and other healthcare services are discussed in this section. The set of challenges outlined above span several domains of research and the majority of relevant work will be reviewed in this section. In this section, basic concept is discussed for better understanding of the project.

- **Role of Cloud in Pervasive Health-care**: Jiafu Wan, Caifeng Zou, Sana Ullah, King Saud University Chin-Feng Lai, Ming Zhou and Xiaofei Wang have penned a good analysis of use of cloud services in Pervasive Health-care. [3] They have
- **Mobile Access to DICOM images**: Ilias Maglogiannis, George Kormentzas, Thomas Pliakas and Charalampos Doukas discuss the compression, encoding and Decoding of the DICOM images. [1] They have also elaborated the mobile access to

used the concept of WBAN(Wireless Body Area Networks) for the data collection or data accumulation. The authors have made a valid point of improving QoS (Quality of Service) of the existing systems which often have resource

limitations like Space limitation and Time limitation by using the Cloud Services and Virtualization. These technologies provide ample storage on cloud and also give processing powers which are situated remotely which obviously improve the QoS as stated above.

- **Health-care in PERVASIVE manner**: Upkar Varshney, a professor at Georgia State University, in his article has rightly pointed to the importance Mobile Telemedicine in health-care. [4] This Mobile Telemedicine technique plays a vital role in getting the pervasive nature of the health- care. Patient Monitoring is done through Wireless LAN(Local Area Networks) and PAN(Personal Area Network). With remote monitoring, the patients undergoing intensive care at the less manpower areas can get the services within less time spanned. Author has also emphasized on the use location based tracking of the patients. It can also help us find people with matching blood groups, organ donors, and so on.

## 3. Proposed Idea

The main idea here is to design an intuitive app wherein system does:

- Enable the user to select the symptoms that user is having.
- Using those symptoms, predict the risk of the user having a particular disease.
- Take various constraints like Age, Race and Gender into consideration for that prediction.
- Give the risk analysis of the disease which patient has.
- Send an SMS or just a normal notification just after the risk analysis of the disease is done.
- Store the data accumulated onto the cloud.
- This storage on cloud will enable the user to retrieve records, update records and to delete them as required and whenever required.

## 4. Goals

The main objective of this application is to provide immediate response to emergency situation. Other goals are:

1. To prevent data fluctuations i.e. to maintain data integrity of user.
2. To provide accurate predictions based on medical history.
3. To increase the reach of health-care products
.
4. To provide cost effective solution to solve health related issue in remote or rural side area.
5. To reduce gap between doctor/specialist and patient for solving the problem related to health.

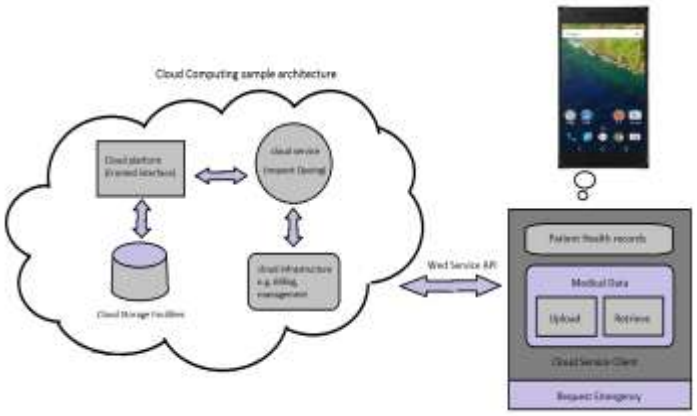
## 5. Mobile Health-Care Predictor System And Cloud Computing

The mobile health-care system focuses on reducing the delay the request for emergency and response to that request. In order to achieve this we need to enhance access to patient related information during decision making. Another reason behind error occurrence is the ineffective communication among patient care team members which includes doctors pharmacists etc. This app focuses on increasing communication among members. Cloud model promotes availability and is composed of five essential characteristics three service models and four deployment models. Characteristics:

1. **Resource pooling**:- The providers computing resources are pooled to serve multiple consumers and dynamically assign reassign resources ccording to consumer demand. Example of resources includes storage, platform, processing ,virtual platforms and network bandwidth .
2. **Broad network access**:- Resources are available over the network. And access through standard mechanism by thin or thick client platforms. examples Smart phone, PDA, tablets. Use of cloud enables us to widen our network access that is it ensures enhanced scalability.
3. **Rapid elasticity** :-resources can be rapidly and elastically engaged and disengaged that is resources can be quickly scaled in or scaled out.
4. **On demand self-service**:- consumer can obtain access to computing capabilities such as server computing, network storage in single handed manner without requiring human interaction with each service provider.

## 6. Proposed System

Following are the basic part of the system architecture for developing and deploying the mobile health-



care applications that utilize Cloud Computing.

1. **Android Application:**

**Get/Set Personal Details**: For the sake of storing records, it is important to get the personal details of the patient. The personal details include some factors like ID, Name, Address, Contact Number, Height, Weight etc. The other essential details that are supposed to be uploaded are the DICOM images which include MRI Scan, X-Ray report, CT scan and various other details. The application will contain the separate interface for entering Personal Details, deleting them and updating them. The interface would start with the buttons to be tapped. These buttons when tapped will lead to respective process to complete.

- **Get/Set Symptoms**: It is a bit tricky to perform this kind of an action. To know what exact symptoms of a particular disease are, one needs perfect knowledge of the symptoms which varies according to Location, Age, Gender and similar factors. For now, it is probably enough to take the symptoms of a patient by making him to tick mark the symptoms and storing them. Basically prediction is always based on something that has already happened. So we are making use of history of each and every disease. After that, there would be proper analysis of those symptoms. Prediction will be done by one of the best prediction algorithm having less time and space complexity. We are going to store some instances of a particular disease which would be taken into consideration while prediction.

2. C**loud Infrastructure**:

- For the realization of the mobile health-care infor-mn management system the Simple cloud Storage Service has been utilized. The main reason for selecting the specific Cloud Computing platform is that it is a well established and used successfully in several applications. All the data will be stored on to the cloud.

## 7. Utilizing Cloud Service

For the realization of the mobile health-care information management system the Simple Storage Service has been utilized. The main reason for selecting the specific Cloud computing platform is that it is a well established and used successfully in several applications. It provides users with several inter-operable web interfaces for managing data (SaaS model) and developers with the ability to create their own applications for accessing the latter (PaaS model) and is suitable for managing health-care information

## 8. Mathematical Model

Let H be the Mobile Health-care system.

H ={ I , O , P , S , F }

Where,

I = Set of inputs

O = Set of outputs

P = Set of processes

S = Set of success cases

F = Set of failure cases

I = {I1, I2 , I3 , I4}

Where,

I1 = Personal details ( Name, Address, Weight, Height)

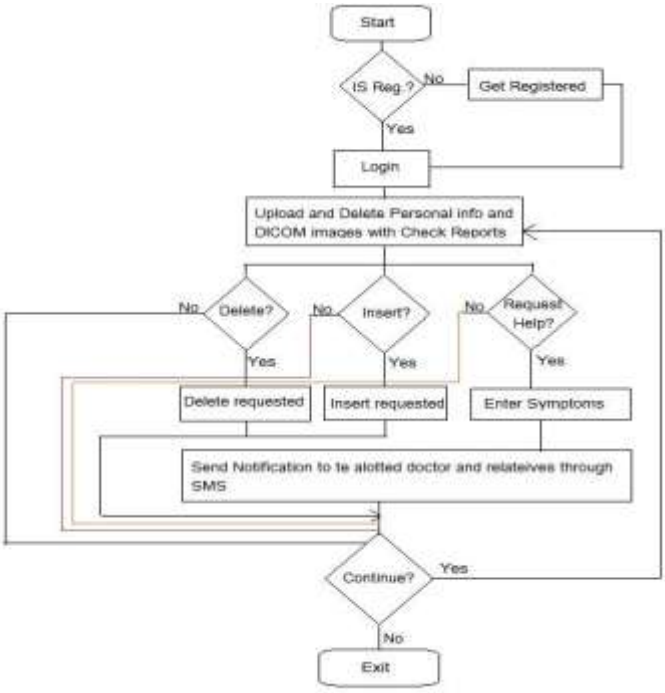
I2 = DICOM Images (CT scan, MRI, ECG etc)

I3 = Symptoms of patient

I4 = Medical history

O = {O1, O2, O3, O4}

Where,



O1 = Set of data requested by Patients

O2 = Set of data requested by Doctors

O3 = Set of DICOM images

O4 = Individual disease risk analysis based on symptoms

O5 = Analysis according to medical history

P= {P1, P2, P3, P4, P5, P6, P7}

Where,

P1 = Upload records (such as Personal Details and DICOM images)

P2 = Retrieve records

P3 = Update records

P4 = Delete records

P5 = Request emergency

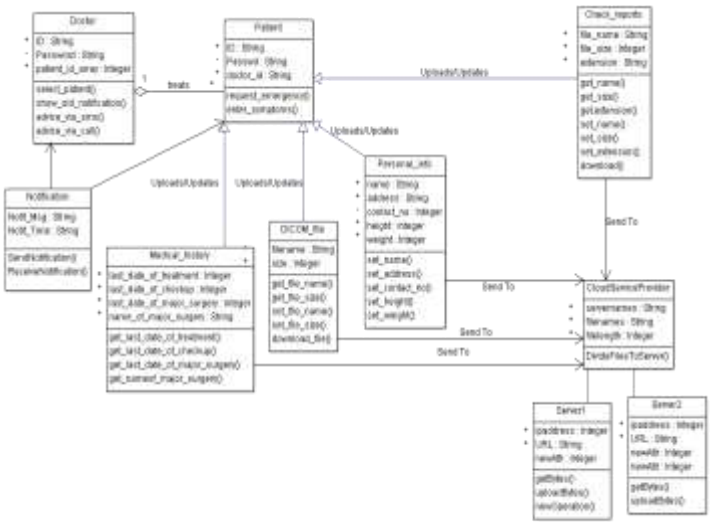
P6 = Get symptoms

P7 = Send notification about Risk

S= {S1, S2}

Where,

S1 = Undisturbed internet connection




S2 = Ample amount of battery

F = {F1, F2 , F3}

Where,

F1 = Shaky internet connection

F2 = Insufficient battery

F3 = Wrong interpretation of reality by Patient while entering the symptoms

**Figure:Class Diagram**

## 9. Conclusion

A. It provide Quality of Service, low power consumption, and Cost effective continuous health monitoring and mobility

B. Mobile Based Health Monitoring System is very useful technology with many benefits for medical applications, patients and society by continuous monitoring and early detection of diseases.

C. By using this system medical health-care system will improve their performance and will be useful for reducing death rate.

## 10. Future Work And Scope

A. System made available to all users such patient and doctors easily.

B. This system can be made to handle larger amount of data and handle more number of hospitals data.

C. In future, this app can also provide its own messenger, in order make patients from same hospitals to communicate with each other.

D. Availability of reliable communication net-works, electrical power for device charging in remote rural locations.

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