



## PHR Based Health Care and Emergency Aid System using Google Cloud Messaging

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**Abstract:** Recently, there has been a remarkable upsurge in activity surrounding the adoption of Personal Health Records (PHRs). PHRs contain global patient information and not certain pieces collected by individual healthcare providers. Thus they can be used as basic infrastructures for building and operating several important systems for healthcare system. Emergency medical systems (EMS) are among the most crucial ones as they involve a variety of activities which are performed from the time of a call to an ambulance service till the time of patient's discharge from the emergency department of a hospital and are closely interrelated so that collaboration and coordination becomes a vital issue for patients and for emergency healthcare service performance. The integration of leading-edge technologies, such as cloud-based services and mobile technology, with Personal Health Records (PHRs) can prove important in emergency care delivery as it can facilitate authorized access to comprehensive and unified health information. The proposed EMS is accessible by Android-enabled mobile devices and incorporates a customized asynchronous notification feature whereby caregivers are notified on critical data updates in a way that efficient utilization of mobile device resources is achieved.

**Keywords:** Google Cloud Messaging, Client Server Architecture, Android Operating System, Push Notification, Database

### I. INTRODUCTION

PHR is abbreviated as Personal Health Record. For keeping track and share past and current information about person health, or collect all PHR information this tool can be used. [1]. This concept of PHR Based Health Care System can act as connecting bridge between patient and doctor with no restriction of time and place. In this System, the patient have its own PHR record and cannot update his PHR record and can also links his/her family doctor to PHR record. When a Doctor updates PHR record, the patient who has linked PHR record will get automatic notification. Thus doctor get updates about recent condition of patient and can also give suggestion to patient as required.

Emergency Aid System, more commonly known as EAS, is a system that provides emergency medical care [1]. The Concept of Emergency Aid System using PHR is that, Suppose an accident of person occurs who has a PHR record, he/she can immediately notify through his/her digital device about accident to nearest registered hospital from the location where accident has took place. The corresponding hospital will get notification about the accident, which contains person's user id for PHR record. Thus the hospital personnel can get the person's health related information and location where accident has taken place, in advance and thus can do emergency treatment appropriately. The project will be implemented on android platform [2].

#### A. Scope of Project:

- Provide a tool to a person to keep track, collect and share their present and past Health information by means of PHR (Personal Health Record) [3].
- Minimizing the communication gap between Patient and Doctor by means of PHR regardless of their place or time and thus contributing to overall enhancement of health care service for patient.
- Enhancing Emergency Medical service by giving person a medium to notify nearest emergency center

immediately in case of an accident or emergency.

- Helping Emergency team in providing emergency medical treatment by providing them with the PHR record of the person who has to be given emergency treatment.

Thus there will be an efficient communication between patient and doctor by the medium of PHR and also PHR will be used to improve emergency medical service

#### B. Advantages over Current Health Care System:

It makes dealing with your illness easier by helping you stay organized. Never forget a doctor visit, medication, or contact many number again. Since it implements concept of using PHR in Emergency Aid System which can provide sufficient past and present health information about the person and also provide exact location where accident has taken place to Emergency team Thus this model provide an efficient way for communication of health information between patient and doctor. Also there no online tool for better emergency aid service for the person. This model provide an effective way for emergency aid system using PHR. [6]

### II. REVIEW OF LITERATURE

#### A. Current Technology for PHR Based Health Care and Emergency Aid System and Their Drawback:

Many tools available to maintain PHR such as Web based service tools like iHealthRecord.org [4], Care plan is tool for patients with longer term illnesses like cancer, heart disease, diabetes, etc. [4], Software based tools like Personal Portable Electronic Medical Records and ID, Clade Health Tracker, etc. and Paper based tools such as MyPRO Medical-Health Records Organizer, Jakoter Health Organizer, etc. But none of them implements concept of using PHR as connecting bridge between patient and doctor with no restriction of time and place. That is Patient can share his/her health information with his doctor due to which doctor can get regular update about patient's health

which can contribute to better Health care procedure. There also many Emergency Aid System in Web based service or Software form such as Ambutrax, Advance Dispatch, Ambulance Dispatch Software, AmbuPad, etc. Since they doesn't make use of PHRT, Thus Emergency team cannot use this information to provide better emergency medical service to the person. Thus there are no online tool which can provide an efficient medium to communicate with the doctor to provide each and every current information about patient.

**B. Correlation of emergency system and Android operating system:**

Figure 1a represents increasing emergency incidents over years. It could be clearly seen that from the year 1994 there is a tremendous increase in the emergency incidents till now and the figure 1b represents the use of android operating system among users in the year 2014. The number of android users are more as compared to other platform users.

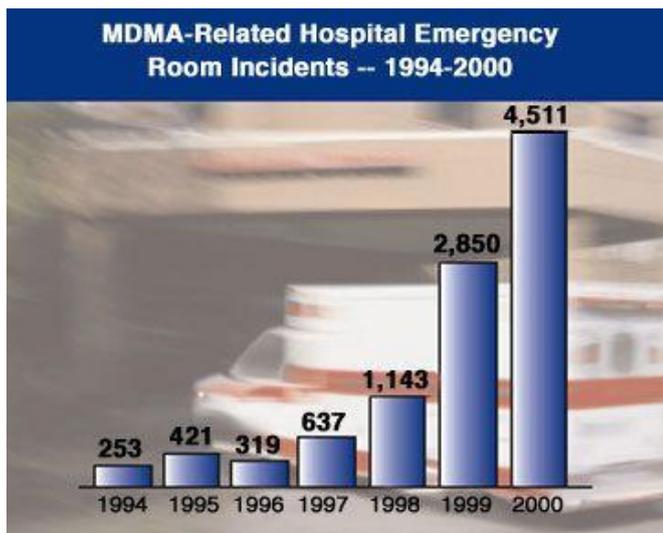


Figure 1a :- Hospital Emergency incidents[5]

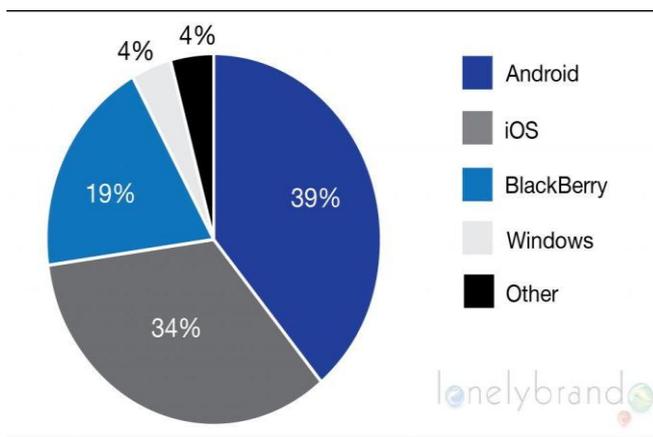


Figure 1b :- Android operating system preference among Users[6]

Thus it is clear that increasing emergency medical system require a platform which should be popular among most of the users. So, use of android smart phones as a platform to serve for emergency medical system is quite feasible and will help improve emergency medical service.

**C. User of the System:**

The user of this system can be broadly classified as:-

- a. Patient
- b. Doctor

The Patient access the system to create or update his/her PHR record and register or update his/her family doctor's name. As soon As patient updates his/her PHR record, the updated fields of PHR is notified to device of patient's family doctor. Thus PHR will become an effective medium for communication between patient and doctor. The patient can also press an emergency button to send emergency medical service team a notification regarding accident of patient. Thus a timely notification is send to emergency team and emergency team then can perform the emergency medical service efficiently.

**III. PROPOSED SYSTEM ARCHITECTURE**

As the project will be implemented on android platform, the medium for user of system to interact with the system will be digital devices with android platform such as smartphones, tablets, etc. Android is chosen as platform as it is popular and it is best suited as client device for this system architecture. The server will be web server to which Android clients connect through HTTP, in order to send request and receive responses along with data contents. A database will be present behind web server which store all system relevant user information such as patient's identity, health detail's, doctor's identity, etc. Web server will provide data to clients, where the data will be the data stored in database. A client can also send data to other client in form of notification. The notification will be send through web server using Google Cloud Messaging.

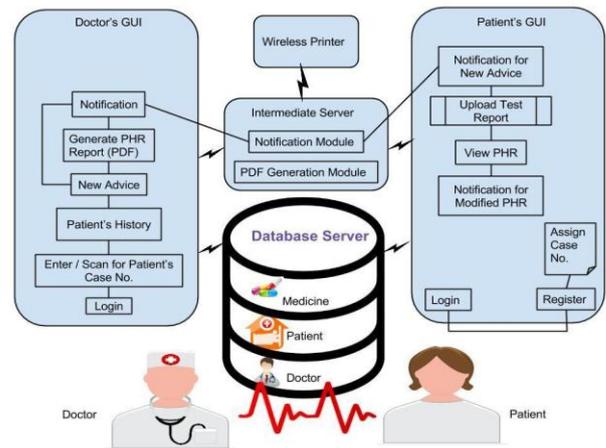


Figure 2. System Architecture

The explanation of the System Architecture as shown in figure 2, is as follows :-

- Step 1: - Patient informs to doctor his name using which doctor creates personal health record for patient.
- Step 2: - Personal health record created by doctor appears in the list of Personal health records of patient. Now Patient can attach test report as per advised by doctor in patient health record.
- Step 3: - Doctor will be notified when patient attaches test report to the Personal health record created by Doctor himself.
- Step 4: - Doctor then can create new Personal health record for patient after getting test report along with Personal health record from patient which then again will be notified to patient and so on.

The Doctor receives notification about the updated PHR record which is updated by patient through the system. The

**Table 1.**

Sample PHR Data Types and Potential Sources

Data Type	Source
Problem list	Patient, EHR
Procedures	Patient, EHR, or claims
Major illnesses	Patient, EHR, or claims
Provider list, potentially linked to problems	Patient, EHR
Allergy data	Patient, EHR
Home-monitored data (eg., BP, glucose, peak flow)	Patient, automated interface with equipment
Family history	Patient, EHR
Social history and lifestyle	Patient, EHR
Immunizations	Patient, EHR, immunization registries
Medications	Patient, EHR, claims history (partial data)
Laboratory tests	Patient, EHR, commercial laboratories

PHR = personal health record; EHR = electronic health record.

Doctor thus can get the current as well as past information of the patient and also receive updates about any current information about patient's health. Doctor can also send any suggestion about any health related issue to patient's to which he/she is registered as family doctor.

Ideally, the PHR should include as much relevant data as possible over the individual's lifetime, from multiple sources, including health care facilities as well as the individual. The specific data source of each item should be labeled and visible to the user. The more comprehensive the data contained in a PHR are, the more useful the data will be to patients and care providers. Although there are no conventions for what data should be contained in a PHR, symposium participants suggested that the items listed in Table 1 should be included in any PHR. A number of different sources may furnish the data outlined in Table 1.[7]

**IV. IMPLEMENTATION**

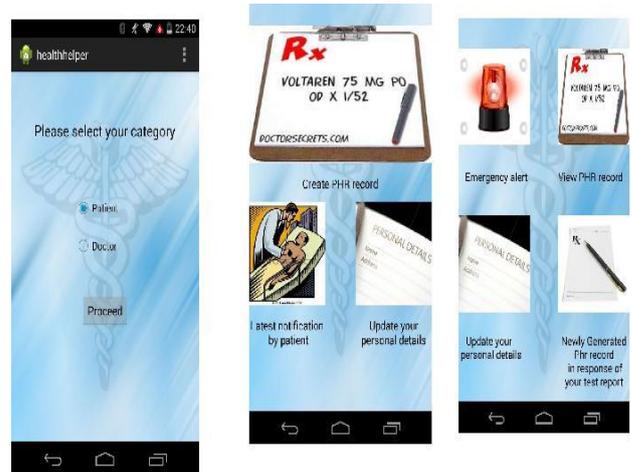


Figure 3a. Home Page Figure 3b. Doctor’s home Page Figure 3c. Patient’s home Page

Fig 3a. shows home page of app in which user will provided with two option either to select patient or doctor Fig 3b. shows different options provided to doctor after log in successfully from the home page given in Fig 3a. The options are :-

- a. Create PHR record of a Patient
- b. Update his/her personal details
- c. View the notification given by patient.

Fig 3c.shows different options provided to patient after log in successfully from the home page given in Fig 3a. The options are :-

- a) Send Emergency notification to doctor
- b) View his/her own PHR record
- 3)Update personal details
- c) View Notification given by Doctor.

**A. Working:**

Firstly the patient will tell his name to the Doctor, then the Doctor will check his name in the Database. If the name is already present the Doctor will check the record of the patient and can update or create a new PHR of patient. Else the doctor will ask the information of the patient and generate a new PHR of the patient.[8]

Now the patient will be notified by the application regarding the new PHR update or the suggestion made by the Doctor and will undergo the treatment as per suggested by the Doctor.The new PHR will be updated to the patient record. The patient can view his PHR record and can undergo the test suggested by the Doctor. After the patient has gone through all the test the patient will update/link/submit his test report in the application software.

Doctor will get the notification of the same. The Doctor then can view all the test undergone by the patient and will generate the new PHR of the patient if required or will suggest the medicines to the patient.

Figure 4 represents a sample PHR record generated through the implemented android application.This PHR record is in its digital form and is stored in pdf format.

11 Mar 2015 22:02:26

**DOCTOR DETAILS**  
 Shifa clinic Mumbra  
 Dr. raees(MBBS)  
 Registration no :-4688826

**PATIENTS PERSONAL DETAILS**  
 Name :-ravish      Age :-20  
 Gender :-Male      Blood Group :-A+

**Medical Report**  
 List of diseases occur or symptoms of disease:  
 malaria

**Medicine prescribed**  
 zepugff

**Progress Notes**  
 not good at moment

**Consultation**  
 sleep

**Physician's Orders**  
 eat light

**Operative report**  
 [Empty field]

**Discharge summary**  
 [Empty field]

Followed by phr on date:-  
 11 Mar 2015 21:57:21

(raees)

Figure 4. Pdf generated

## V. APPLICATIONS

PHRs grant patients access to a wide range of health information sources, best medical practices and health knowledge. All of an individual's medical records are stored in one place instead of paper-based files in various doctors' offices. Upon encountering a medical condition, a patient's health information is only a few clicks away [9]. PHRs offer patients the opportunity to submit their data to their clinicians' PHRs. This helps clinicians make better treatment decisions by providing more continuous data.[7][10]

In part, PHRs represent a repository for patient data, but PHR systems can also include decision-support capabilities that can assist patients in managing chronic conditions. Most consumers and patients receive care from many health care

providers, and consequently their health data are dispersed over many facilities.

## VI. CONCLUSION

PHR provide a tool to a person to keep track, collect and share their present and past Health information. It also minimizes the communication gap between Patient and Doctor regardless of their place or time and thus contributing to overall enhancement of health care service for patient.

PHR also enhances Emergency Medical service by giving person a medium to notify nearest emergency center immediately in case of an accident or emergency. It also helps Emergency team in providing emergency medical treatment by providing them with the PHR record of the person who has to be given emergency treatment.

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