



ANDROID MOBILE APPLICATION FOR HOSPITAL MANAGEMENT

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ABSTRACT

Hospitals are the largest and most complex organizations where health care is provided. Safe and effective patient care services in hospitals depend on the efficient decisions made by hospital executives. The main task of hospital executives is to ensure the hospital can provide high quality patient care and services. "Android Application For Hospital Management" is an Android application used for displaying hospital performance metrics on a daily basis. This application allows hospital executives to review and monitor hospital operational data with ease of access and in a portable manner. Thus, reducing the effort of the hospital executives to perform their tasks.

Keywords- Android application, hospital executives, portable, hospital performance metrics.

I. INTRODUCTION

Hospital executives need to monitor hospital performance metrics on a daily basis. Such metrics include hospital occupancy i.e. daily census, surgery schedule for the day, staffing requirements and patient care metrics like the length of stay of each patient, diagnosis details, discharge, insurance etc. The hospital executives review such metrics through reports generated on a daily basis either on paper or on their desktops through proprietary software. As a consequence of The Health Information Technology for Economic and Clinical Health (HITECH) Act [6] and The Patient Protection and Affordable Care Act (PPACA) [1], all the health care providers including hospitals have implemented Electronic Health Records (EHR) [10].

The interface for health data exchanges utilizes Health Level 7 (HL7) data set. HL7 is a US-based, ANSI-accredited health information development standard [7]. HL7 Standard helps to improve better hospital administration, record transfer and maintenance and enables the exchange of information between medical software applications. Therefore HL7 interfaces containing most of the above mentioned hospital metrics is ubiquitously available in all hospital EHRs. HL7 interfaces contain different types of messages such as Order Messages (ORMs), Admission Discharge Transfer (ADT), Detail Financial Transactions (DFTs), etc.

This mobile application utilizes ADT test feed as input because using live patient data affects patient privacy under The Health Insurance Portability and Accountability Act (HIPAA) and displays hospital operational data in an android mobile platform using Representational State Transfer (REST) web services. The main significance of the project is the mobile application developed in association with Prime Healthcare services using HL7 ADT test feed data as the input for this application.

II. LITERATURE SURVEY

A. A design approach to smart health monitoring using android mobile devices

This project deals with a new reliable health monitoring system designed for affordable low cost wireless patient monitoring system. The patient monitoring and patient care is one of the major fields which lack proper technology in rural India hospital and homes. The main cause of patient death in many parts in India is mainly due to lack of critical health care devices for monitoring the patient. This is due to 4'A's- Affordability, Accessibility, Awareness and Availability. So this project deals with monitoring of the patient through wireless



technology. The monitoring signals are finally obtained in Pc and Android mobile devices. A visualization module of the server program graphically displays the recorded biomedical signals on Android mobile devices used by patients and doctors at the end of the networks in real-time. Our approach is affordable for global health care solution is managed to process the large amount of biomedical signals through wireless body area network and mobile technology for daily lifestyle to users efficiently.

B. Development, integration and operation of mobile, Android-based medical devices in hospitals

The use of mobile applications is increasing in the hospitals. Besides numerous advantages such as time- and location independent view of examination results, documentation of therapy at the patient site, point of care workflow and decision support, smart phone- or tablet-based mobile systems pose challenges to system manufacturers and hospital-IT operators. In this paper we present our experiences on managing mobile, Android-based medical devices in hospitals based on the GlucoTab®. GlucoTab® is a client-server system using a Google Android-based tablet as a frontend device for diabetes workflow and insulin decision support in hospitals. We analyzed the hospital IT-infrastructure for mobile devices in eight different hospitals and based on recent published reports. Based on this analysis we developed suggestions on how to handle typical administrative issues like domain integration, software inventory and distribution or user management. Depending on the integration prerequisites of hospitals we finally provided five different integration scenarios for the GlucoTab® system.

C. Domain Specific Search Of Nearest Hospital And Healthcare Management System

Developed and developing countries have recognized the importance of Electronic Health Record in Healthcare Management System. Emergency Medical System (EMS) is a revolutionary approach to emergency medical treatment in some medical emergency. It also describes a mobile system that enables electronic healthcare data storage, update and retrieval using Cloud Computing. It observed that people in unknown area are in severe danger if they don't able to find hospital quickly. In emergency case a single minute counts so it is very important that automatic applications must be used for decision making, maintain up to date status of the hospital. Saving the time which can be save life of the patient. When the doctor or family receives the alarm message, they can immediately take measures to rescue the user. It can also manage the health record of the user. The user can take online medical to send their physical condition and then get prescription from doctor who will send the prescription on the user's phone. The proposed system locates nearest available hospital, contacts its ambulance emergency system, accesses a Electronic Health Record of emergency patient that can critically assist in pre-hospital treatments. The system will identify availability of the nearest available specialized hospital all through EMS server which provides continuous information about the incoming patient to the hospital. This paper proposes Android Based Tracking for EMS (Emergency Medical System) on cloud.

D. Patient Monitoring System Using Android Technology

Telemedicine is a rapidly developing application of clinic medicine where medical information is transferred through the phone or internet or other networks for the purpose of consulting and performing remote medical procedures or examinations. Telemedicine can be applied to a greater extend in the field of cardiology where ECG serves as the major tool. This project elaborates the experience; a methodology adopted and highlights various design aspects to be considered for making telemedicine in patient monitoring system effective. In this method, the patient's vital signs like ECG, heart rate, breathing rate, temperature, SpO2 are captured and the values are entered into the database. It is then uploaded into the web based server and sent to the doctor's phone using ANDROID technology. It also enables the doctors to instantly send back their feedback to the nurse station.

E. Patient Data Viewer: An Android Application for Healthcare

Health care environments today have turned to be technology-oriented. Also mobile devices and their usage have increased manifold in recent times. This paper presents the design and development of a Patient Data Viewer System using the Android mobile application development platform. This system allows the doctors to view the vital parameters of a patient remotely and respond accordingly.

III. EXISTING SYSTEM

In existing system, hospital executives will either use desktop or paper generated reports for reviewing the hospital performance metrics. It is extremely difficult to monitor the hospital operational data in a speedy and portable manner. The data in existing system will be stored in the back end.

IV. PROPOSED SYSTEM

The mobile application allows hospital executives to review the hospital performance metrics with ease of access. The mobile app will contain hospital operations data, including daily census, average length of hospital stay, patients admitted and discharged for a given day, patient insurance and diagnosis details.

The mobile app will in part free the hospital personnel from the need for daily paper reports and the need for the hospital personnel to login to the proprietary software only available on their individual office desktops. To use this mobile application the user needs to login with valid credentials. Improper or invalid authentication results in an error message. Successful login leads to the dashboard comprised of a series of icons for each of the above mentioned metrics. The user can easily view the required information just by tapping the metric icon. In order to review another metric, the user can go back to the metrics screen by using a back option. This mobile app contains refresh option in order to see updated information. Once the reviewing process has finished, the hospital executive can logout from the application using the logout option and will need to login whenever he/she wants to use the application again.

V. SYSTEM IMPLEMENTATION

The figure 1 shows the implementation overview of the application. In this application, HL7 ADT test messages need to be decoded into a meaningful format and stored into the SQL database using Java programming language and Java Database Connectivity (JDBC) connection through the Eclipse IDE tool.

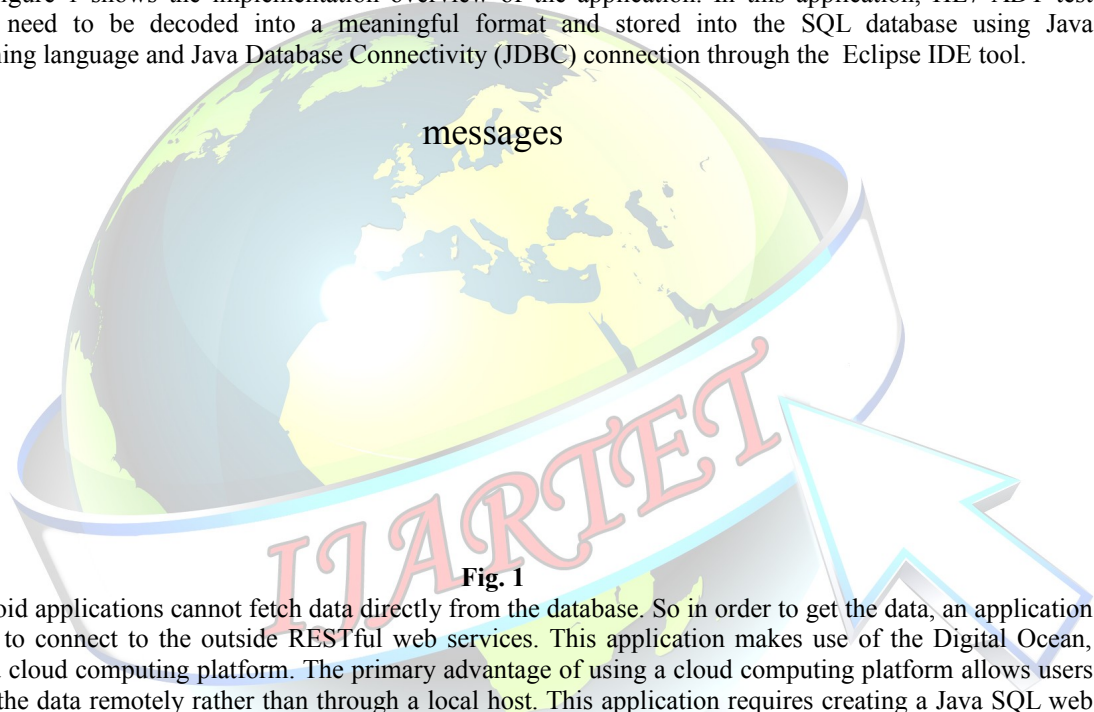


Fig. 1

Android applications cannot fetch data directly from the database. So in order to get the data, an application is needed to connect to the outside RESTful web services. This application makes use of the Digital Ocean, which is a cloud computing platform. The primary advantage of using a cloud computing platform allows users to access the data remotely rather than through a local host. This application requires creating a Java SQL web app which acts as the RESTful web service.

Uniform Resource Locator (URL) for the web app which holds records from the database in JSON format. The host name for Putty is used for deploying java files to the web app in order to generate a JSON/XML representation of values that are fetched from the database. The next step is to connect the Android application to the web app for accessing the JSON data and updating the user interface. This can be achieved by using asynchronous task (Async task) in Android.

VI. OUTPUT SCREENSHOTS

The figures displayed below are the sample screenshots of the android application for mobile phones.

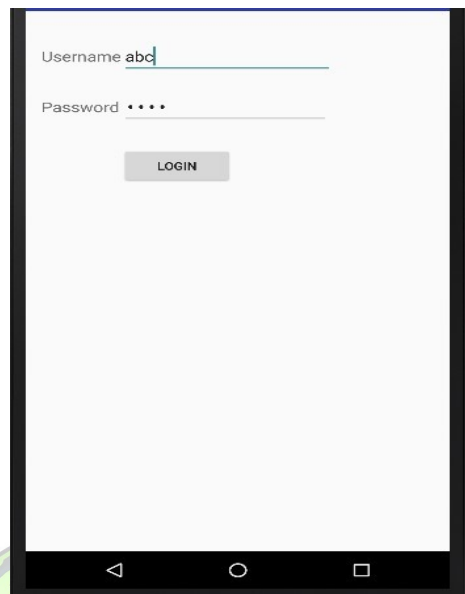


Fig. 2

The fig.2 is the login page of the android application. The login page will have the username and password. Only valid username and password must be enter. If the user enters wrong username or password, the application will popup a invalid username and password message.

In the fig.3, the application will display the different metrics of the hospital such as admit, discharge, census, insurance, length of stay, diagnosis.

The fig.4 will display the admit screen where we can select any date and number of patients admitted on particular selected date will be displayed.

The fig.5 is the discharge screen where the selected date will display the number of patients discharged.

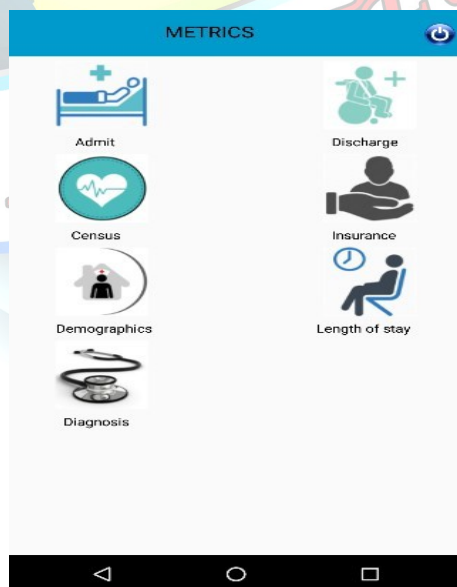


Fig. 3

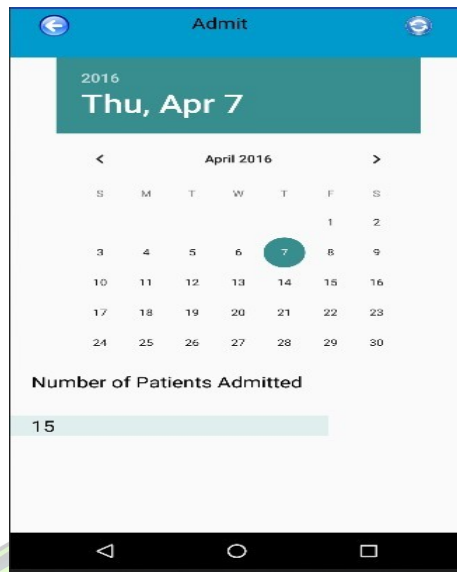


Fig. 4

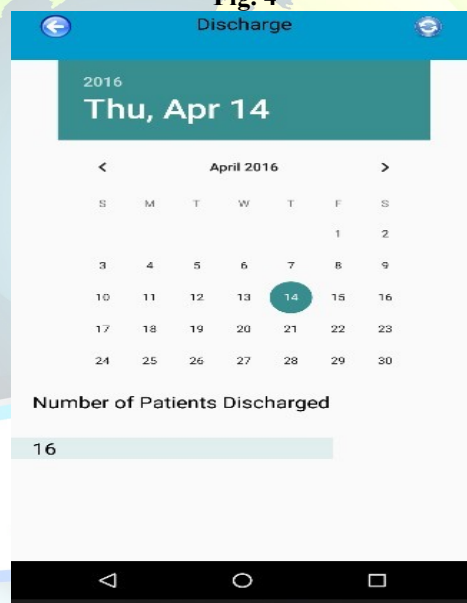
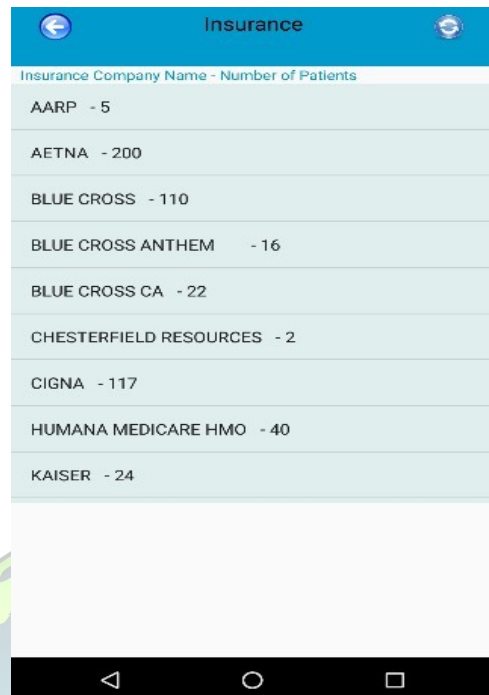


Fig. 5

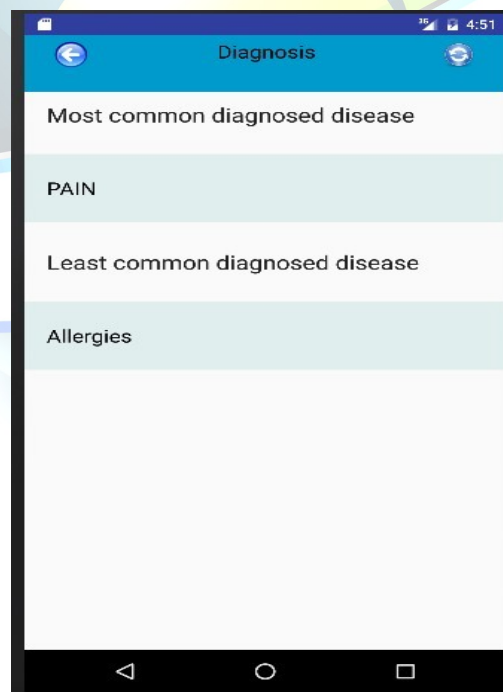
The fig.6 is the insurance screen. This will display the details about the insurance company name and the number of patients using particular insurance.



| Insurance Company Name - Number of Patients | |
|---|-------|
| AARP | - 5 |
| AETNA | - 200 |
| BLUE CROSS | - 110 |
| BLUE CROSS ANTHEM | - 16 |
| BLUE CROSS CA | - 22 |
| CHESTERFIELD RESOURCES | - 2 |
| CIGNA | - 117 |
| HUMANA MEDICARE HMO | - 40 |
| KAISER | - 24 |

Fig. 6

The fig.7 is the diagnosis screen. This metric will give the information about the diagnosis under gone by the patients. The diagnosis is differentiated as the most common diagnosed disease and least common diagnosed disease.



| | |
|--------------------------------|--|
| Most common diagnosed disease | |
| PAIN | |
| Least common diagnosed disease | |
| Allergies | |

Fig. 7

VII. FUTURE ENHANCEMENT

The application can include the number of surgeries done on a particular day. It can also include the staffing requirements etc on the android application. The registered patient number can get the details about his/her billings, disease etc. Even the application can be developed for the easy usage for the patients. The ambulance service for emergency purpose can also be added in future.



VIII. CONCLUSION

The “android mobile application for hospital management” is designed to help the executives to review, monitor and analyze the hospital performance metrics on a daily basis such as number of patients admitted and discharged, daily census, length of stay, details about the insurance for a patient, disease diagnosed etc. In this application the patient registration can be done a web application and the details can be retrieved on the android application from the database instead of viewing it on a desktop or paper generated reports.

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