A Survey on Android Application E-Health Care System

Kirti Borke[1] Sailee Malvankar[2] Utkarsha Hajare[3] Madhuri Adsul[4] Prof. Khandu Khot[5]
[1,2,3,4]B.E Student [5]Assistant Professor
[1,2,3,4,5]Department of Information Technology
[1,2,3,4,5]PVPPCOE Sion, Mumbai

Abstract— Recently there has been a need to incorporate the use of mobile computing devices in hospital or clinical applications, to enhance patient care. many healthcare organizations still record and distributed instrument output data and patient records in paper form, which can lead to errors in interpreting records and ultimately to misdiagnosis. Existing system like 'practo' there are some faults noticed in customer review. The advancement of wireless technology has created unique mechanisms of interaction that can meet the needs of e-health system robustness, reliability and accuracy requirements. The proposed system is mainly used by the organizations where confidentiality and integrity of the data has utmost importance. It sets up a schedule for the project members to make them aware of the complexity and risks that are related to project. The purpose of this project is to improve the efficiency of the existing Health Care System by incorporating some mechanisms to reduce the overload on the system.
Key words: E-Healthcare, Patient Records, Vaccination, Cloud Database, E-Bill

I. INTRODUCTION

To take up WHO's famous "Health for all in 2000" declaration, made in Alma Ata, we may now speak of "e-health for all in 2015" as being a credible and realistic objective – and one which it is our shared responsibility to achieve. Different definitions have been used over time to designate ICT applications in the service of health. Around 1970, the term "medical informatics", considered at the time to be state-of-the-art technology, was used to refer to the processing of medical data by computers. However, the importance of "information processing" was to be rapidly superseded by that of "information communication", as seen in the extremely rapid development of the Internet. Health applications then became known as "health telematics" or "telemedicine", and now "e health". The acceleration of transfer rates over networks of interconnected computers (currently in the order of several gigabytes per second) has removed all barriers to the exchange of medical data, physiological signals and medical imagery between computers. The standardization of exchange protocols between computers, such as the Internet Protocol for example, in addition to the improved structuring of medical data and data security rules, is increasingly making it possible for health professionals in different locations to understand one another and work together, despite differences in languages. It is now clear that the value of these applications lies not in the technology itself, or even in the exchange of data, but in the ability to develop human networks of competence and expertise in the field of health.

In short, this new way of working – networking all those involved in the health enterprise – is rapidly expanding thanks to technological progress. Tens of thousands of health, wellness, and medical apps are now available for download to Apple or Android devices from online stores. Harnessing the potential power of apps for healthcare has become a focal point of innovation, in particular those apps which can be used by consumers or patients as part of their wellness, prevention or treatment Development and use of healthcare related apps is growing rapidly but the current level of functionality is limited and use is mostly for prevention and wellness. The advancement of wireless technology has created unique mechanisms of interaction that can meet the needs of e-health system robustness, reliability and accuracy requirements. This chapter describes the project goals and possible applications of the system. It also sets up a schedule for the project members to make them aware of the complexity and risks that are related to project. The purpose of this project is to improve the efficiency of the existing Health Care System by incorporating some mechanisms to reduce the overload on the system.

The proposed system is mainly used by the organizations where confidentiality and integrity of the data has utmost importance. The goal of the System is to improve the efficiency of the healthcare system by reducing the overall time and cost used to create documents and retrieve information . The main feature of E-Knowledge in Health Care system is to provide the browser to get appointments from a doctor through internet instead of going there and fixing an appointment. In Doctor's side they can view their appointments and prescribe medicine for their patients. E-Health Care System maintains patient's prescriptions so that their medical details are always available in Internet, which will be more convenient for the patients. This will be more comfortable for the patient. Patient details and prescriptions are maintained confidentially.

Earlier, many healthcare organizations still record and distributed instrument output data and patient records in paper form, which can lead to errors in interpreting records and ultimately to misdiagnosis. In existing system like 'practo' there are no vaccination remainders for new born baby. Features like E-bill for medication by doctor is provided where user can pay to doctor conveniently are absent in existing system. Patient and doctor chatting feature also not available. To improve the performance of the system, E-health care system enables more informed decision making and enhanced quality of care and Saves lives through remote consultations, whether urgent or diagnostic. The main feature is to provide the browser to get appointments from a doctor through Internet instead of going there and fixing an appointment. It creates more efficient, convenient and potentially more cost effective delivery of care. Also provides Facilitates earlier - and more accurate – diagnoses and greater, and faster, access to a patient's medical history, reducing the risk of negative drug interactions or poor response to a course of treatment. Proposed system improves administrative efficiency and coordination. Allows rural residents to receive expert

diagnosis and treatment from distant medical centers. Supports real-time treatment by first responders through the use of wireless devices.

A. Main Objectives include:

- Emergency SMS
- Efficient alert generation for Vaccination
- Online Appointments.
- E-Billing.
- Patient Records Maintenance using cloud computing.
- Video Calling , Inbox Queries Features
- Searching nearest clinics and Doctors.

Paper is organized as follows. Section II describes the usage of cloud and services it provides. Also its functionality for e-health care application. Literature survey is given in Section III. Section IV presents the proposed system to be implemented. Finally, Section V presents conclusion.

II. RELATED WORK

The Cloud Computing paradigm offers E-Health systems the opportunity to enhance the features and functionality that they offer. However, moving patients' medical information to the Cloud implies several risks in terms of the security and privacy of sensitive health records. In this paper, the risks of hosting Electronic Health Records (EHRs) on the servers of third-party Cloud service providers are reviewed. To protect the confidentiality of patient information and facilitate the process, some suggestions for health care providers are made. Moreover, security issues that Cloud service providers should address in their platforms are considered.

To show that, before moving patient health records to the Cloud, security and privacy concerns must be considered by both health care providers and Cloud service providers. Security requirements of a generic Cloud service provider are analyzed. To study the latest in Cloud-based computing solutions, bibliographic material was obtained mainly from Medline sources. Furthermore, direct contact was made with several Cloud service providers.

Some of the security issues that should be considered by both Cloud service providers and their health care customers are role-based access, network security mechanisms, data encryption, digital signatures, and access monitoring. Furthermore, to guarantee the safety of the information and comply with privacy policies, the Cloud service provider must be compliant with various certifications and third-party requirements, such as SAS70 Type II, PCI DSS Level 1, ISO 27001, and the US Federal Information Security Management Act (FISMA).

Storing sensitive information such as EHRs in the Cloud means that precautions must be taken to ensure the safety and confidentiality of the data. A relationship built on trust with the Cloud service provider is essential to ensure a transparent process. Cloud service providers must make certain that all security mechanisms are in place to avoid unauthorized access and data breaches. Patients must be kept informed about how their data are being managed.

Sometimes an image may contain text embedded on to it. Detecting and recognizing these characters can be very important, and removing these is important in the context of removing indirect advertisements, and for aesthetic reasons. Medical experts believe that cloud computing can improve health care services, benefit health care research, and change the face of health information technology. Cloud computing refers to an on-demand, self-service in the cloud Internet infrastructure, that enables the user to access computing resources anytime, from anywhere in the world, with the help of the Internet. The cloud is a new model of delivering computing resources to health care service provider industries, for the development of medical applications, which includes Microsoft HealthVault and Google Health platform. Compared with conventional computing, the cloud model provides three advantages: massive computing resources available on demand, elimination of an upfront commitment by users, and payment for use on a short-term basis as needed. Health care, as with any other service operation, requires continuous and systematic innovation in order to remain cost effective, efficient, timely, and provide high-quality services. The biomedical informatics community, especially consortiums that share data and applications, can take advantage of the new computing paradigm. Anderson et al indicated that data-handling problems, complexity, an expensive or unavailable computational solution to research problems are major issues in biomedical research data management and analysis. Some of the commercially available cloud platforms include Amazon Elastic Compute Cloud (EC2), Google App Engine, and Microsoft Windows Azure. The cloud model is composed of three main services depending on the capability and availability to support Web-based health services, such as Infrastructure as a Service, Platform as a Service, and Software as a Service. In addition, cloud computing has special features for clients (radiologists, physicians, researchers, and patients), aiming to reduce the burden of heavy investments and to utilize resource outsourcing, software, hardware, automated resource management, parallel computing, virtualization, and utility computing.

III. LITERATURE SURVEY

In the previous chapter we have given the aim of the project for developing an efficient E-Health Care System. In this chapter literature survey on the existing Health care system is highlighted in reference to the performance and approach of the current Apps have become ubiquitous in many aspects of our lives over the past five years, fueled by the widespread availability of tablet computers and smartphones. Tens of thousands of health, wellness, and medical apps are now available for download to Apple or Android devices from online stores. Harnessing the potential power of apps for healthcare has become a focal point of innovation, in particular those apps which can be used by consumers or patients as part of their wellness, prevention or treatment Development and use of healthcare related apps is growing rapidly but the current level of functionality is limited and use is mostly for prevention and wellness.

- Despite the large number of healthcare apps developed, the majorities have only simple functionality; however mobile apps can be used for remote monitoring providing potential for extra data collection to aid healthcare management.

- Almost 50% of healthcare apps available to consumers can be downloaded for free and are produced by a variety of types of developer
- Apps are available across the full spectrum of the patient journey, although healthy living apps dominate the space, whereas self-diagnosis, filling prescriptions and medication compliance have the lowest numbers of apps developed to date
- Some apps cover the full patient journey and are therapy area specific or demographic specific but there are still significant areas of unmet need to be filled With increasing interest in the use of mobile apps in healthcare, this study sought to undertake the most comprehensive analysis of the 43,689 mobile healthcare apps available to the general consumer through the English language U.S

IV. EXISTING SYSTEM

Many healthcare organizations still record and distributed instrument output data and patient records in paper form, which can lead to errors in interpreting records and ultimately to misdiagnosis. In existing system like 'practo' there are features such as online appointments, searching feature for nearby doctors and clinics. Patient and doctor chatting feature such as video chatting, Inbox queries and posting Images also not available.

V. PROBLEMS IN EXISTING SYSTEM

- Lack Information about doctors profiles.
- Availability of Patients record.
- No Emergency Service.
- Posting Pictures, queries to doctors.
- Updating of patient account information.

A. Example of Existing System:

1) My Medical

It is a comprehensive record-keeping app for your personal medical information. It's the perfect replacement for unreliable paper records or various electronic systems that hold bits and pieces of your medical history. With My Medical, any and all information that is important to you is kept together in one My Medical isn't just one medical record. You can keep as many records as you need in a single purchase. Use it for a spouse or aging parents. Use it to keep immunization records for your children. Use it to look after a special needs child.

It's never been easier to keep up with the health of your whole family. Doctors, nurses and clinicians: use My Medical to maintain observations on your patients or keep track of lab results. My Medical will automatically put doctor's appointments and upcoming lab tests on your device's calendar. You can even set reminder alarms directly from the app, without ever going into your calendar. My Medical provides a range of common test result templates for you to track test results. To name just a few: blood pressure; cholesterol; metabolic panels; blood sugar; CAT scan; height and weight. If that isn't enough, construct and customize your own test results to keep track of exactly what you need.

Chart test results with sophistication and discover trends over time. With the charting feature you can view multiple graphs simultaneously and even see moving averages to uncover long term changes. From the user's review this application was less flexible varies from device to device and Visualization of data requires long time. Vaccination reminder feature is not present In this application. It poorly fails in to enter Daily Log Entries such as Weight, Blood Pressure, Blood Sugar Levels, etc. responsiveness also low.

B. Urgent Care

Lets you speak to a US based registered nurse who will triage your medical questions and if needed have a licensed physician call you back within 30 The doctor may give assessments, medical advice or diagnose a wide range of conditions over the phone as well as prescribe common medications. Plus, Urgent Care features the award winning A.D.A.M. medical dictionary and medical encyclopedia as well as an interactive symptom checker for additional health How can this be only $3.99 a call when other apps charge $40 or more? Other apps connect you instantly to a doctor for upwards of $40 a call, no matter if it's medically necessary or not. Urgent Care however connects you first to a Registered Nurse who based on the symptoms can escalate your call to a Doctor or Pediatrician if needed for no extra charge – saving unnecessary calls and allowing us to pass the savings on to you. In this application on the description receipt it was printed $3.99 you can talk to a nurse then if needed, a doctor at no extra cost .but practically when patient went to hospital sometimes he had to pay more money, where it actually not predetermined. It doesn't provide reliable and consistent customer service.

C. HealthTab

Live Virtual Consults – HealthTap Prime Members receive unlimited medical advice from top doctors via chat, HD video, and audio, 24/7 from any mobile device or web browser. Doctors can order lab tests, refer to specialists, or prescribe medically appropriate treatments that are delivered to your home or local pharmacy.

Personalized feeds Get a customized feed of answers, news, and tips based upon your individual Health Graph — a proprietary custom digital map of your personal health and well-being. Daily health tips Get useful daily tips on a variety of healthy living and health topics written for you by the world's best doctors for free! Free answers from doctors Get a free second, third, or 10th opinion on any health question or issue with multiple answers from more than 70,000 trusted physicians in Manage all your health data — Securely and privately share health information, lab test results, images, and other health-documents with the doctors of your choice to get more personalized advice, prescriptions, and reminders. Save time — No need to deal with paper forms, insurance, or calling the doctor's Find the best doctors for you — We have more than 1.3 million doctors in the deepest and most comprehensive mobile doctor directory in the world. Unfortunately advices posted by doctors are not complete straight answer, it is not affordable for pay only for advice on app. Application with poor Customer service, no support line, no real quality assurance team. Information provided for doctors is not satisfactory. It also come up with restrictions like example Do like the idea and do use the free membership.

D. IVACCINE

Baby vaccine reminder & tracker with vaccine descriptions and customized alerts for upcoming vaccinations. iVaccine is the first child vaccine reminder application of its kind, designed to ensure you don't forget or lose track of your child's shots, iVaccine uses your regions Immunization schedule to automatically send out reminders for any upcoming . This application is not flexible varies from device to device. Outdated vaccine schedule of India is incorrect. Import from free version did not meet expectations Import only imported name of kids.

E. Practo

Search for doctor based on your problem. Type in your symptoms or the treatment you are looking for and Practo's smart system will give you a list of verified doctors for you to choose from. Search for relevant tests and find a diagnostic lab near you. Take private online consultation sessions with a doctor of your choice. Intuitive interface makes finding and booking confirmed doctor appointments possible with just a few clicks. Search for doctors based on their specialty, clinic or doctor name. Listings based on area, availability and consultation fees. View doctor profiles with qualifications, awards and more information. See clinic & lab details such as timings, consultation fees, clinic Address and photos. Unfortunately, In some of the city app is not working even if it is well developed city. People unable to find doctors near area even if people live in an area where there are 15 big. Inconvenient customer care service. Rescheduling of appointment is not possible. Even if appointment confirmed but doctors are not available on scheduled time. Later It is notified that doctor will not be available fo some time. This application Needs certain specifications. Application development Need to have filter or sort based on location in searching for doctors and clinic. search results sometimes poorly managed lead to unsatisfactory results. This application sometimes becomes less responsive.

VI. PROPOSED SYSTEM

To overcome the drawback of existing system, we have developed E-Health Care approach. The E-Health Care system can be implemented as three main Modules: Doctor Module, Patient /User Module, Cloud Database.

A. Doctor Module

Every Doctor will have their own unique Id and Password with which, they will login to this site. After they logged in this site. They will have their main form. From there by choosing the link, they can see their appointments. He/she can see their new appointments and they can also see the previous appointments. After attending the patient, the Doctor selects a particular patient Id for prescription. In the prescription form, the Doctor will enter the detail about the prescription and give to the particular patient like specifying Patient condition, Kind symptom and dosage about the medicine.

1) Authentication:

Every Doctor will have their own unique Id and Password with which, they will login to this site.

After they logged into this site. They will have their main form. From there by choosing the link, they can

see their appointments. He/she can see their new appointments and they can also see the previous appointments.

2) Prescription:

After attending the patient, the Doctor selects a particular patient Id for prescription. In the prescription form, the Doctor will enter the detail about the prescription and give to the particular patient like specifying Patient condition, Kind symptom and dosage about the medicine.

B. Patient Module

Everyone needs to have Medical attention at any time. So we allow every user to register freely at any time.

The user does registration by specifying their details like His/Her Name, Contact Number, Address, and Mail Id etc. After validation the user will receive a message regarding his/her membership. After registration the user can Login to this site with his/her Unique Id, which is provided by E-Knowledge in Health Care System and password.
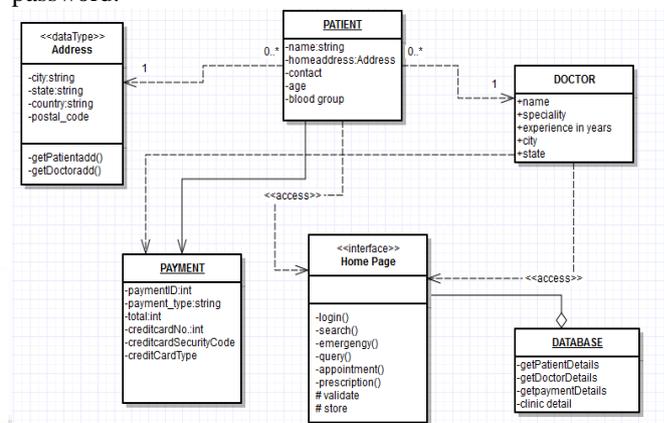

Fig. 1: Class diagram

To get an appointment from a doctor we need the user to pay some minimum amount through credit card/account.

The Doctor list is categorized by his/her specialization and Location like HEART, SKIN CARE, CHILD CARE etc. and T.Nagar, Valasarawakkam, Kodambakkam respectively. So that the user can easily access the doctor for his/her treatment. The user can fix Appointment with a particular doctor by specifying the time, which is convenient for them. After this they will be shown a confirmation message about the timing they preferred. Various services such as Emergency services, Vaccination, Video Calling, Inbox queries are provided to only registered users.

1) Registration:

The user does registration by specifying their details like His/her Name, Contact Number, Address, and Mail Id etc. After validation the user will receive a message regarding his/her membership. After registration the user can Login to this site with his/her Unique Id, which is provided by E-Knowledge in Health Care System and password.

2) Online Appointment:

To get an appointment from a doctor we need the user to pay some minimum amount through credit card/account. The user can fix Appointment with a particular doctor by specifying the time, which is convenient for them. After this they will be shown a confirmation message about the timing they preferred. A patient visits the doctor at specified timing

as per the appointment timing. E-Knowledge in Health Care System maintains the prescription given by the doctor for future use. Patient can view their prescription any time. Patients can cancel their appointments within a time limit. The time limit is about two hours from the time they had registered their appointments and their Money will refunded. The Doctor list is categorized by his/her specialization and Location like HEART, SKIN CARE, CHILD CARE etc. and T.Nagar, Valasarawakkam, Kodambakkam respectively, So that the user can easily access the doctor for his/her treatment.

– Vaccination reminder which has been crafted especially for the parents to remember the important vaccination dates and keep a track of the vaccination schedules for their newly born kids. All you have to do is download the app, make a login id, password and register yourself.

3) Video Calling and Inbox Query:
In proposed system we provide chatting feature of patient with doctor where patient can inbox problems with photos to doctor then doctor will decide further action.

4) E-Billing:
We also provide e-bill facility at time of booking appointments. If doctor recognise problem he give prescription so that patient able to make online payment to doctor.

5) Cloud Storage:
E-Health care system allows to access data which is stored on their personal account anytime and anywhere using unique id and password as well as patient can update or post any data to their account.

6) Emergency Care:
After Installation of app in mobile one emergency icon will be generated automatically on home screen after pressing this button emergency sms will be send to registered contact numbers and respective doctor.

7) Cloud Database:
a) Cloud Model: Infrastructure as a Service (IaaS)
In an IaaS model, a third-party provider hosts hardware, software, servers, storage and other infrastructure components on behalf of its users. IaaS providers also host users' applications and handle tasks including system maintenance, backup and resiliency planning. IaaS platforms offer highly scalable resources that can be adjusted on-demand. This makes IaaS well-suited for workloads that are temporary, experimental or change unexpectedly. EHealth Care System maintains patient's prescriptions so that their medical details are always available in Internet, which will be more convenient for the patients. This will be more comfortable for the patient. Patient details and prescriptions are maintained confidentially .The project will deliver wireless monitoring system for patients (Ehealth). Every user can update respective account and can get required data at anytime from anywhere. Data will be accessed by authenticated users.

VII. Conclusion

We have presented analysis and design for a new online helath care application for the users based on cloud computing storage. Proposed system comprises of main components such a Doctor module ,Patient Module and Cloud storage, each with its own contribution to the enhancement of efficiency of E-Health Care system by reducing the overall time and cost used to create documents and retrieve information .E-health care system enables more informed decision making and enhanced quality of care and saves lives through remote consultations, whether urgent or diagnostic.It creates more efficient, convenient and potentially more cost effective delivery of care. Also provides Facilitates and more accurate diagnosis and greater access to a patient's medical history, reducing the risk of negative drug interactions or poor response to a course of treatment.

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