A Survey Paper on Android Based Doctor Patient Interaction System
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Abstract— Information and Communication Technologies are commonly used in healthcare organizations worldwide. The android operating system based devices such as smartphones and computer tablets are extensively used for many purposes like instant messaging, word processing, gaming, Internet and downloading applications, word processing. A quick growth of android phones has enabled to replace PC’s software and alternative licensed software development technologies. There are completely different varieties of healthcare applications developed in android devices that facilitate patients to reduce time and cost efficiency. In this paper, an overview of the android based platform for consumers, doctors, patients and the medical service providers at their finger-tip is taken. The application is suitable for patient as they can consult a doctor for particular illness or disease. The usage of this application is incredibly easy for the doctors because it permits them to enter patient’s name, drug’s details, and dosage. Once the details like patient’s postal address is fed into the application, it allows the patient to accumulate medicines directly from any pharmacy or medical store and can pay the bill online through app. The system also provides a facility to send instructions and prescriptions to the patients. Doctor can set the timer for patient’s medicine to remind the patient for taking his medicine. Patient’s reports are also managed and available to both doctor and patient. Patient can keep informing doctor about his health status and doctor can perform necessary step on that basis.

Key words: Doctor-Patient Interaction, M Health, Smartphone application, Online Appointment

I. INTRODUCTION

The establishment and improvement of doctor-patient interaction system is now an important requirement for medical services information. Especially now when the mobile communication technology develops rapidly, whether the advantages of mobile web can be made full use of to make up the time and distance gap between doctors and patients to provide fast and adequate medical services or not becomes an important factor to measure hospitals’ competitive ability. Through the connection between mobile terminals and specific service, both physicians and patients are able to obtain required data to achieve a better interaction. [1]

Android is a Linux based open source operating system which is mainly used in portal devices with excellent performance that make its market share growing. The platform, Web services and database technology are all gradually maturing, so that we can develop a set of doctor patient interaction system on Android platform to meet the needs of patients to be treated as soon as possible and provide doctors more efficient and convenient means of communication with patients. [1]

The modern visionary of healthcare industry is to provide better healthcare to people anytime and anywhere in the world in a more economic and patient friendly manner. Therefore for increasing the patient care efficiency, there arises a need to improve the patient monitoring devices and make them more mobile. The medical world today faces two basic problems when it comes to patient monitoring. Firstly, the needs of health care’s provider’s presence near the bedside of the patient and secondly, the patient is restricted to bed and wired to large machines. In order to achieve better quality patient care, the above cited problems have to be solved. [6]

Physicians’ offices seem decades behind the times when it comes to an online presence. Much of the day-to-day business of healthcare is still paper-based, which increases healthcare costs due to additional time and manpower required to transcribe data. Much of the population has grown up using the Web and is accustomed to it being in every facet of their lives. Many people and physicians alike feel that if it’s not online, it doesn’t really exist. There are several objectives as part of this system; however, the overarching objective of this research is to eliminate down time, human error, and unnecessary paperwork by moving aspects of the practice to the Web. There are several aspects of doctor-patient interaction that can be improved upon. Among the elements being implemented are: booking an appointment online; patient check-in via a kiosk or tablet; doctor notification and interaction via a tablet; and patient check-out via a kiosk. [15]

II. BACKGROUND

A. Traditional System:

The clinic uses a standard manual file process, that is simply too time overwhelming. Appointments are being set based on the doctor’s available time prior to patient’s visit on clinic. Therefore, patients aren’t assured if their preferred schedule is still kept. The clinic workers can handle patients on their visit and they are going to be given a token that has the priority number of their token. The patient can wait for his priority number to be called. If he stays unattended (e.g. he goes to the bathroom or happens to be entertained). [12]

<table>
<thead>
<tr>
<th>Traditional system</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dependency on mobile phone and internet is not required.</td>
<td>Patient has to visit to a hospital or doctor.</td>
</tr>
<tr>
<td></td>
<td>Patient can interact and communicate with the doctor without any difficulties.</td>
<td>Patient cannot book appointment prior to his visit to a doctor.</td>
</tr>
<tr>
<td></td>
<td>Patient’s reports are maintained in files.</td>
<td>Patient’s reports are maintained inside the file hence Patient has to carry the file every time he visits the doctor.</td>
</tr>
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<td></td>
<td>Information safety is maintained</td>
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TABLE 1: ADVANTAGES AND DISADVANTAGES OF TRADITIONAL SYSTEM
B. Existing Applications:

1) Epocrates:

Epocrates enables patient care by delivering the right information, when it is needed. It has features such as, find providers for consults and referrals in the Provider Directory, review drug prescriptions and safety information, check for potentially harmful drug interactions, access timely medical news and research information, disease information, alternative medications, lab guides, and more clinical tools. In addition, disease information, clinical practice guidelines, alternative medications, lab guides, coding and more content is available by upgrading to an Epocrates Plus subscription. Members with an Epocrates Plus subscription will have access to premium content across all Epocrates supported platforms. [16]

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<table>
<thead>
<tr>
<th>Advantages</th>
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</thead>
<tbody>
<tr>
<td>Information safety is maintained</td>
<td>Internet Access is needed.</td>
</tr>
<tr>
<td>Drugs and medicines details are provided.</td>
<td>The application do not provide doctors online for helping the patient.</td>
</tr>
<tr>
<td>Provide access to medical news and information.</td>
<td>Patient cannot communicate and interact with the doctor.</td>
</tr>
<tr>
<td></td>
<td>Patient cannot book an appointment.</td>
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TABLE 2: ADVANTAGES AND DISADVANTAGES OF EPOCRATES

2) Doctor @T Work:

This application manages patient records, appointments, patient visit notes, bill patients, track customer payments and balance due. This app can be useful for medical professionals and students that visit patient every now and then. It also helps the patients to get the appointments with doctors and sends the reminder through SMS or by email, create itemized bills for patients to track the due amount, maintains the visit history of the patients, etc. Additionally, if doctor bill patients for medical or professional service, doctor or patient can use this app to keep track of patient bills, payments made, and balance due. All from your mobile device. [17]

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Manages Patients records and appointments.</td>
<td>The application do not provide doctors online for helping the patient.</td>
</tr>
<tr>
<td>Provides online bill payment. Remainders are provided to the patient about appointments.</td>
<td>Patient cannot communicate and interact with the doctor through application.</td>
</tr>
<tr>
<td></td>
<td>Online prescription are not provided by the doctors.</td>
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</tbody>
</table>

TABLE 3: ADVANTAGES AND DISADVANTAGES OF DOCTOR @T WORK
3) **Diagnotes:**

Diagnotes is a mobile and web-based software system that gives medical groups the tools to improve physician communication with their patients, care teams, and office staff. User must have a Diagnotes account in order to benefit from this app’s functionality. It routes phone calls and text, supports documentation of every encounter for continuity of patient care. Automatically delivers key patient data from patient medical records to mobile devices so remote patient encounters are informed no matter when and where they occur. [18]

**TABLE 4: ADVANTAGES AND DISADVANTAGES OF DIAGNOTES**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
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<tbody>
<tr>
<td>Doctors are available online. Communication with the doctor is possible. Appointment can be easily scheduled.</td>
<td>Prescription are not provided by the doctor through the application. Patient reports are not managed.</td>
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**C. Efficient System:**

All the existing applications discussed are kind of more commercial and money making, but DPIS cares more for patient centered approach, and provides an optimal communication between doctors and patients. DPIS has many beneficial features such as sending prescription to the user selected pharmacy, interacting with the doctor through messages, and getting health tips from the doctor. DPIS also serves the patient needs by allowing them to make an appointment with the doctor and seeing the prescriptions.

**III. DOCTOR-PATIENT INTERACTION SYSTEM**

The system is aimed to automate the doctor patient interaction system. This system is developed mainly to administrate doctor’s appointment with the patient, prescription management, patient data management, etc. The aim of the system entitled as **DOCTOR PATIENT INTERACTION SYSTEM (DPIS)** is to computerize the Front workplace Management of Hospital and clinic to develop software that is user friendly, easy to use, quick to process, and price – effective. It deals with the gathering of patient’s data, diagnosing details like symptoms, etc. Traditionally, it had been done manually. The main function of the system is to register and store patient details and doctor details on to the server and retrieve these details as and once needed, and also to manipulate these details meaningfully. The goal system development is to develop and implement the system value effectively; easy and most suited to the user’s analysis that is the heart of the process.

This function of Doctor patient interaction System deals with registering the new Patient and giving unique Identification Number to the Patient. This number is unique throughout the System for identifying the patient. Analysis is the study of the various operations performed by the system and their relationship among and out of doors of the system. Throughout analysis, information is collected within the files, decision points and transactions are handled by this system. Totally different forms of techniques are utilized in analysis of which interview could be a common one.

The patient can be registered at Reception. Patient identification number is also created for each separate visit of the patient. This is also a part of registering patient. ID is used for tracking of medical records of the patient. All the medical record of the patient are identified by combination of numbers i.e. Patient ID. The numbers gives flexible search in terms of finding patient’s History Record.

**Fig. 3: Screenshot of Diagnotes android application** [18]

**Fig. 4: System Architecture**

The Doctor Patient Interaction system architecture consists of three major parts Graphical User Interface (GUI), front end and back end. The architecture displays the basic flow of the system.

Through GUI the system will interact with the user. It GUI allows the use of icons or other visual indicators to interact with users. It will display the different categories such as patient reports, doctor’s prescriptions, doctor and patient details etc.

When the patient or doctor clicks on the particular link, the query goes to the front end part. After that front end fetches the required data from the database i.e. backend. The results are returned to front end and from there, to GUI for displaying as shown in fig.4.

There is a database in the back end which handle all the crucial data regarding patient, doctor, pharmacy, etc.
A. Use Case:

In Figure 3.1.1, all the ovals represent the functionalities of the doctors and patients, there are some common use cases between doctor and patient such as registration, login, and pharmacy selection are initially made by patient, and otherwise the doctor will be choosing the pharmacy near to the patient location. Patient will be requesting for doctor appointment which has to be confirmed by the doctor, similarly for the messages sent by patients, doctor has to reply and vice versa. Apart from these common features between doctors and patients, doctors also have some specific functionalities like, adding patient & send health tips, send prescriptions to pharmacies and patient referrals.

B. Sequence Diagram:

A sequence diagram describes how the communication happens between the user, application, and server. Figure 6 describes the user sequence with the application and how the application handles the user request. The application processes the user request and makes a request to the server to get the data from the server database.

IV. CONCLUSION

The major goal of this application is to create online interaction between doctors and patients, to fulfill the basic needs/problems of the patients. Patients can update their problem to doctors by messaging and get advice from the doctor. Through the messaging services patients can seek 24/7 help from doctors. DPIS serves as the platform for easy and quick treatment, with extended support from doctors to patients. DPIS has unique features such as issuing online prescription to patients, referring patients to a specialist, sending health tips to patients, and finally, reducing the cost of customer service and providing a vital communication link between doctors and patients.

This app can be improved in the future by adding the following functionalities:
- Extending to Apple iOS.
- Create two separate apps for doctor & patient.
- Supporting video calls to discuss the problems with doctors.
- Implement hardware for monitoring status of the patient.
- Patients reports can be stored in encrypted form.

REFERENCES


