Design and Development of BD Doctor Assistant

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Abstract — This study aims to design and development of BD Doctor Assistant application as a physician assistant for ensuring accurate and speedy human health treatment. This is an android based application which requires an android device to run and helps the patients to get doctor's token, so called serial. The application also intends to assist the user in finding their desired doctor's token by providing sufficient information. From stored information, user will find a list of doctors of different departments including the doctor's information, location, availability day and time and contact number if it is given. Using all these, user will be able to get desired doctor's serial for treatment only if the doctor's token list is available. One patient or user may not request more than once. If same user tries to request more than once through the same user id the system would not allow to get new token more than once. So that no one can down our system intentionally. In the development of this application the most essential elements were computer, an android device and an android application development tool. The development of this application is described in the project report. Using this application user will also get facilities which includes details about a desired doctor, online service for taking serial rather than physical appearance or harassment and a specialized free service that is easy for both doctor and patient. After development session of this application we have tested it by different user and found it to be a well build application which works perfectly.

Keywords **—** Health mobile app, Mobile technology, Health treatment, Health technology, ICT in treatment.

I. INTRODUCTION

The modern technology provides an opportunity to lead easy and comfortable life. The application of information technology can enable to use it in all spheres of life [1]. But still there are some places in Bangladesh which are not blessed by modern technologies. Such a place is our hospital management system. For example, a person that may be a patient or any relative of a patient has to suffer a lot for getting serial of a desired doctor for treatment. They have to stand for a huge queue for this purpose, wasting lots of valuable times. If the patient himself/herself has to wait in the queue the sufferings are knows no bound [2]. From this point of view for doing something helpful that can eliminate the sufferings of the people, idea of building an application have crossed our mind [3]. An application that can help a patient and their family to avoid the sufferings and valuable times we implemented our idea in an android application that is much easier, user friendly and less time consuming [4]. By using this application people can very easily request for token for their desired doctor by only a single touch by using their own email or phone. Nowadays, applications and websites are helping people more than ever before [5]. Starting from kitchen to spaceship we are using computer and mobile application everywhere. Thus, we are taking efforts forward to the hospital token system.

We know that "Time is Money". Time flows by its own. For the family members of a patient it is hard to wait in a long line only for getting a single token of a desired doctor. And if the patient is alone then this turns more crucial for him/her to stand in a line for a day long [6]. But if a single application can save their time and sufferings that will be very much helpful. So, we have decided to build this application by the least effort to save their valuable time and reduce harassment of standing along [7].

Keeping in mind the goodwill of our people we have decided to build an application that will diverge the sufferings of the people those who had to wait earlier. Through this idea we have started gathering data which contains different departments, doctor 's information related to those departments, doctor's contact (if available), doctor's available time and location [8]. Using this application client can easily access desired doctor's details by searching. They can request for token for that specific doctor. However, surfing through internet, we found some related rough application that is either incomplete or inefficient or just a static application [9]. Thus, our developed application may help thousands of people in their critical moment.

Users can access the system by being registered once using either valid phone number or email and password. After logging in users can search for their desired section for the desired doctor. They can search for a specific doctor either by scrolling or by searching through search bar. This will take a user to the specific doctor's profile. Then the user can ask for a serial form that specific doctor through a button [10]. Thus, the user does not have to wait for a huge queue for a single token and reduce harassment. Therefore, this study aims to design and development of BD Doctor Assistant application as a physician assistant for ensuring accurate and speedy human health treatment.

II. RELATED PREVIOUS WORK

Some works are done earlier on the information of hospital but not getting token properly. For instance, there are some applications such as BD Doctor Finder, Doctor Assistant, Doctor List BD, Bangladesh Doctors Directory, and DocApp. BD Doctor Finder is a static application that contains only static information about doctors. Even in some departments there is no information. There is no such option to get appointment or contact with them. This is actually an efficient application. Doctor Assistant application has just one activity and used only frontend design with a lame button. Nothing can be done by this application. Doctor List BD application is also a complete static application. There is some information only but no way to connect to the doctor. Bangladesh Doctors Directory application provides some more information than others application but again this is a static application and there is no option to contact with the doctors dynamically. It seems like one has to go through the address physically. DocApp is a good concept application with great user interface. The main drawback of this app is this app is developed may be only for Indian people. We could not find out any usable functionality for Bangladeshi people.

A. Comparative Studies

As we shown earlier, there are some applications available in the playstore which are not completely developed. Some applications are completely static and some has only front-end design. There is no such application related to this that can perform very well, can give a nice user interface and a real-life problem solution or to contact to a doctor to inform for a serial. That's why we took such step to go ahead so that we can be a part of human goodwill.

B. Scope of the Problem

Different trouble may occur in the way to the clinic. So that lots of time may have wasted. Again, this will cause to a long line to stand after. If the token receiving individual is a relative of the patient then he/she has to waste lots of time. But if the patient thyself needs to go to the line and wait for the token then the state of that patient may be more critical. It would be much more useful if we can build an application which can eradicate such sufferings that should be praiseworthy to everyone. One can ask for a doctor's serial from home lying down to bed that can also do the same thing without elapse of time and harassment.

III. CHALLENGES OF THE APPLICATION

Different trouble may occur in the way to the clinic. So that lots of time may have wasted. Again, this will cause to a long line to stand after. If the token receiving individual is a relative of the patient, then he/she has to waste lots of time. But if the patient himself/herself needs to go to the line and wait for the token then the state of that patient may go awful. Moreover, searching for a specialist for a particular disease is also tedious and effort full. Real life problems are much more difficult to implement in coding to perform actually same [11]. Thus, designing user friendly interface, designing database and performing everything in a sequence is quite difficult [12].

We work on the area of medical services. Taking token of a doctor from a clinic is a lengthy process. Again, we know that some specialists are not found available every time. So that patients have to suffer for unlimited time that can even lead to the death of the patient which is only for not getting just a token. But if the patient can be taken to another doctor who is also related to this particular field, then patient's sufferings can be reduced in a big circumstance. Even they can search for a particular doctor in a particular department. So that everyone can know which doctor is busy in that particular date and also can go for another doctor very easily (only by scrolling top to down). Thus, it becomes easier for a patient or relative of the patient to get the token of a doctor. So just get token by this application and go to get treatment in the particular time without any hassle.

IV. REQUIREMENT SPECIFICATION

Following figure shows the total Business Process Model E-R Diagram (Figure 1).

A. Requirement Collection and Analysis

For the sake of collection of data first we gathered some of our friends and neighbours. Then asked them to register them using their phone and email both [13]. At time of analysis we found that some fake account was also added by us only for testing. But 99% was the successful rate. Again, we had to travel through different hospitals and online services for gathering information of doctors.

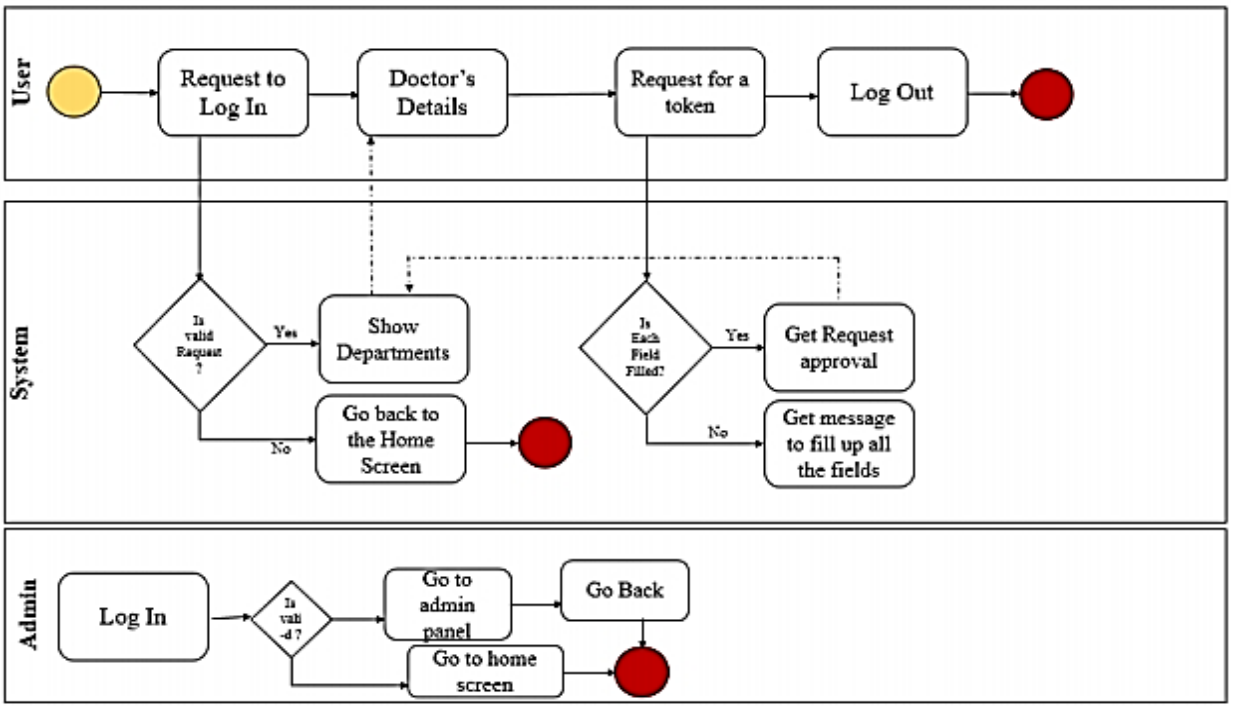

Figure 1. Showing E-R Diagram

B. Non-functional Requirement

- Help text will be provided in English.
- The process of using the application will always be available.
- There is no user limit for browsing the application.
- This application can be used only on android os.
- During browsing through the application system responses should be no more than 1 second.
- Only admin can modify the information of the application.

C. Usability Requirement

An android OS based device (Android version 4.2 - 7.0) with internet connection and GPS support. The interface of the application is suitable even for the colour-blind people. Anyone who knows Bengali or English can use this application (Figure 2).

D. Logical Data Model

A logical information demonstrate is an information model of a particular issue space communicated freely of a specific database administration item or capacity innovation yet as far as information structures, for example, departments and sections, object-oriented classes, or XML labels.

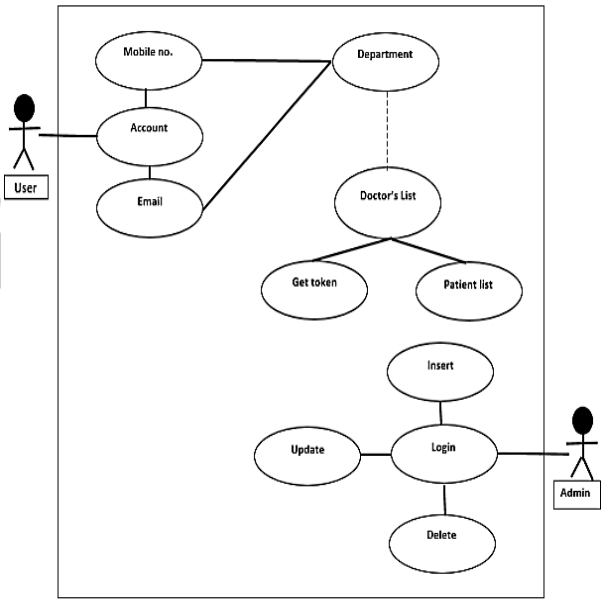

Figure 2. Use case diagram of Bd doctor assistant

E. Design Requirements

Help text will be provided in English. The process of using the application will always be available. There is no user limit for browsing the application. This application can be used only on android OS. During browsing through the application system responses should be no more than 1 second. Only admin can modify the information of the application. An android OS based device (Android version 4.2 - 7.0) with internet connection and GPS support. The interface of the application is suitable even for the color-blind

people. Anyone who knows Bengali or English can use this application.

F. Design Specification

User Interface (UI) that allows user to interact with the mobile devices or other electronic devices. UI design usually refers to the design of Graphical User Interface (GUI), but can also refer to others, such as natural and voice user interfaces. Home screen shows four items such as Sign in, Register, Login with phone, Login as Admin. User can select any from Sign in, Register, Login with phone, Login as Admin for go forward (Figure 3).

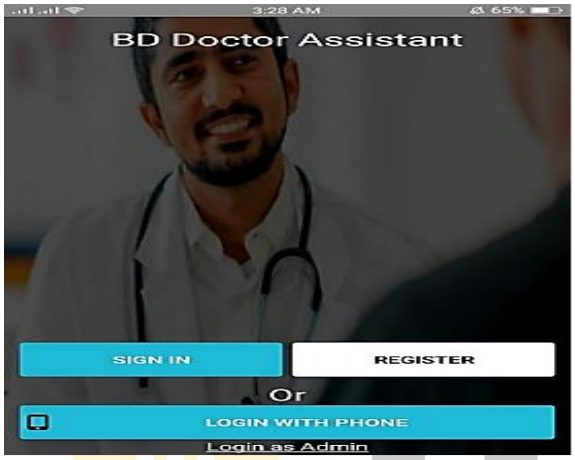

Figure 3. Home screen

G. Sign in and Register

Sign in pops up a toolbar containing user's email and password to enter. There are two buttons, one for cancelling another to sign in. Register pops up a toolbar containing user's name, email and password to enter. There are two buttons, one for cancelling another to register (Figure 4).

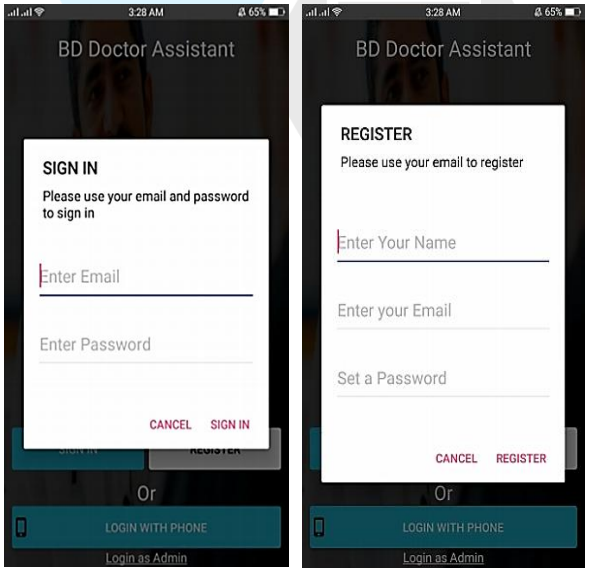

Figure 4. Sign in and registration option interface

Login with Phone no pops up a toolbar containing user's phone number to enter. After entering phone number user has to wait for a few moments to get verification code. Then user has to put verification code to verify. There is one button for verifying. Login as Admin pops up a toolbar containing admin's phone number and password to enter. There are two buttons, one for cancelling another for sign in.

H. Departments

Department shows different types of sections available such as anatomy, anaesthetics, orthopaedics etc with Bangla meaning for being easier for everyone. This section is scrollable (Figure 5).

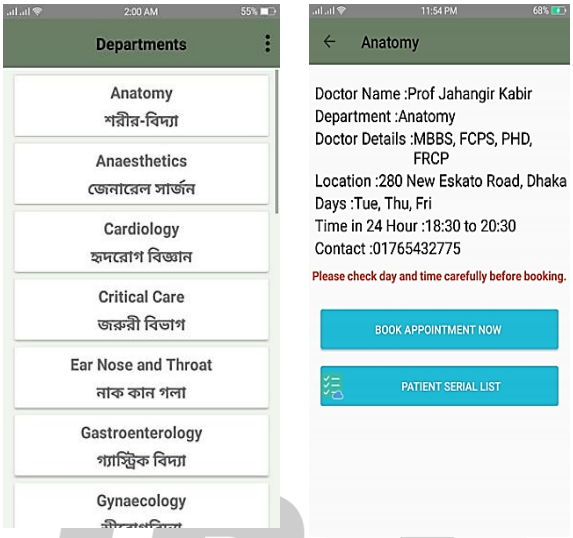

Figure 5. Showing department's name in application

I. Departments

Section denotes categories of the department. Through sections user can search for different doctors and find out their desired one. In this activity, user has to submit his/her name or patient's name to get token from that particular doctor. User can also see the list of the patients, their name and serial time. Before requesting for a token user must have to check the availability date and time of the corresponding doctor. After pressing "BOOK APPOINTMENT NOW" a new intent will appear before the user to input required fields. After filling up all the fields' one user may confirm the request or may press back button for another purpose.

J. Admin Activity

Here admin can customize doctor's information through selecting a definite department. Admin has to add doctor's details, location, contact (if available), available days and times. Then admin has to hit the "Save Detail" button to save it to the database.

K. Back-end Design

Database design is the way toward producing a point by point data model of database. Figure below dictates the Database Design of our developed application. This database acts as host of data from which the application can fetch data whenever it needs. The first, second and third part of assigned database configuration (Figure 6).

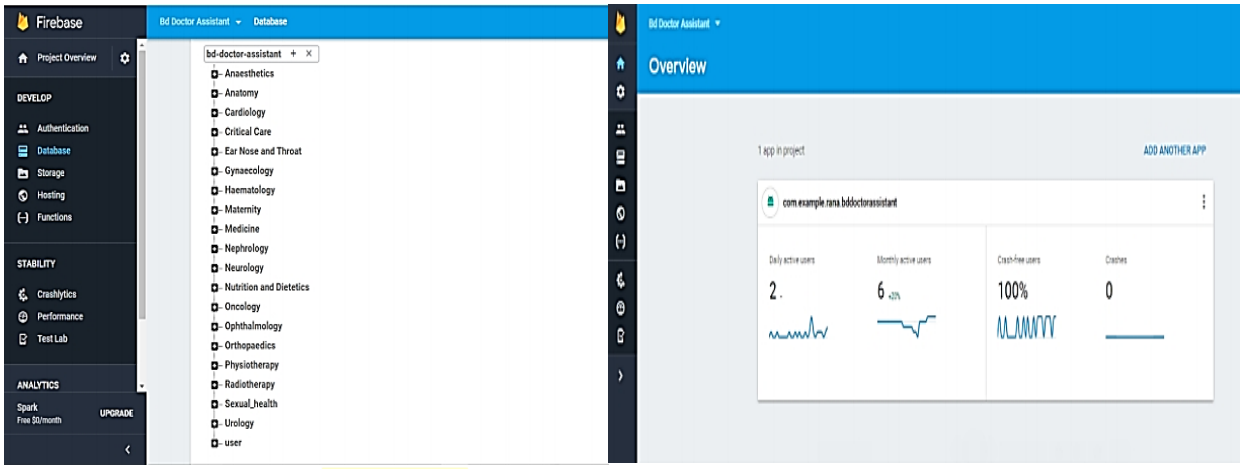

Figure 6. Database design for Android App.3 Interaction Design and UX

Interaction design of our application is made in five steps of trial. The login system took three steps and the home screen took two steps of trial. After the analysis most of the user's feedback was "very nice user interface". Interaction of user with the system is very fast and efficient. Only retrieving data from database may vary depending on the user internet connection. Our developed system is much easier to use thus experience is still now adorable.

V. IMPLEMENTATION REQUIREMENT

Implementation of our project needs Android Studio, Android SDK and Java Development Kit (JDK). Android Studio is the IDE (integrated development environment) to run android operating system. It is designed specifically for android application development. By android studio, we developed our application. Android SDK provides the API libraries and developer tools necessary to build, test, and debug android applications. To develop Android application, Android SDK is a must. This SDK is very efficient tool that includes not only the library for development, but also includes the simulator to run test application. Java Development Kit (JDK) is an implementation of either one of the Java SE, Java EE or Java ME platforms. [16] 4.4.4 Android Virtual Device (AVD). The AVD manager provides a graphical interface which run the android application called emulator. A QEMU-based device-emulation tool that is used to debug and test applications.

VI. IMPLEMENTATION AND TESTING

A. Implementation of Database

The usage stage is the place designer introduces the Database Management System (DBMS) on the required equipment, streamline the database to run best on that equipment and programming stage, and make the database and load the information. The underlying information could be either new information caught specifically or existing information imported from a DBMS. The engineer can set up database security and give the different clients that the designer has recognized access appropriate to their requirements.

B. Implementation of Front-end Design

It is really a good challenge to develop a gorgeous front-end design which will be attracted to user. Because, for developing a design for android devices, all the time developer has to consider the display dimension of android device, it is very tough work to balance the design with android display size. Sometimes it can't fix with the display for many reasons [14].

So, a developer needs to check several times of his/her android application by building or running within an android device. For interactive design we always try to think as a simple and easier in user interface design for creating user attraction to our android application. We also tried some materials and tools, design for making and creating attraction to the user [15].

On the other hand, the user can enjoy to using a very simple and easier interface. So, it was really a good challenge to us when we were designed our android application's user interface. But most challenging part is to make our android application. There are a lot of and many types of smart-phones that support android. But all of these are not same quality assurance [16].

Some of them have very weak hardware component, in a little bit pressure those devices getting hang and behave like weird [17]. These reasons occur for different types of version. So, we design the application which will be support to all the devices as like older to newer version and we ensure that our android application is

secure and will not create any extra pressure on devices [15].

C. Implementation of Interactions

Interaction design of our application is made in five steps of trial. The login system took three steps and the home screen took two steps of trial. After the analysis most of the user's feedback was "very nice user interface and fast user and system interaction". Interaction of user with the system is very fast and efficient [18]. Only retrieving data from database may vary depending on the user internet connection [19]. Our developed system is much easier to use thus experience is still now appreciable.

D. Testing Implementation

In ease of use testing fundamentally, we as analyzers tests the simplicity with which the UIs can be utilized [20]. It is tests that whether the application [21] or the item assembled is easy to use or not [22].. We ran a review among 30 clients, matured between 18-35, where 20 of them were male and 10 were female [23]. Barely any inquiries were incorporated into this overview which had parameters to guarantee the accomplishment of this study [24]. So, at the end, we can carry out the results as the benefits of usability testing to the end user or the leaner. Application is easier to use. Application is more readily accepted by users. Shortens the information for new users

VI. CONCLUSION

This study aimed to design and development of BD Doctor Assistant application as a physician assistant for ensuring accurate and speedy human health treatment. The application also intended to assist the user in finding their desired doctor's token by providing sufficient information. From stored information, user will find a list of doctors of different departments including the doctor's information, location, availability day and time and contact number if it is given. Using all these, user will be able to get desired doctor's serial for treatment only if the doctor's token list is available. Unit testing is utilized as a part of a subtle elements outlining and executing of a venture. Unit testing is a procedure of utilization advancement in which the littlest testable parts of an application, called units, are separately and freely tried and executed subsequent to breezing through the test. Unit testing includes just those qualities that are imperative to the execution of the unit under test. The Unit test was done in time of actualizing the codes of this application and endless supply of this task. Using this application user will also get facilities which includes details about a desired doctor, online service for taking serial rather than physical appearance or harassment and a specialized free service that is easy for both doctor and patient.

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