

GPS Based Android Application for Healthcare Dissemination

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Abstract - Preliminary healthcare is one of the most important aspects of any human beings. This paper presents a way to provide service to patients in terms of saving their time and providing details of the hospital and also predicting disease. Our application involves navigation function and disease prediction. The navigation function makes use of Global Positioning System (GPS) technology so that patients can navigate to the desired hospital based on the services available in a particular hospital. The database matching technique is used in the disease prediction which takes symptoms of the patient from which they are suffering and those symptoms are processed to check for various illness or diseases that the patients may have and display the articles based on the result.

Key Words: Navigation, Global Positioning System (GPS), Healthcare, Disease prediction, Database matching technique.

1. INTRODUCTION

A hospital is a healthcare institution which provides treatment to patients with specialized staff and equipment. The best-known type of hospital is the general hospital, which has an emergency department. A district hospital typically is the major health care facility in its region, with large numbers of beds for intensive care and long-term care. Specialized hospitals include trauma centers, rehabilitation hospitals, children's hospitals, seniors' (geriatric) hospitals, and hospitals for dealing with specific medical needs such as psychiatric problems (see psychiatric hospital) and certain disease categories. Specialized hospitals can help reduce health care costs compared to general hospitals. We use Global Positioning System (GPS) technology in our project [2]. GPS is a system designed to help navigate on the earth. Most GPS receivers can record where they have been, and help plan a journey.

While traveling a planned journey, it predicts the time to the next destination.

Some patients go to a hospital just for diagnosis, treatment, or therapy and then leave ('outpatients') without staying overnight; while others are 'admitted' and stay overnight or for several days or weeks or months ('inpatients'). Hospitals usually are distinguished from other types of medical facilities by their ability to admit and care for inpatients whilst the others often are described as clinics. The medical facility smaller than a hospital, is generally called a clinic. Hospitals have a range of departments (eg: surgery, urgent care and intensive care) and specialist units such as cardiology. Some hospitals have outpatient departments and some have chronic treatment units. Common support units include a pharmacy, pathology, and radiology. A patient admitted to a hospital on medical emergency should be provided with required treatment. If services are not available, patient has to be shifted to other hospitals which give them required service. But this can be time consuming where each second can save a life. It is expensive and cause discomfort to patient and their family. If the services provided by each hospital are known, the patients can be admitted to the hospital with required service. In our project we also predict possible diseases of the patients/users that they may have based on their symptoms. The symptoms are taken from the user through checkbox options.

1.1 Problem Statement

Unnecessary time will be wasted when the patients go from one hospital to other for required services, they may not know what are the services available in departments of a hospital and also route will not be familiar to those who are new to the city. The existing system provides navigation [1] to the hospitals but not the services available in departments of the hospitals and also does not integrates both navigation and disease prediction.

1.2 Proposed System

The patients instead of going from one hospital to other for required services, we give all necessary information about the departments in hospitals and also predict the possible diseases [3] of patients. There are two types of applications involved in this project. First one is the web based application, which is used by the administrator. Second one is the Android application which is used by the users. The admin of the project adds all the details of cities, hospitals, department, different types of services, symptoms and diseases. The users or patients can get registered with the android application to use the services. The users can view the different hospitals and services provided, and can perform search based on services of the hospitals. The user can also know the possible diseases that they may have based on their symptoms. In this app. the navigation and disease prediction is integrated to help the patients to navigate to the desired hospital where required services are available and also to know the possible diseases that they might be suffering from.

2. Implementation

The implementation is as follows:

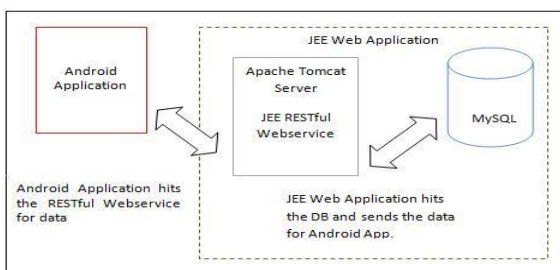


Fig-1: Architecture

The above architecture shows Java Webservice in Android. Here the Android Application will be used by the user for navigation and disease prediction. Administrator uses J2EE Web Application which acts as a server to authenticate and register the users of Android application and also sends the data required by the Android Application.

A. For Administrator

Scripting language is necessary for any software development process. One such language that is

employed in this paper to design the web based application for administrator is Java Enterprise Edition (J2EE), it is a platform independent Java centric environment which can be used as a server side application and also offers several services for developing and deploying web based applications. Some of the services used here is Java Server Page (JSP), Java script (JS), Java Database Connector (JDBC), and Java Beans.

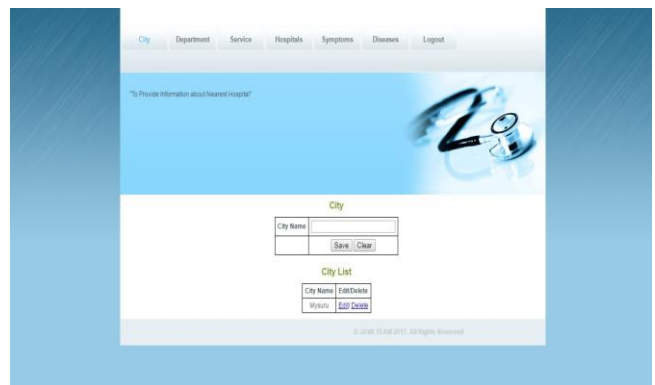


Fig-2: Web Application for Administrator

Java Server Page (JSP) supports HTML tags, CSS tags and Java applets to design the presentation tier. JSP code is executed using the Tomcat server to display the web page in the browser. As shown in the Fig-2. The web page is displayed in the browser using Apache Tomcat server, this is only for the administrator to interact with the database by adding cities, departments, services, hospitals, symptoms and diseases through Java Beans.

The logic tier used in our application is Java Beans. It is server side software which consists of business logic of the app. The getter and setter methods are used to access the properties of variables. The validation of web pages is done by using the JavaScript. It supports procedural programming along with Object-Oriented programming.

Java Database Connectivity is an application programming interface (API) which is used to provide connection to the database. The Data tier used in our app. is MySQL. Data tier defines the table, views, functions, procedures and login associated with the user's database.

B. For User

To develop innovative applications and games on Android OS for mobile devices like smart phones and tablets, many programming languages like Java, C and C++ using Android Native Development Kit (NDK), Python, bash and c# can be used. Here Java language using Android Software Development Kit (SDK) is used in our app. Java requires Java Development Kit (JDK) platform which includes Java Runtime Environment (JRE), Java Compiler (JavaC), Java Documentation Generator (JavaDoc) and many other tools.

Android SDK platform is mainly used to develop Android app. The IDE used for Android app. development is Android Studio, which is a light weighted flexible android platform with the best debugging tool. It has very little bug and provides most stable performance.



Fig-3: Services in a Dept.

In our app. Global Positioning System (GPS) technology is used to help patients to navigate to the desired hospital based on the services available in that hospital. Fig-3 shows that there are number of departments and each department has several services associated with it, so the user can go to any of the department whichever he/she needed and select the service. Here the departments and services will be stored in MySQL which is sent to the android app. through JEE RESTful web service. When the user selects the service of a particular department hospital lists will be displayed so that they can choose the suitable hospital and click

on the “view route” button. Then the patients or users will be directed to the Google map for navigation.

```
View.OnClickListener onViewRoute=new View.OnClickListener () {
    public void onClick (View v) {
        Toast.makeText (getApplicationContext (), "View Route", Toast.LENGTH_LONG).show ();
        SharedPreferences sp=getSharedPreferences (Const.pref,MODE_PRIVATE);
        mylatitude=sp.getString ("latitude","");
        mylongitude=sp.getString ("longitude","");
        Intent intent=new Intent (Intent.ACTION_VIEW);
        String url="http://maps.google.com/maps?saddr="+mylatitude+","+mylongitude
            +"&daddr="+hlatitude+","+hlongitude;
        intent.setData (Uri.parse (url));
        startActivity (intent);
    }
};
```

Fig-4: Code for Navigation

The code for redirecting users to the google map is shown above.

Fig.4.URL "http://maps.google.com/maps?saddr="+mylatitude+","+mylongitude+"&daddr="+hlatitude+","+hlongitude; is used to provide navigation through Google map. “mylatitude” and “mylongitude” is the latitude and longitude of the user which can be determined using Global Positioning System (GPS). This is the source.

“hlatitude” and “hlongitude” is the latitude and longitude of the hospital which is taken from the address of the hospital stored in the database. This is the destination to be reached by the user.

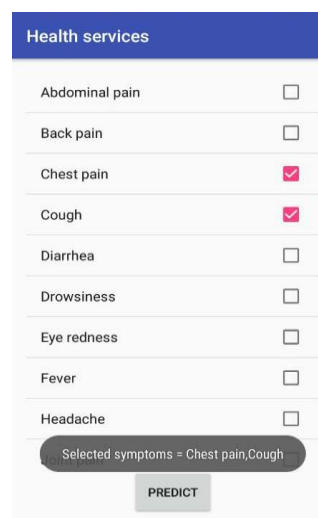


Fig-5: Symptoms

As shown in Fig-5. List of symptoms are given so that the users can select one or multiple symptoms which he/she has. When the user click on the predict button we display the possible diseases that they might be suffering from and also articles pertaining to the diseases will be provided.

Here the simple database matching technique is used to match the diseases and symptoms. The administrator adds the symptoms and diseases to the database using JEE web app. JEE uses JavaScript Object Notation (JSONObject) to send the data from database to Android app.

3. CONCLUSIONS

The challenging issue here is to get the information from hospitals about the services available in the department. Another issue is to provide accurate disease that the patient is suffering from. Our application helps the patients to navigate to the desired hospital where required services are available and also predict the possible diseases of the patients. In case of any emergency incidents the patients can navigate to the nearest hospital without any registration. Therefore this application is useful in both emergency case and navigating to hospitals based on services.

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