Online Intelligent Health Prediction System using Data Mining

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Abstract—It might have happened so many times that you or someone yours need doctors help immediately, but they are not available due to some reason. The Health Prediction application is an end user support and online consultation project. Here we propose an android application that allows users to get instant guidance on their health issues through an intelligent health care application online. The application is fed with various symptoms and the disease/illness associated with those systems. The application allows users to share their symptoms and issues. It then processes user’s symptoms to check for various illness that could be associated with it. Here we use some intelligent data mining techniques to guess the most accurate illness that could be associated with patient’s symptoms. If the application is not able to provide suitable results, it urges users to go for blood test, x-ray, CT/ MRI scan or whichever report it feels user’s symptoms are associated with, so next time user may be able to login and upload an image of those reports. The application also has a doctor login, where the uploaded images are sent to respective doctor along with patient contact details. The doctors may now contact the patient for further process.

KEYWORDS: Smart health, Android application, E-health, Intelligent health care application.

I. INTRODUCTION

Nowadays, a promising trend in healthcare is to move routine medical checks and other health care services from hospital to the home environment [2]. With that patients gets health care more easily especially in case of emergencies. Moreover hospitals can reduce their burden by shifting the possible and easy tasks to the home environment. One major advantage is in reduction of expenditure. Patients could avoid the fees charged by hospital each time they went to visit doctor. Therefore, it is urgent that in the near future a trending technology need to be implemented in the health industry to develop advanced health care techniques and technologies and use them for the easy monitoring of patients from anywhere else. Patient monitoring include checking the physical conditions of the patient and their medication details. If the right medicines are taken at right time there are less chances that the condition of a patient getting worse. Especially for elderly people taking medication at the right time is a great challenge. There are chances that they could forget it at times. So poor medication adherence is a major problem for the population and medicine providers. The concept of the Internet of Things first became popular in 1999. If all objects and people in daily life were equipped with identifiers, computers could manage and inventory them. The Internet of Things (IoT) is the network of physical objects — devices, vehicles, buildings and other items embedded with electronics, software, sensors, and network connectivity — that enables these objects to collect and exchange data. [1] The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, [2] creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020. With the use of IoT, embedded sensors, tags etc. have developed rapidly. Wearable sensors could be integrated with IoT to get more clear details. An android application could be used along with medicine box to make the system more user-friendly. Incorporation of different technologies at the right time like IoT could make a drastic change in any field especially the medical field.

II. EXISTING SYSTEM

In the existing system, to consult any doctor is very tedious task for the patient. We have seen that a patient is not able to select an appropriate hospital for his/her emergency in unknown area. Again, if any patient wants to take an appointment of specific doctor then patient has to go to the hospital and patient has to standing in a queue to take the appointment. This is very time consuming process. Also, sometimes doctors schedule may get change at that time patients appointment may be got cancelled. Even though the appointment is got cancel but patient may not aware of that cancellation. Because of this time of patient get wasted and in the case of emergency it may cause harm to the patient. If doctor gives prescription to patient sometimes patient forget to take medicine. Every time patient needs to go in hospital with consulted test report. This increases
the overhead of the patient. This process is very time consuming for the patient and doctor.

III. PROPOSED SYSTEM

In this system firstly patients have to register into the application. After registration patient will get username and password. Patient can use this username and password for logging into app each time. Patient can search the hospital based on the categories i.e. Orthopedic, General Physician etc. After selecting the hospital category hospital list will be display. Patient will select hospital from that list. After selecting hospital doctors list will be display. Patient can see doctors profile. From that patient can search the specific doctor from any hospital. Also the patient can view doctors schedule and look for an appointment according to his convenience.

The patient will send request for appointment. Then doctor can either accept or reject the appointment. The database will get update accordingly and the patient will get confirmation message. In this system patient will receive notification before the actual appointment. This is useful in case patient tends to forget the appointment.

After appointment doctor will give prescription to the patient. This reminder will give alert to patient for medicine, test, etc. If doctor give medicine to patient and patient have to take that medicine at morning and evening session. Then system will give notification to patient at morning and evening time for taking medicine. Doctor will recommend the test to patient and pathologist. After test pathologist will send report to patient and doctor.

   a) SEARCH HOSPITAL: The Dr. on Click is an Android App that helps the patient to search the hospital which is near to him/her. Patient search the hospital based on category like orthopedic, neurologist, general physician etc. The location of patient can track using GPS. Calculating the path between the patient and hospitals is done using two attribute Longitude and Latitude. The Haversine formula is used to calculate great-circle distances between the two points that is, shortest distance over the earths surface.

   b) ONLINE APPOINTMENT: After searching the hospital patient can view the profile of hospital and doctor. The patient will book appointment as per availability of doctor. The database will get updated accordingly and a unique token will be generated then same can be sending to the patient.

   c) PRESCRIPTION ALERTS AND PRESCRIPTION VIEWER: Patient can also receive appointment alert before actual appointment. This will be very useful in case the patient tends to forget the appointment and it also reduce the hesitation of queuing and filling the registration forms. The proposed system gives the reminder to the patients to take medication at the given instance of time this is possible by sending alters/notification using GCM (Google Cloud Message). This will be very useful in case the patient tends to forget of taking medicine. It also gives an alert of test recommended by doctor.

d) SEND REPORT: The report sending is also possible using this App, it help the patient to receive its own report from pathologist. Pathologist can also send the same report to specific doctors who actually recommended which saves the time and also simplifies the task of patients.

IV. SYSTEM ARCHITECTURE

In this section we have included system architecture and also described various components of system architecture.

1. MOBILE APPLICATION FOR PATIENT: The patient has to register into application for first time. Password and Username used for login into this app. After login patient can perform various operations i.e. Search Hospital, Take Online Appointment, Alerts/Notifications, Send Reports.

2. MOBILE APPLICATION FOR ADMIN: Doctor/PA/Admin has to register into application for first time, for the registration of the hospital.

3. MOBILE APPLICATION FOR PATHOLOGIST: Pathologist has to register for the first time into the application. So that Username and Password is used for the login. After login pathologist can view the test recommended by doctor. Also, he can send the report to doctor and patient.

4. WEB APPLICATION FOR ADMIN: Web Application is used by Admin. By using this Admin can perform various operation like add department, add doctor, view the list of department and doctor.

5. WEB APPLICATION FOR DOCTOR/PA: Web Application is used by doctor/PA. By using this doctor can update his schedule, view appointment, give the prescription etc.
V. IMPLEMENTATION DETAILS

a) SEARCH HOSPITAL: In this research paper, this module will help the patient to search appropriate hospital based on selected category. When patient click on “search Hospital” then list of categories will be displayed like ENT, Gynecologist, Orthopedic etc. Patient will select category and based on that list of hospitals will be displayed. The following technical concepts are used in implementing the Search Hospital. Before searching the hospital administrator should register his hospital location through android app and list of available departments (ENT, Gynecologist, Orthopedic and General Physician etc.) then available specialist doctors.

1) GPS: In this research paper, GPS is used to capture the latitude and longitude of users location. GPS is inbuilt in users android phone which should be enabled. A GPS tracking unit is a device, normally carried by a moving person that uses the GPS (Global Positioning System) to determine and track its precise location.

2) Great circle distance algorithm: In this research paper, to search hospitals based on the categories great circle distance algorithm is used. Hospitals are searched from the users current location by using this great circle distance algorithm. But, for this users mobile GPS should be enabled. The great-circle distance is the shortest distance between two points on the surface of a sphere, measured along the surface of the sphere. This algorithm uses the haversine formula which gives great-circle distances between two points on a sphere from their longitudes and latitudes.

b) ONLINE APPOINTMENT: In this research paper, this module will help the patient to take online appointment. After searching hospitals, patient can take online appointment. Patient can view the doctor’s schedule. After taking appointment token will get generated. To complete this task doctor has to schedule his availability in following specific manner.

d) Table 2 : Prescription of Medicine Given by Doctor

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Date  From</th>
<th>Date  To</th>
<th>Turn1</th>
<th>Turn2</th>
<th>Crosine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/09/2015</td>
<td>3/9/2015</td>
<td>10 AM</td>
<td>3 PM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above given prescription will be send to patient as alerts using GCM.

GCM: In this research paper, we used “Google Cloud Messaging” service to send the notifications to the patient regarding medication and about general precautions. Google cloud messaging (GCM) is an Android platform API provided by Google for sending and receiving push notifications to and from an Android application. “Google Cloud Messaging” helps to send data from servers to their Android applications on Android devices. Using this service you can send data to your application whenever new data is available instead of making requests to server in timely fashion. Integrating GCM in android application enhances user experience and saves lot of battery power. To receive notifications on the patient’s android phone, its mobile should be connected to the Internet.

e) SEND REPORT: Pathological test recommended by doctor for a particular patient will send to the pathologist. Pathologist will receive test recommended by doctor on his profile. After generation of a test report, Pathologist will send that report to respective doctor and patient also. In this way, all the modules mentioned in this research paper will be helpful and time saving for all its users.

VI. SYSTEM REQUIREMENTS

It includes minimum software and hardware requirements of project.

a) Software Requirements:
- Operating System: Windows7/Ubuntu
- Front end: Java
- Server-side scripting language: PHP
- Android app development tools: 1) Android SDK 2) Android visual studio
- Database: MySQL

b) Hardware Requirements:
- Hard-disk 40GB
- RAM 2GB

CONCLUSION
The Dr. On Click Android App is helpful for patient to search the hospital based on specialist. This application is simplify the task of patient and doctor. Patient can take online appointment so that time of patient will saved. This application facilitates the interaction between patient and doctor. It helps to optimize the work of patient and doctor. Patient can receive the prescription alerts which helpful for patient to keep a record of its prescription. Installation of the app in the smartphone is quite simple and more useful to patients who have normal idea of android mobile. The Dr. On Click is a simple, efficient and powerful Application for society.

REFERENCES


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