

Multipurpose Health Application

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Abstract - In this paper our aim is developing an Android application for finding closest hospital, calculating calories burned and administration of medication. GPS system locates hospitals in the user's vicinity. Path from place of emergency to nearest hospital is found using two attributes: Latitude and Longitude. Calorie counting will be done by detecting human activities using Android accelerometer. ACSM equations are used to find burnt calories. The medication management module intend to notify the user about medication schedule to avoid unsteady intakes or over doses. Notifications can be in form of audio, visual, vibrating alerts.

Key Words: Android, Emergency, GPS, Accelerometer, Calorie counting, Medication.

1. INTRODUCTION

Through this paper, we are proposing health care model which uses simple android system for monitoring health and medication. This application will be multipurpose and user friendly. It will combine the advantages of three modules which can serve interests of different people. Mobile technology can be used to resolve major issues related to health care, since mobile devices can provide instant assistance to users by their diverse functionalities. Due to its broad applicability Android platform is capable of providing different services. A user in need during emergency such as an accident will get access to nearest hospital based on their current location[1]. Details and timing of the dosage can be notified to the users [2]. Also monitor health and weight [3].

1.1 Problem statement

To create an application on android platform which comprises of overall health benefits for all kinds of users. The application will target the health conscious people, people on medication, people in need of medical assistance specially people in emergency. Also to provide an inexpensive and easily accessible application for overall health benefits.

1.2 Project overview

The project will cover features such as:

1.2.1 Hospital Locator

The purpose of this module is to assist the user to locate the nearest hospital in his vicinity. The main objective is providing the list of nearest hospitals to the user. It is also useful when the user is unknown with his current place or region. It acquires information about current location from. Global Positioning System (i.e. GPS) receiver. To locate closest hospitals the Google Map's Application Programming Interface (i.e. API) is used.

The Harvesine Formula is used to find the shortest path between the user's current location and nearest hospital. For this the Harvesine Formula uses two attributes, namely: Latitude and Longitude. [1]

Harvesine Formula:

R = earths radius (mean radius = 6,371km)

$$\Delta lt = lt2 - lt1$$

$$\Delta ln = ln2 - ln1$$

$$a = \sin^2(\Delta lt/2) + \cos(ln1) \cdot \cos(ln2) \cdot \sin^2(\Delta ln/2)$$

$$c = 2 \cdot a \cdot \tan^2\left(\sqrt{a}, \sqrt{1-a}\right)$$

$$dist = R \cdot c$$

1.2.2 Medication Management

Majority of the issues faced by outpatients are due to erratic and inconsistent dosages of prescribed medication. In today's busy routine life it may slip out a person's mind to take proper medication at proper timings. To ease this problem in one's life one can use assistance from the application.

One can easily set details regarding the number of medicines, their respective dosage, and timings and receive notifications as reminders for medicine intake in order to prevent any faulty medicine intake

Input to the system will be the details of medicines, calendar for the intake of their dosages. The input will be provided by the user once for a particular medicine. This information about medicine and dosage will be stored in the database and can be retrieved from the database whenever required. Initial window will represent all the significant medication information. New drugs prescribed can be added, and previously registered details of medication may be

inspected. Also, obtain a list of drugs that have been taken earlier.

This modules main window shows the main layout of the working of this module. It also guides the users about the medication history and what medication is to be taken in the future with its time and date. [2]

1.2.3 Calorimeter

In this module the calories burned by the user will be calculated for health management. This module is useful for users that wish to maintain and manage their weight or wish to reduce their weight. It will recognise physical activity user is performing by using the Android accelerometer. Acceleration is generated which will be used in metabolic equations by converting it into speed. The ACSM metabolic equations are used to calculate the calories that are burned during the physical activity. [3]

The ACSM metabolic equations are discussed below:

- Maximal Oxygen consumption equation :

$$VO_2 Max = H + V + R$$

$$VO_2 Max(W) = (0.1 * Speed) + (1.8 * Speed * Gradient) + 3.5$$

$$VO_2 Max(R) = (0.2 * Speed) + (0.9 * Speed * Gradient) + 3.5$$

Where, V, H and R are amounts of oxygen consumed in the vertical, horizontal motions and resting.

0.1 and 0.2 are oxygen cost/meter for moving each kilo of body weight while walking and running respectively.

1.8 and 0.9 are oxygen cost/meter of moving total body mass against gravity (i.e. vertically).

- Calorie Expenditure :

$$caloric\ expenditure = (VO_2 Max * Weight / 1000) * 5$$

Unit of Calorie Expenditure is Kilocalorie (i.e. kcal).

- BMR (Basal Metabolic Rate):

$$Male\ BMR = 66 + (13.7 * Weight) + (5 * Height) - (6.8 * Age)$$

$$Female\ BMR = 665 + (9.6 * Weight) + (1.8 * Height) - (4.7 * Age)$$

2. SYSTEM ARCHITECTURE AND REQUIREMENTS

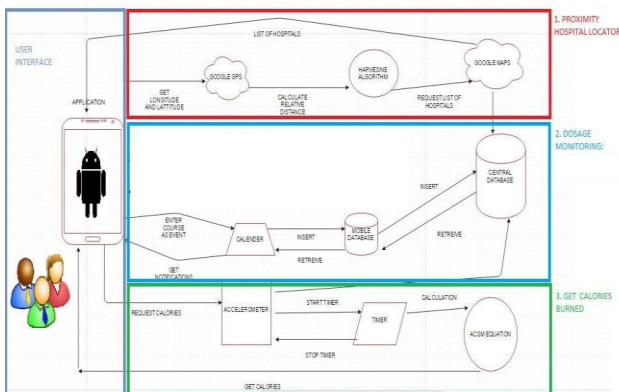


Fig -1: System Architecture

2.1 Software Requirements

- Android IDE (Integrated Development Environment) as Android Studio bundle 141.22 - Android is the platform on which our application will run hence we have used android studio. Database design and creation - A database is a collection of information that is organized so that it can easily be accessed, managed, and updated.
- Android Layout design in XML -XML is the front end of our application. XML is used for its simplicity, generality and usability. XML is used for representation of data structures which are used in web services.
- Java Script Object Notation (JSON) passing with web services. JSON is used for the communication of the database with the web services and the front end with the web services.PHP and Java. PHP and Java languages are used for the front end of the application.
- XAMP (Cross platform Apache MySQL and php) v3.2.1 XAMP server is used as the back end of the application. It is the central server for the application.
- Database design and creation in MySQL 5.5 Structured query language is used to create central database. Android Tool kit 21.1.0.

2.2 Hardware Requirements

- Processor Type : Dual Core
- Speed : 2.4 GHz
- RAM : 2.0 GB
- HDD : 128 GB

3. CONCLUSION

In this report we have successfully presented our project which is an Multi Purpose Android Health application. As presented our application has three functions which are Proximity hospital locator, Dosage monitoring and a calorimeter to calculate the calorie expenditure.

4. FUTURE SCOPE

There are various directions of future work. In future, analysis of the different aspects and variations of emergency services in different context is necessary. We also would like to work on other various emergency services. We would also like to introduce the variety of applications of offline maps, so that the client's job is much easier.

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REFERENCES

- [1] M., S. (2013). *Android Mobile Widget for Proximity Hospital Locator* (Vol. 2). Madurai, Tamil Nadu, India: ER Publications.
- [2] Bruno M. Silva, Ivo M. Lopes, Mickael B. Marques, Joel J. P. C. Rodrigues, Mario L. Proenca. (2013). A mobile Health Application for Outpatients Medication Management. *IEEE*, 5.
- [3] Sukaphat, S. (2015). An Applying of Accelerometer in Android Platform for Controlling Weight. *IEEE*