Health Buddy – Mobile based Nutritional intake Tracking Application for Young College Students

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Abstract

With developing technology, changing lifestyles and busy schedules, people often tend to neglect their health. This has led to an outcry about health related issues among all age groups. A healthy body is a combination of good eating habits and nutritional intake through a balanced diet. For a lay man it is difficult to keep a track of their diet, calculating its nutritional value and maintaining their daily health record. This paper addresses the above mentioned practical problem, Health buddy the mobile application, has been constructed in such a way that it will not only help to keep track of everything they eat but will also give them suggestions of what they need to include or exclude from their diet along with daily exercise requirements, interesting food facts and myths, and useful health tips.

Introduction

Health is a dynamic phenomenon, due to its changing nature. Hence, it persists in being one of the chief concerns among all the age clusters. In the contemporary terms a healthy diet is defined as something that allows one to maintain their health whilst their busy schedule. Maintaining a healthy diet is the practice of making choices about what to eat with the intent of improving or maintaining good health. Usually this involves consuming necessary nutrients by eating the appropriate amounts from all of the food groups, including an adequate amount of water. For around 20% of the planet's population, lack of food and malnutrition are the main impediments to healthy eating. Generally, a healthy diet is said to include sufficient calories to maintain a person's metabolic and activity needs, but not so excessive as to result in fat storage.

The key objective of this project is to develop an android based mobile application to apprise people about their food intake pattern by tracking their daily intake and to maintain their calorie and nutrient need via graphical representation of the results. Target group for this application would be college going students, the most appropriate choice in today's scenario to spread awareness about the need to maintain a good health status.

The section 2 of this paper enumerates various mobile and desktop applications as well as websites that we studied and analysed before starting to build our version of a health application.

Section 3 gives details of the application that we are proposing, including its technical objectives and salient features. Section 4 is a description of the methodology that we've followed thus far in the development of the app. Various technical diagrams have also been included in the next section (Section 5) to present, in graphical form, various stages of the development process. Section 6 concludes the paper and the future aspects of the application are enlisted in the last section, Section 7.

Related Work

We have reviewed a number of apps available in the market to assess the features and services offered by them. Among these were mobile applications like Health Infinity[1], Google Fit[2], and Health Manager[3], desktop applications like Microsoft's Health and Fitness[4] and websites like www.eatthismuch.com[5], www.fooducate.com[6], and www.freedieting.com[7].

Health Manager focuses on regulating the activities that will directly affect the user's health like eating habits, water consumption, and exercise routines. Health Infinity tracks, analyses and summarizes user's weight, foods, activities, sleep, heart rate, blood pressure and squats why measuring their BMI, number of steps they take daily, and tracking their sleep patterns. Google fit on the other hand is concerned only with tracking a person's fitness routines and their impact on his/her health. Microsoft's Health and Fitness is a desktop application that provides workout routines, health plans (uncostumized), diet tips in forms of articles and videos. The websites mentioned above give daily health tips, recipes of trending and healthy food dishes, and recommends the amount of calories a user must consume on a daily basis to achieve their health targets.

After this review we concluded that our application should combine the exercise and diet suggestions and provide them to users in form of short and easy to understand texts. Further we decided to use the traffic light approach to notify the users if their meals had an excess, shortage, or an optimum amount of micro-nutrients like iron and calcium.

Proposed Application

Health Buddy, the Android based health application aims at providing diet and exercise related recommendations to its users along with helping them to track their nutritional intake. This application will create health awareness among its users and its continuous usage may lead to gradual improvement in their diet behaviour[8]. The application will also update its users with health tips thereby dejecting food fallacies. Depending upon height and weight of the individual, BMI will be calculated which will suggest RDA (Recommended Dietary Allowances) for various nutrients and recommend an increase or decrease in calorie consumption and extent of physical exercises.

Technical Specifications

The specific technical objectives of the project are :

1. Collection of food composition data for cooked dishes according to standard serving sizes.

2. Nutrient data collection of packaged foods through analysis of nutritional labelling.

3. Classification of foods on the basis of Traffic light approach — green for good foods, amber for medium and red for bad.

4. Collecting data on different types of physical exercise and the energy expenditure while performing them.

5. Development of the application which will include-. Calculation of BMI and waist to hip ratio, suggestion of recommended nutrient intake, and calculation of nutrient intake of user on the basis of data entered i.e. name and amount of a particular food eaten and calculation of energy expenditure on the basis of data on physical exercise as user input.

6. Recommendation of ideal food choices for the user on the basis of data generated.

Features of the Application

The general features of the application will be :

1. Providing health tips to users at the click of a button.

2. Studying the effect of the user's lifestyle on his/her nutritional intake. For example: Analysing the adverse effect of junk food on the health of teenagers.

3. Specifically studying the nutritional intake habit of college going students.

4. It will provide nutritional and exercise tips to users of the app.

5. Creating a user friendly interface to make health management easier for users.

Methodology

We are taking an incremental approach of software engineering and nutrition information.

Detailed description of incremental approach

1. Study and analysis of IOS, Android and Windows health apps available in the market.

2. After studying the requirements and objectives of the target app, we designed a questionnaire with an aim to analyze the eating habits of college going students.

3. Conducting a manual as well as online survey using google forms to collect the required data.

4. Studying and collecting information on the nutritional contents of various food items (including packaged and cooked food stuffs) commonly available in college canteens.

5. Identification and finalization of tables required for the database, theoretical formulas to calculate the waste to hip ratio and BMI, and other data required for the app.

6. Generating DFDs and ER diagrams for the application.

7. Designing screens on paper and analysing control flow through the application as a whole.

8. Learning technical details of Android application development by on-hands experience on softwares like Android Studio, Eclipse, and database language — SQLite.

9. Generating XML codes for the screens of the mobile app.

10. Populating the various tables of the database with their respective information.

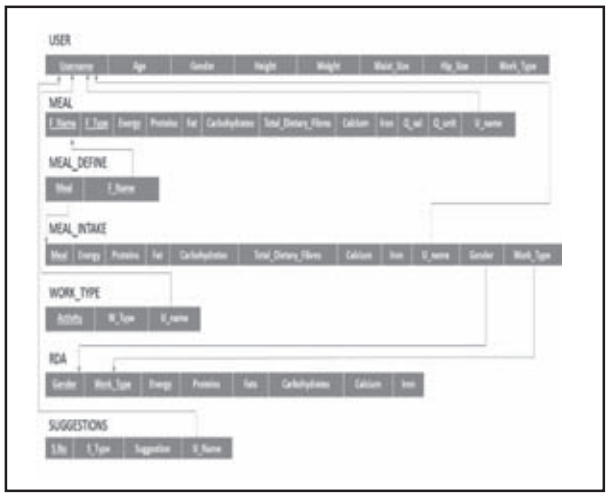
Diagrams Related to the Application

Following are the various diagrams related to the development phase of the mobile application[9].

Database Schema

A database schema is the skeleton structure that represents the logical view of the entire database. It defines how the data is organised and how the relations among them are associated [10].

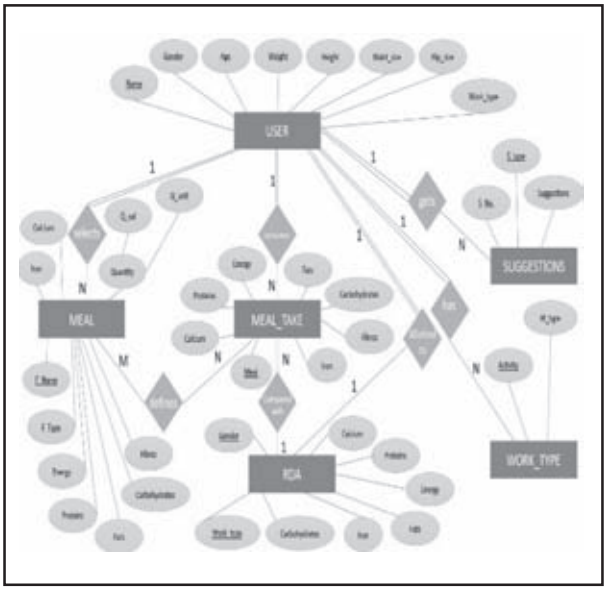
Figure 1: Database Schema



ER Diagram

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database [11].

Figure 2 : ER Diagram



DFDs (Data Flow Diagrams)

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated [12].

Figure 3 : Level 0 DFD

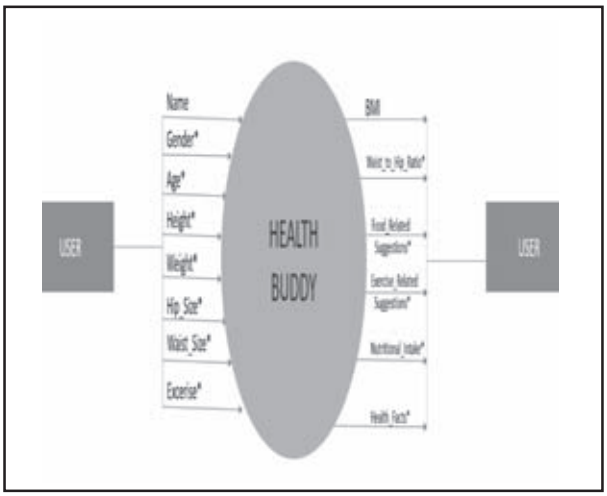
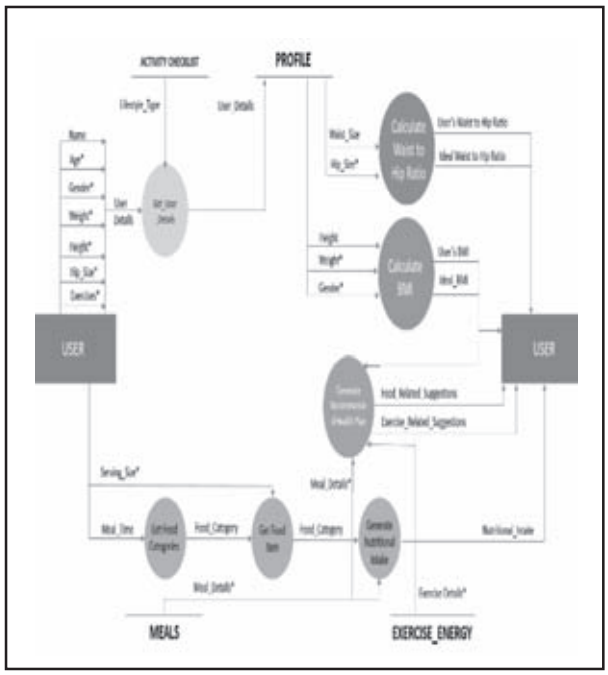


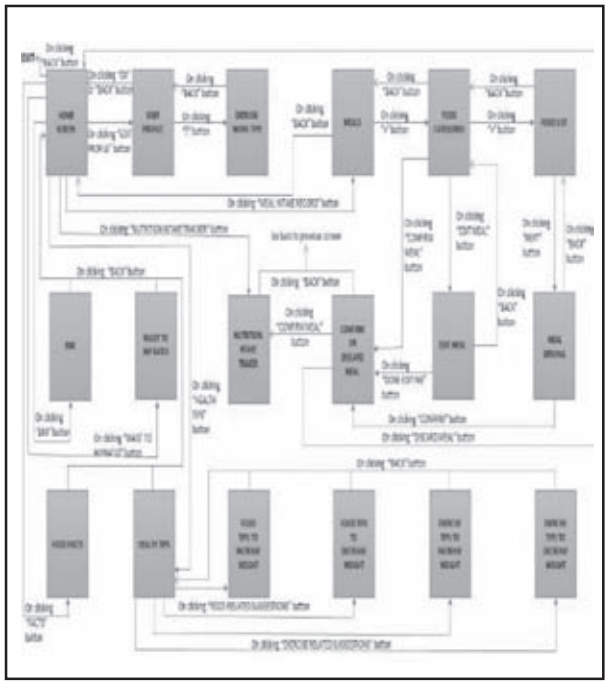
Figure 4 : Level 1 DFD



Screen Flow Diagram

Screen flow diagram illustrates the flow of screens in the functional parts of the site or the software. It shows in detail the sequence in which forms, pop-up windows and confirmation windows are presented[13].

Figure 5: Screen flow diagram



Conclusion

This project of building a health application for Android ecosystem has been funded by Delhi University Innovation desk (for session 2015-2016) and has been undertaken by the faculty and students at Shaheed Rajguru College of Applied Sciences for Women, University of Delhi.

Health Buddy, the Android application aims at providing the users a friendly, easy and a customized interface to keep track of their daily nutritional intake. It equips the user with an easy to use mobile application so as to manage ones health on a day to day basis in an interactive manner. The graphical representations of conclusions derived from user's meal intake adds to the user-friendliness of the app. Some of the unique features of the application includes the traffic light approach, pictorial representation of the calorie intake of the user, and providing customized health tips to them based on their current health status. The application will take into special account the calcium, iron and dietary fibre of the foods.

Future Approach

Once the application is developed, the following features will be incorporated to extend its functionalities.

1. The application will be customized so as to target a larger audience.

2. The application would also take into account the Sodium and Potassium intakes of an individual and their impact on the user's health.

3. We will provide the feature of user login in our application to enable multiple users to access their accounts through a single mobile phone.

4. The application will be configured to work on a cloud which will make it light and more efficient.

5. The application will access information (including the menus and recipes) on the nearby restaurants and cafes and provide the nutritional details of their dishes to the users.

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