Diet-Planner Android Application

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***Abstract*—The development and the rapidly increasing popularity of smartphones has transformed the people's lifestyle. Every person's necessity to have a smartphone can be attributed to the wide range of applications that it provides. Albeit helpful, these applications are making people smartphone addicts, leading to mainly health disorders and physical inactivity. This paper aims at contributing to the well-being of the user by the development of a mobile application on the Android platform. The idea is to utilize the smartphone addiction to counteract the effects of the same on the user. This Android application allows the users to plan their diet according to a daily calorie and sugar intake limit which is calculated using the user's physical personality, age, gender and physical activity level.**

Keywords— Android (operating system), Applications, Health Care, Mobile systems

I. INTRODUCTION

THE development of smartphones has changed "the paradigm of life style" [1]. Smartphones, with the help of mobile applications, provide a wide variety of services to the users which has turned the smartphone from a luxury into a necessity.

The mobile applications and the smartphone, albeit helpful, have made its users addicted to them. Smartphone addiction, especially in youth, has resulted in physical inactivity, health disorders and detachment from the real world. People have become busy with their smartphones even during their meals resulting in improper diet leading to an unhealthy lifestyle. This has led to health disorders of obesity and diabetes. With this smartphone addiction and improper diet causing obesity and diabetes as motivation, this paper aims at contributing to the well-being of the users by identifying the features and the structure of a mobile application that allows users to plan their daily diet. The idea is to utilize the users' smartphone addiction to counteract the effect of the same on the users.

The paper gives a brief account of the previous works related to mobile health application in section II, the problem statement and the main contribution of the project in section III. Section IV deals with the problem solution describing the complete development process starting from modeling of the application, the implementation and validation of the mobile application on the Android platform.

II. SURVEY OF RELATED WORKS

Mobile applications can play a vital role in providing nutritional support to people affected by obesity and diabetes, two of the most common health problems. Android-based mobile applications have been developed to assist people in losing weight such as "DietPoint" [2] and "LoseIt" [3]. Furthermore, an account of the development process and characteristics such as the user interface, database management and calculation of Body Mass Index, BMI, and Basal Metabolic Rate, BMR, in similar mobile applications which provide diet assistance, namely, "Hopeful Hearts" [4] and "myPDA" [5]. These applications and papers have helped understand the requirements and structure of a diet-based mobile application.

III. PROBLEM STATEMENT AND MAIN CONTRIBUTION

People with obesity or diabetes, two of the most common health problems, require nutritional support and a healthy diet to overcome their health problem.

This paper aims to tackle this problem by developing a mobile application on the Android platform. So, the research question is what are the requirements, structure and characteristics that are necessary for developing an Android application which allows the users to plan their diet.

We hypothesize that such an application would require:

- A user interface to allow users to plan their diet and provide inputs for the application.
- A database to store the nutritional information of various types of foods.
- An algorithm to determine the daily calorie intake for the user. In case of diabetic users, a daily sugar intake as well.

Main contributions of this paper are modeling of the Android application for allowing users to plan and have a healthy diet, implementation of this model on Android platform and validation of the application by testing its operation.

IV. PROBLEM SOLUTION

A. Modeling

The required features for the diet-planner Android application are as follows:

- A user interface that allows the user to choose diet for weight loss or diabetes, to enter the parameters required for calculation of BMI and BMR, to display diet suggestions and to indicate the user of calories and sugar intake limits.
- A database to store the information regarding the amount of calories in different types of food.
- Algorithm to calculate the calorie and sugar intake per day for the user using the user's physical personality, activity level, age and gender.

TABLE I. BODY MASS INDEX

Category	BMI
Underweight	<18.5
Normal weight	18.5 to 24.9
Overweight	25 to 29.9
Obese	30 to 39.9
Morbidly obese	>40

BMI is a relative measure of body mass, refer to Table 1, which is calculated using the person's weight *w* in kg and height *h* in m as given in equation 1.

$$BMI = \frac{w}{(h*0.01)^2} \quad (1)$$

BMR is a Harris-Benedict equation that calculates the daily calorie intake for a person using the person's weight *w* in kg, height *h* in cm and age *n* in years. Equations 2 and 3 are used for calculating the BMR for males and females, respectively

$$BMR_M = 66.47 + (13.75*w) + (5.003*h) - (6.755*n) \quad (2)$$

$$BMR_F = 655.1 + (9.563*w) + (1.85*h) - (4.676*n) \quad (3)$$

The daily calorie intake for the person is determined by the application by multiplying the calculated BMR and the activity factor corresponding to user's physical activity level:

- **Sedentary:** Minimal movement, lots of TV watching, reading, etc. Activity factor = 1.4
- **Light activity:** Office work, around 1 hour of moderate exercise/activity during the day. Activity factor = 1.5
- **Moderate activity:** Light physical/manual labor during the day, plus more active lifestyle. Activity factor = 1.6
- **Very active:** Active military, full time athlete, hard physical/manual labor job. Activity factor = 1.9

For diabetic users, the daily calorie intake is determined using different formulae for males and females as shown in equations 4 and 5. And sugar intake is calculated as 2.5% of the calculated daily calorie intake.

$$Males = (10*w) + (6.25*h) - (5*n) + 5 \quad (4)$$

$$Females = (10*w) + (6.25*h) - (5*n) - 161 \quad (5)$$

B. Implementation

The Android application model is implemented using Google's Android Development Tool (ADT) plugin for Java Eclipse [6]. The layouts for the application is created using XML scripts and Android application activities are handled with the help of Java scripts. SQLite database is used to store information about the amount of calories and sugar contained in different kinds and categories of food. This nutrition information about food is obtained from [7].

For weight loss, the daily calorie intake in regulated. For diabetes, both the daily calorie intake as well as daily sugar intake are regulated.

Fig. 1. Android diet-planner application activity screens

C. Validation

The implemented Android application is validated by executing the scripts on an Android Virtual Device (AVD), which is an emulation of an actual Android smartphone. As shown in Fig. 1, the Android application allows users to choose their diet category and enter requested parameters which are used to calculate the recommended daily calorie intake and the daily sugar intake as well, in case of diabetes. Furthermore, the application allows the users to plan their diet from a list of food items that is retrieved from the SQLite database.

V. CONCLUSION

The paper gives a brief description of the structure and the necessary requirements for the development of a diet planner mobile application on the Android platform.

The structure or architecture of such an application includes the user interface, an algorithm to determine daily calorie and sugar intake for the user and a database to store the data related to nutritional value of different types of food.

Implementation of the Android model is done on the Eclipse ADT by preparing XML scripts for interface layouts and Java scripts for calculation and data retrieval from SQLite database which stores the nutrition data of a range of food categories and types. The Android application is validated by running it on an emulated Android device.

For future work, researchers may consider involving hardware such as sensors to detect physical activity or insulin levels, particularly for diabetic people, and determine calorie intake for the day in real time.

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