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BE FIT (Fitness Tracker Application)

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Abstract
Activity Recognition using smart phone sensor is the current development in the mobile phone technology. Use of smart phones as a personal health trainer is a noble idea. With improvement in the sensors and lowered cost of smart phones, the application will come useful to many users worldwide.Our contribution is the application that would calculate energy consumption, collect health information like weight, height etc. and give alert and statistics of health conditions using tools available in an android enabled mobile device. The Project is use of Smartphone for keeping track of the user's physical activities and collect physical information like calories burnt, steps walked etc. to use the application as a personalized health contextual app
Keywords: *Activity Recognition, Smartphone, contextual app.*

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I. INTRODUCTION

Mobile applications are programmes that run on Smartphones and other mobile communication devices. They can also be attachments to a Smartphone or other mobile communication device, or a combination of accessories and software. Mobile medical applications are medical devices that are mobile apps, meet the definition of a medical device and are an accessory to a regulated medical device or transform a mobile platform into a regulated medical device. Consumers can use mobile medical applications as well as mobile applications to manage their own health and wellness, such as tracking their caloric intake for healthy weight maintenance. Our contribution is the application that would calculate energy consumption, collect health information like weight, height etc. and give alert and statistics of health conditions using tools available in an android enabled mobile device.

1.1.1 Project overview

The project's goal is to develop a mobile application that functions as a personal health trainer app. Using sensors, the application will calculate the amount of activity performed by the user. The sensors are installed in the user's smartphone, and the readings from the sensors, combined with a sophisticated algorithm, produce an output. The app will also collect user input such as age, gender, height, and so on. And, as a result, the plan for each user will be determined. The app will provide health tips to the user based on the user's health situation. The output of the following reading will be recognition of the activity performed by the mobile app user.

1.1.2 Objectives

- To collect information from the sensors of mobile phone to identify the activity that the user of the application is performing.
- To use the collected information from the user (age, sex, height, eye no etc.) to give appropriate health tips to the user.
- To collect information of the various activity performed by the user for a predetermined period of time and perform analysis over the information.
- To Focus mainly on activities that consume lots of calories and thus have an effect over the health.
- To suggest suitable lifestyle changes based on medically approved values like ideal heart rate and BMI (Body Mass Index).

1.2 Need of the project:

Now-a-days people living in cities have a very hectic lifestyle, full of responsibilities to be fulfilled and deadlines to be met. At any given time people have more number of things to take care of than they actually can. Given this, it is common that health may be neglected in this race of life. One aspect of this is that many times we may forget, find it irritating or even neglect to follow a doctor's prescription and other important schedule related to exercises and diet. This app should

The application will first collect certain basic health information such as age, gender, and height, followed by other information such as sugar level, blood pressure, eye number, and so on, and will then decide on an approach for the person. The application will collect information using environmental sensors. The activity would be recognized by using algorithms that uses sensor values to predict the calories consumed. Using periodic collection of data the application will provide regular insights into most of the physical activities.

1.2.2 DFD for BeFit

A Data Flow Diagram (DFD) is a traditional visual representation of a system's information flows. A neat and clear DFD can graphically depict the appropriate amount of system requirement. It can be manual, automated, or a combination of both. It demonstrates how data enters and exits the system, what changes the data, and where data is stored. A DFD's goal is to show the scope and boundaries of a system as a whole. It can be used as a tool for communication between a system analyst and anyone who is involved in the order that serves as a starting point for redesigning a system. The data flow diagram (DFD) is also known as a data flow graph or bubble chart.

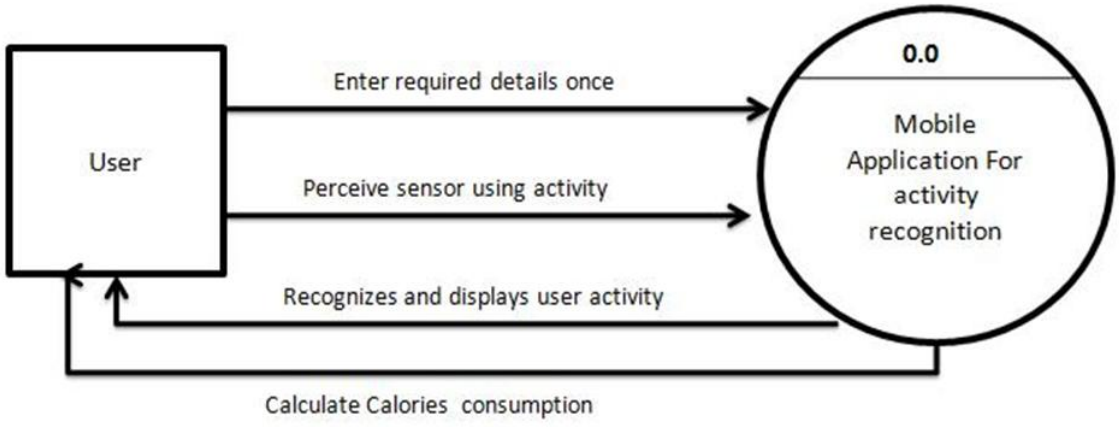


Figure 1: DFD level 0

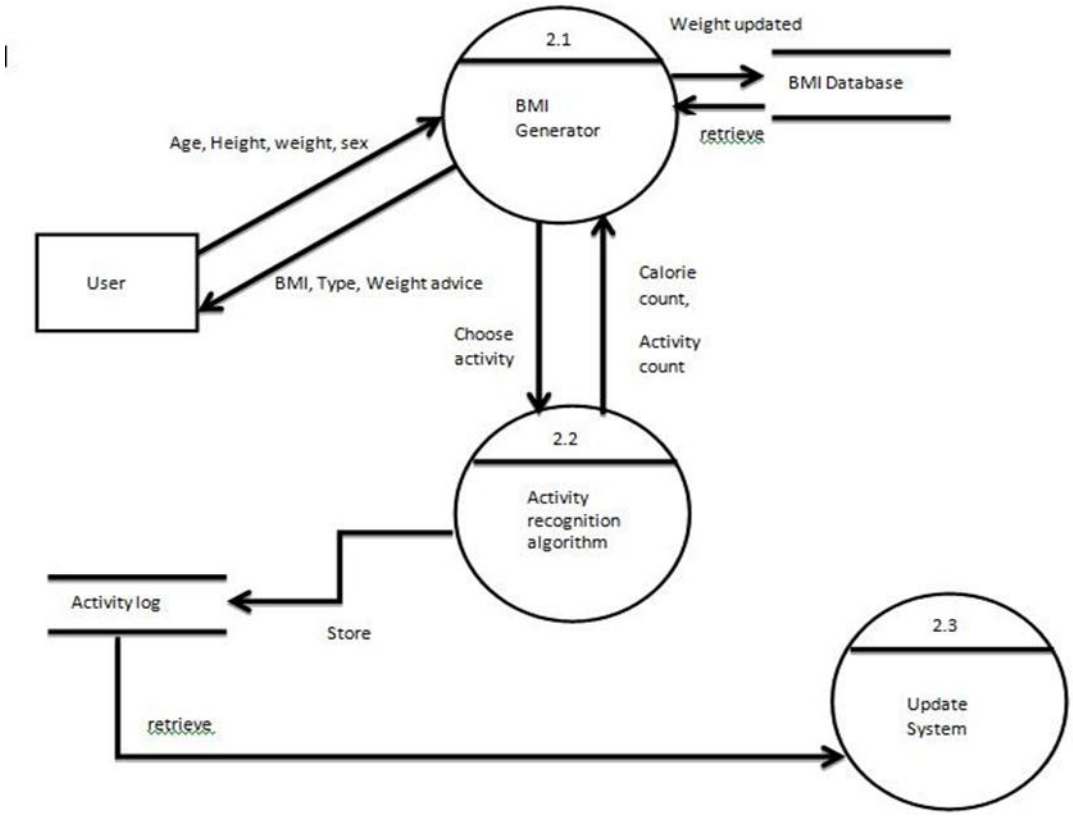


Figure 2: DFD level 1

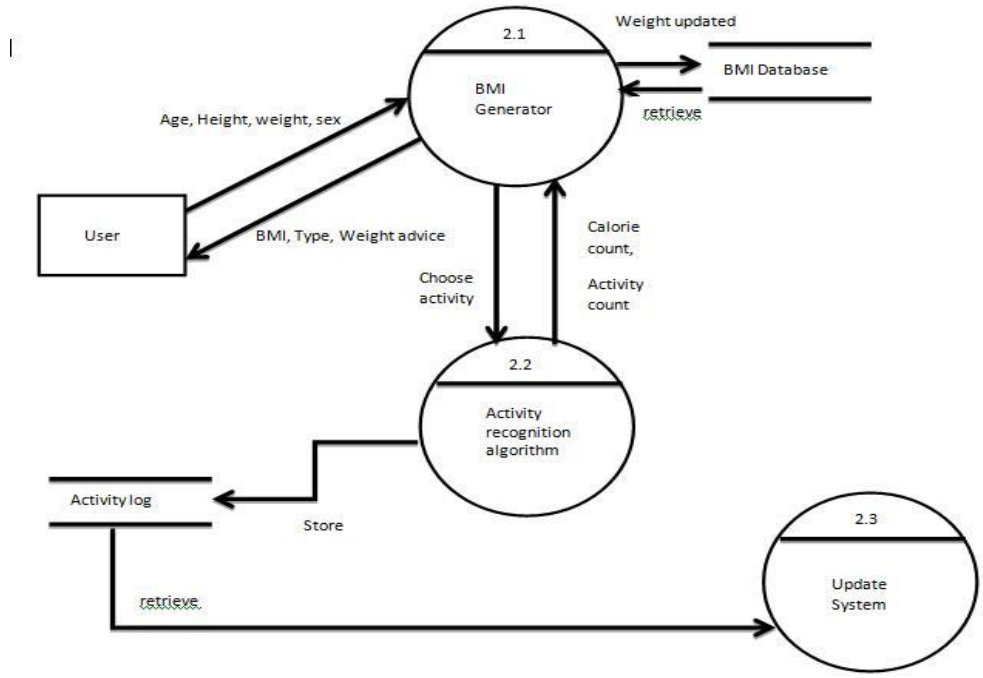


Figure 3: DFD level 2

1.2.3 Technologies & Programming Tools Used:

Software requirements:

• Development platform: Microsoft Windows.

• Deployment platform: Android platform with Dalvik bytecode converter (comes along with Android 2.2).

• Eclipse IDE for Java Developers with Android Development Tool (ADT) plug-in.

• Android SDK for Windows operating application.

Hardware Requirements: An Android enabled device for the purpose of deployment and a personal computer workstation for application development.

Android Studio:

Android Studio is Google's official integrated development environment (IDE) for the Android operating system. It is based on JetBrains' IntelliJ IDEA software and is designed specifically for Android development. In 2020, it will be available for download on Windows, macOS, and Linux-based operating systems, as well as as a subscription-based service. It is intended to be a replacement for the Eclipse Android Development Tools (E-ADT) as the primary IDE for developing native Android applications. On May 16, 2013, at the Google I/O conference, Google announced Android Studio. It was in the early access preview stage beginning with version 0.1 in May 2013, then entered the beta stage beginning with version 0.8 in June 2014.

2.2.4 Introduction to Programming Tools:

1. Android Software Development Kit (SDK):

Android is a software stack for mobile devices that includes an operating system, Middleware and key applications. The Android SDK includes the tools and APIs required to start developing applications for Android-powered devices. It enables developers to write managed Java code that controls the device using Google-developed Java libraries. The Android SDK comes with a plethora of development tools. A debugger, libraries, a handset emulator (based on QEMU), documentation, sample code, and tutorials are among them.

Java:

Java is a high-level, class-based, object-oriented programming language with a low number of implementation dependencies. It is a general-purpose programming language designed to allow programmers to write once and run anywhere (WORA), which means that compiled Java code can run on any platform that supports Java without the need for recompilation. Java applications are typically compiled to bytecode, which can run on any Java virtual machine (JVM), regardless of underlying computer architecture. Java's syntax is similar to that of C and C++, but it has fewer low-level facilities than either of them. The Java runtime provides dynamic capabilities (such as reflection and runtime code modification) that traditional compiled languages do not.

II. RESULT

The results obtained are as discussed below

1.3.1 Architecture of the proposed system:

The architecture of BeFit health analysis based on activity recognition consist of different modules.

1) Activity recognition.

2) Mobile inbuilt sensors

Activity recognition is current development which recognizes the current activity of individual. The combination of two sensing inputs is taken that are hard sensing and soft sensing to recognize the current activity of individual whether person is walking, in vehicle etc. Hard sensing inputs are the inbuilt sensors in mobile. Currently application is using two in built sensors first is proximity sensors and second is accelerometer sensors. Application uses these two sensors for performing activity.

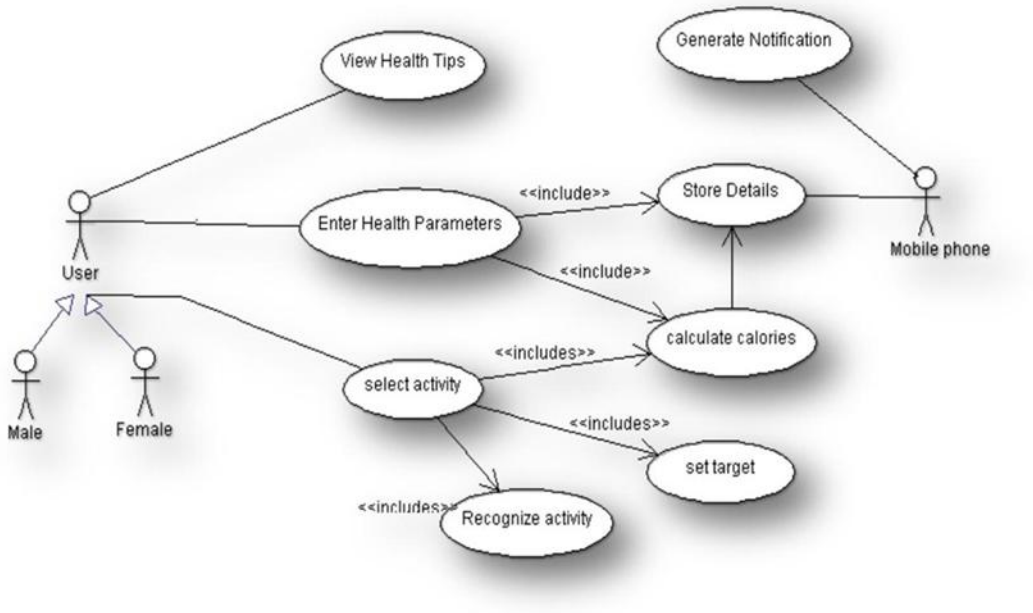
User once opens the application Splash screen occurs. Splash screen is first image of application where the application logo is displayed along with different health tips every time the user opens the application. Then user enters the name and details. User details are important for further calculation and every single activity output is based on this user details. Using user details BMI and BMR is calculated and target calories is calculated based on users lifestyles. The on menu page different activity like push-ups, walk, skipping and squat is present. If user selects push-ups activity then proximity sensors get activated and when user starts performing push-ups proximity sensors start counting the number of push-ups and when user press stop then calorie burned by user is shown along with the number of push-ups. This number of push-ups and calorie burned by user is

saved in log after pressing ok button. For walk, Skipping and Squat activity accelerometer sensors are used. An accelerometer sensor consists of X-axis, Y-axis and Z-axis. For walk Z-axis value is calculated and rest axis value is kept zero. For Skipping only Y-axis value is calculated and for squat only X-axis value is calculated. After user press stop button the sensors value and time from start button to stop button are used to calculate the calorie burned by person performing activity. Text-to-speech and notification features are also added using modules of android.

III. DATA FLOW DIAGRAM

4.2.4 Use Case:

At its most basic, a use case diagram is a representation of a user's interaction with the system that depicts the specifications of a use case. A use case diagram can depict the various types of system users and the various ways in which they interact with the system. This type of diagram is typically used in conjunction with a textual use case and is frequently accompanied by other types of diagrams.



IV. FUTURE SCOPE

The Future of contextual Health Apps looks promising with improvement in hardware in the form of new sensors in Smartphone, improved network connectivity and reduction in cost of phones. Following are the salient features that are to be added into the app as a future prospect.

1)Calculation of Heart beat.

Calculating heart beat will help to calculate more accurately effect of the activities performed by the user on the person‟s calorie consumption. It will also improve the health tip algorithm to give health advice based on the user‟s average heart rate. Even further this can also help generate an SOS message if the heart rate increases or fall
below allowed threshold. The Galaxy S5 is the first smart phone with a built-in Heart Rate Sensor, allowing you to measure your heart rate directly on your phone.

2)Social App to share health achievements with group.

This feature would become favourite amongst those people who boast about the exercises that they perform. The social feature would include sharing the amount of exercise the user has done with the friends who are connected using the app. The user could share his location, and share his activity profile.

3)Music played according to your activity and mood.

Emotion recognition and activity recognition algorithms that will help you to swap between songs. The songs will be played which best suits your mood. It will motivate you to perform the activities in a better way.

4)Games like running race, cycling competition etc.

Challenge your friend and family members with this cool feature of setting match between two app users. Multiple users of app can challenge each other in different parts of the world at different time for the same activity. This could build a healthy competition of actual physical activity like cycling, skipping, running etc.

5)GPS Enabled Trekking App.

GPS enabled devices can show the location of the trekker and his health condition and can come to use if a person faces health problem during trek (asthma attack or body sugar level drop). It can also help trekkers find the shortest path on feet to travel on different terrain.

V. CONCLUSION

At present people living the metro life tend to neglect their health owing to the numerous other responsibilities they are obliged to fulfil. Our application would thus contribute to the betterment of such lifestyles.

Currently a part of our application is being customized only for recognizing certain physical activity and calculating the calorie consumption. In the near future, we would be able to expand our user group by targeting numerous other activities as well, thus making life more manageable for the people of tomorrow.

With the widespread adoption and use of mobile technologies, new and innovative ways to improve health and health care delivery are emerging. Mobile applications (apps) can assist people in managing their own health and wellness, promoting healthy living, and gaining access to useful information when and where it is required. These tools are being used almost as fast as they are being developed. Health care professionals, consumers, and patients are among these users.

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