Nutrition Assistant Application

Introduction :

Better health can be achieved by maintaining a simple life style such as a good night sleep, enough exercises and good nutrition. People spend one third of their lives sleeping however most people do not understand the importance of sleep. Moreover, the lack of sleep can affect a person's memory and emotion. The exercise habit and nutrition can also lead to good health. Daily working life can be affected by lack of sleep such as drowsiness and long - term health problems . Many researches have s hown that not enough sleep or exercise can lead to many health problems such as GERD , Alzheimer's disease, hearth disease, sleep apnea and insomnia. In the competitive work environment , now a days, it is not easy for many people to manage good sleeping and exercise habits. With busy work and personal life schedules up very late especially inyoung adults and teenagers. A good night sleep can also be affected by the person's exercise habits and nutrition consumption. The sleep, nutrition and exercise have more complicated relationship than many people have realized. Enough exercise helps people sleep better and good nutrition also lead to better mood and better health. Thus, a that can automatically record personal information, produce a warning, and give personal advices to its owner in order to maintain good sleeping, exercise and nutrition habits is needed. Today smart phone technology is a good candidate for this project because of its low cost,portability and capability which is similar or close to a personal computer. More over, a phone has become a typical device in daily activity. In addition, a current smart phone includes a lot of sensors such as an accelerometer, a microphone and a light sensor. These features make a smart phonesuitable for collecting personal data in this work. Android is a Linux-based operating designed for touch screen mobile devices. Lately, Android becomes the world's most widely used smart phoneplatform. Especially, its customizable features allow Androids to be the software of choice formany developers.Thus, this project aims to develop an application for Android smart phones that has a capability to record the information related to the duration and quality of sleeping, the types and duration of exercise activities and the amount of nutrition consumed, to analyze the collected data and provide a notification or an alarm in order to suggest or remind the user in taking care of his her health; and to present the analyzed results in a format that is easy to understand with out the need of a deep medical knowledge. The rest of this documen t is organized as follows. Next, the design is given. Then, the results and discussions are given. The conclusion is given at the end.

Abstract :

Good health can be achieved by maintaining good behaviors such as a

good night sleep, enough exercise and good nutrition. However, the competitive environment nowadays prevents suchgood behaviors. Thus, this work aims to develop an application on mobile devices that is able to record the daily sleeping, exercise and nutrition information, analyze the collected informationin order to provide a notification or an alarm, and present the analyzed results in a simple and easy to understand format. The proposed application can collect data from other application and from the users. A set of simple data analys is methods is performed on the collected data in order to provide a personal health advice based on the user pre-defined preferences.

Design :

Three activities to be focused in this project are s leep, exercise and nutrition habits. Even though,lots of applications available in Google Play Store have a capability of collecting sleeping or exercise data or providing nutrition suggestions, no application offers all threefeatures in a single application like what is proposed in this project. Next, the sleeping, exercise and nutrition related information to be collected in this application is given.

Sleeping :

The amount of sleep each person needs may be different even among people with thesame age and gender. The normal sleep at night is approximately four to six sleeping cyclesand each cycle consists of five stages. The first stage-light sleep-the muscle activity slows downwith some movements. Stage 2-5 are considered in a stage of deep sleeps with slow breathingpatterns and limited to no-movement of the body. Therefore, the body movement during sleeps canindicate the sleeping quality. In addition, the duration of sleep is also collected as another sleeping quality indicator.

Exercise :

Regular exercise improves the wellness of human heart and blood pressure, buildsbone and muscle, and helps reduce the stress and the muscle tension. In addition, exercise can evenimprove the mood. The efficiency of the exercise depends on the type of exercise and the durationof the exercise during the day. Sound sleep is another benefit of exercise. In general, exercisingmakes it easily to fall asleep. However, exercising before going to bed will make it difficult tofall asleep. The exercise must be done at least 3 hours before bedtime because exercise will increasethe body temperature. As a result, it will take more time to fall asleep after an exercise due to thetime to decrease the body temperature after an exercise. Thus, the duration of exercises and theperiod of time that the exercise occurs will be collected in the work.

Nutrition :

There is a relation between the sleeping and eating habits. The results showed in on the effects of partial sleep deprivation on food consumption and food choice. The experimentsconducted on selected 50 undergraduate students at Private East Coast University, United State ofAmerica. The results showed that the food choices after a normal sleep are

considered to behealthier than the food choices after a deprived sleep. Thus, the amount and type of foodconsumptions will be collected as the nutrition information in this work.In addition, some notifications are also produced however the proposed application will considerproducing a suitable notification format. For example, an alarm should not wake the user up duringthe stage of deep sleep if it is not really necessary. The proposed application also provides somehelps to the users including the user manual and some health related references. This application isscheduled to be freely available on Google Play store later. Furthermore, the application developerwill also provide an online forum for error/bug reports.

Results and Discussions :

The proposed application is developed to be fully compatible with the Android . The mobile device must be able to connect to the Internet in order to use full features of the proposedapplication. The concept of the user interface is based on the Minimalism   meaning the userinterface of the developed application will use as fewer items on the screen as possible.   the resulting main user interfaces of the developed application. With limited space, three screens of the application. The interface is focusing on a simple and clean design , large image icons , simple menu bar , and a set ofstandard action icons. The user interface is mainly from the touchscreen events such as clicks and seeks which will generate an event signal. Then, the event handlerwill identify the component issued the event and forwards the command to an appropriate event handler for processing.
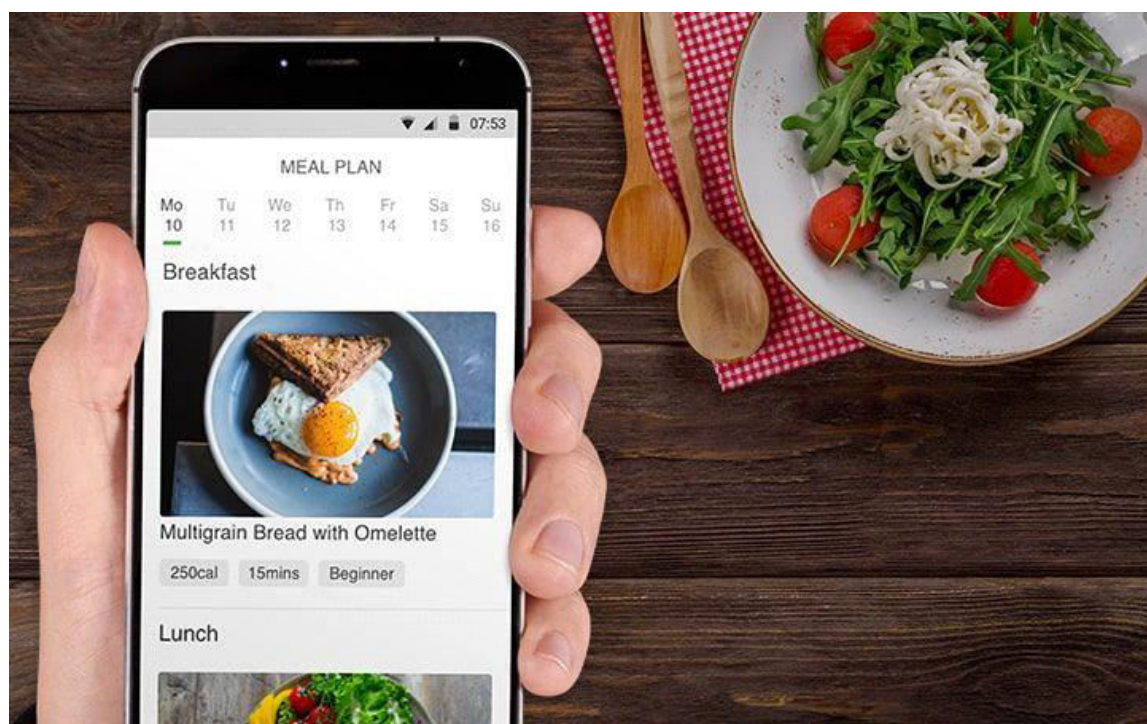

Fig.1.1

Two data collection methods are available in this work. First, the data is collected from the
existing application API such as some sleeping data is collected from the Sleep as Android API

which uses the body movement to indicate the sleeping stage of the user. The second method is tocollect the data from the user via the user interface of the application as shown in shows the user interface of the three main features of the proposed program which allows the user to selecteach feature from the menu bar on the second row of the screen. The list of icons at the last line ofthe screen acts as a list of hot menu items to record the user's activities. This list of icons can bepersonally customized by the user as   shows the personal preference page of the program which allows the user to enter his/her personal information.This information will be used to provide the personalized health related recommendation information by the application. The value of each icon indicated on the right most screen is used foranalysis purposes only. The value indicates the important level of the action while the sign indicatesthe type of habits. That is, a good habit is indicated by a value greater than zero while a bad habit is indicated by a value smaller than zero. A simple data analysis method is used by summing thevalues of all good habits and the bad habits separately. shows the analyzed result in the formof a pie chart. However, there is a limitation to this simple analysis method. That is, each user mayhave different standard such as a glass of water for each person does not have the same size.Therefore, each user must have a standard in mind for collecting his/her data for each activity. For example, amount of fresh water to be considered as 1 glass must be at least 16 ounces.
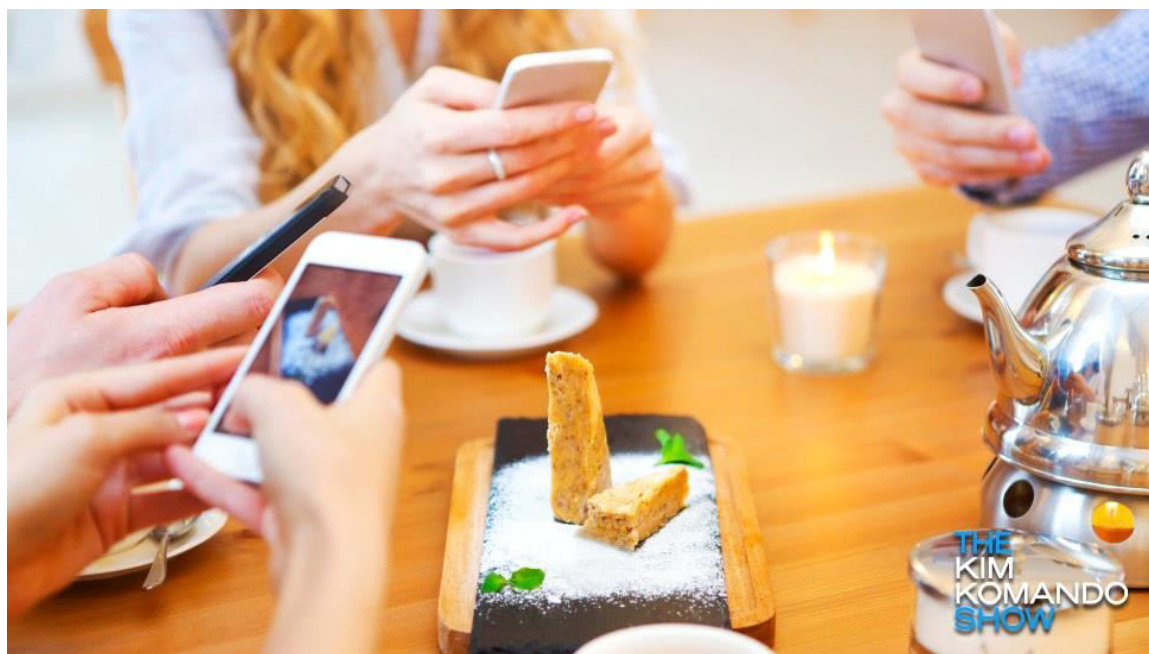

Fig.1.2

To make it easy for the user to the results, all analyzed results are presented in the
forms of graphs and tables. uses a pie chart to clearly show the different between good andbad habits, while   uses a bar chart to show the details of the amount of each activity of the user.The scope of the data is varied   to the user preference. That is, the analyzed results can be calculated from a data set of one-day, one-week, one-month or specific periods.is a exampleof the sleeping

duration data collected during a two-week period .In addition, the recommended sleeping duration which is suitable for the user according to theuser's personal information is also presented as a line in the chart. Moreover, a simple statistically measure such as an average is also provided by the proposed program. presents the average exercise duration of each day of the month which is clearly showing that the user does not haveenough exercise on Tuesday, Thursday and Saturday. Due to the limited space, all results cannot be presented in the paper. However, the developed application will be demonstrated during the conference.
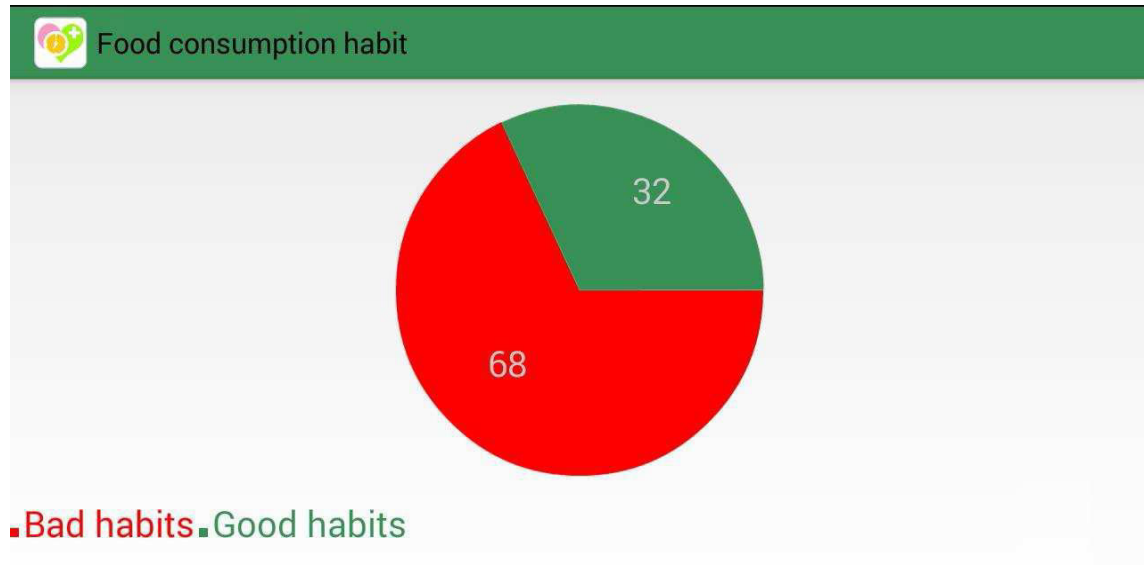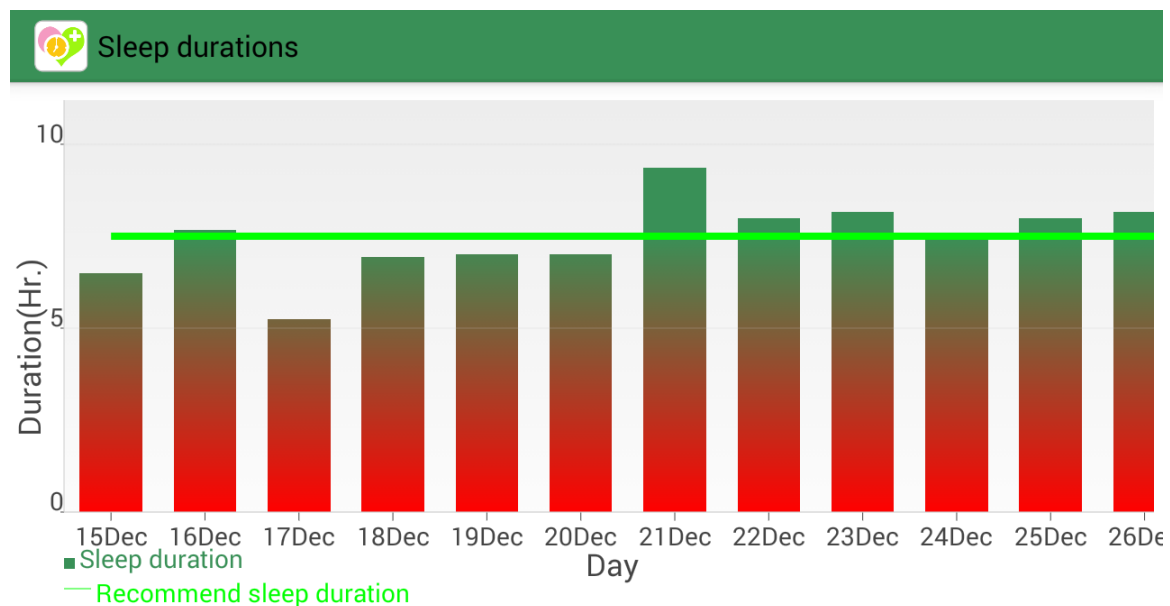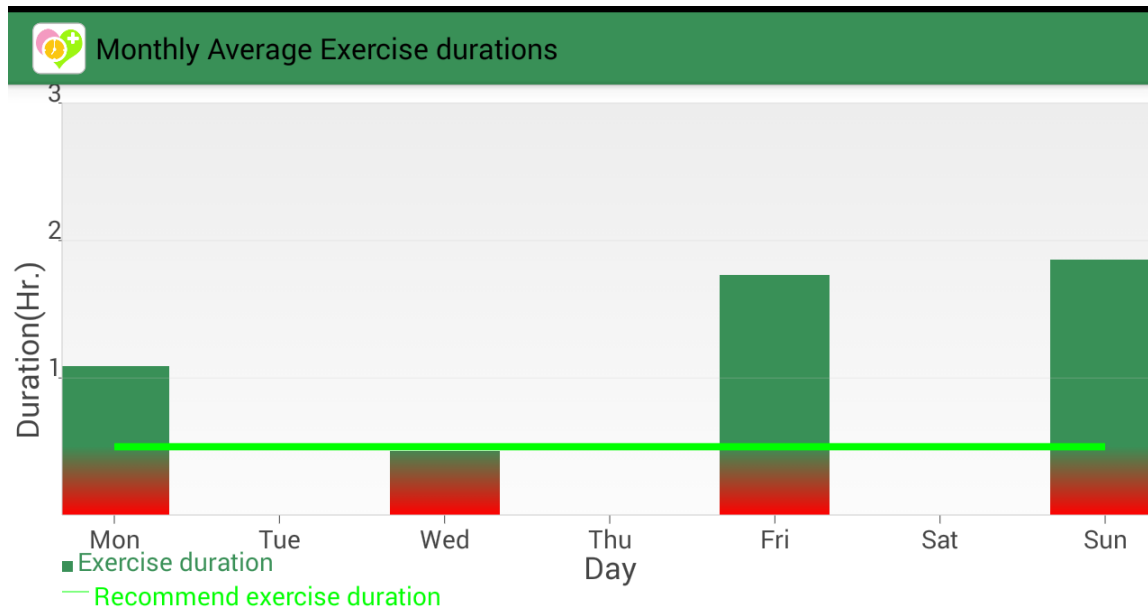

Fig.1.3

Fig.1.4

Fig1.5

Conclusions :

In this work, a personal health assistant Android mobile application is designed and developed. Thedeveloped application allows the user to collect and analyze his/her personal health information related to sleep, exercise and nutrition. The application can collected a set of data from other Android applications and a set of data entered by the user. The collected data is analyzed using a set of simple data analysis methods. A set of pre-defined personal information and a set of pre-defined personal preferences are utilized by the proposed application in order to provide a set of personal health advices. The analyzed results are presented in a simple and easy to understand format such as a pie chart. The application can also issue a notification or alarm on a pre-defined event specified by the user.