

Calorie Counter Information System Development for Weight Loss Program based on Android

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Abstract: Diet is a control of eating habit for someone to achieve the objectives of the diet itself, either to lose weight or to gain weight. The number of calories from the food we eat every day, determine whether a diet that we do may lose body weight or increase body weight. But not everyone can control their daily calorie consumption, because of that, many people have problems of overweight or obesity. Therefore, a mobile application that can calculate a person's daily caloric intake, can help someone to achieve their diet goal. The research purpose is to make a mobile calorie counter application based on Android operating system. The application is developed using a Rapid Application Development (RAD) methodology, the Java programming language has been used to develop the system, while SQLite has been used for database development. This application can run offline without an Internet connection. This application has five main features, namely the body mass index calculator, total daily energy expenditure counter, the body fat calculator, daily calorie intake counter and foods calorie list. Therefore, user can get a variety of information about diets and calories, so it can help them to achieve their weight loss goal.

1 INTRODUCTION

In the modern society, many people who work in an office environment prone to suffer an obesity (Kania, 2014), due their working habit of sitting in front of computer all day.

According to Dr. Ita Muharram Sari SPS as a consultant of the meetdoctor.com, office work patterns that require workers to sit for hours, becoming one of the factors of their lack of physical activities. The difficulty of controlling their diet and lack exercise has an impact on the many people. Because of bad diet and lack of exercise, many people suffer from overweight and obesity.

Lack of knowledge about a healthy diet is also the cause of overweight. Whereas all the necessary resources can now be accessed easily. Developments in information technology should help solve this problem. With the rise of communication devices usage, every people now can access all kind of information.

Now lot of people already owned a mobile device. According to eMarketer in 2014, mobile phone users in Indonesia reached 38.3 million users. Cell phone or mobile phone is now progressing very rapidly (H,

2012). Initially, a mobile phone may only be used to make a voice calls or send and receive short messages. But everything is change after discovery of smartphones. Therefore, development of an application to help people learn a healthy diet, exercise and a way to help them losing weight can be done.

2 RELATED WORK

There are many similar works which research on mobile health information systems for example (Rao & Krishna, 2015), they proposed a design of mobile health for android applications. In (Hariadi, Khotimah, & Wiyono, 2015) and (Doukas, Pliakas, & Maglogiannis, 2010) also proposed a nutrition information systems mobile based.

2.1 Body Mass Index (BMI)

The number of calories from the food we eat every day are determine whether a diet that we do can lose weight or increase weight. Basically, to achieve a weight loss then one must adjust the diet and daily

routine, so that the calories used by the body is more than the calories absorbed by the body. When the calories taken into the body is greater than the calories used by the body to eat excess calories will be stored by the body in the form of fat reserves, which will have an effect on a person's weight gain. The first thing to be done to determine that a person has a healthy weight or not is to calculate the body mass index (BMI). BMI is the ratio of weight divided by the square of one's height, which can be calculated as (Budianto, 2010):

$$BMI = \frac{Body\ Weight\ (kg)}{Body\ Height\ (m)^2} \quad (1)$$

Generally, the result will be of little value for skinny people and has greater value for obese people. Classification of value can be seen in the following table:

Table 1: BMI Table

BMI	Classification
< 14,9	Severly Underwight
15 - 18,4	Underweight
18,5-22,9	Normal
23 - 27,5	Overweight
27,6 - 40	Obese
>40	Severly Obese

2.2 Basal Metabolic Rate (BMR)

After calculating the BMI, then we know the condition of our body. Next stage is to calculate the daily calorie intake of our body by using the BMR. BMR is the amount of energy or calories needed by the body in a state of rest. So at the moment we do not indulge the body also requires a certain amount of energy or calories to use to keep our body function properly. The number of calories or energy is only able to run the organ - a vital organ in our body. The higher the person's body muscle mass, the higher the energy or calories your body needs to keep it in a stable condition.

There are several formulas to calculate these BMR. This time it uses the Mifflin-St Jeor equation. This equation can be seen in the formula 2 (Budianto, 2010).

$$Male: BMR = 10 \times BodyWeight + 6.25 \times BodyHeight - 5 \times Age + 5$$

$$Female: BMR = 10 \times BodyWeight + 6.25 \times BodyHeight - 5 \times Age - 1661 \quad (2)$$

BMR calculations are different for each person depending on their physical activity. Therefore to get the more precise calculation, the results of BMR calculation using the table above should be multiplied by a factor of activities in accordance with daily activities - day, i.e:

- 1.2 for people who are inactive (little or no exercise at all)
- 1.375 for people with mild activity (light work or exercise 1-3 times a week)
- 1.55 for people with moderate activity (work is being or sports 3-5 times a week)
- 1.725 for active people (heavy work or exercise 6-7 times a week)
- 1.9 for people who are extra active (very hard work or jobs that require heavy physical labor)

2.3 RAD Method

System development method that being used is RAD (Rapid Application Development) (Kenneth E. Kendall & Kendall, 2007), This model was made by James Martin to make the system faster without compromising quality (Pressman & Maxim, 2014).

3 SYSTEM DEVELOPMENT

3.1 Requirements Planning Phase

3.1.1 Selecting Gather Information About Diet

The purpose of gathering information about diet are as reference information about what is needed in the process of weight loss. What should be known about the user's body calories needs and calories from foods and beverages consumed. So that the authors can present information in accordance with user needs to support weight loss program (Kumalasari, 2008)(Samudra, 2013). The authors conducted a search of information by spreading the questionnaire, seeking information from the Internet, the authors also do direct observation by executing the process of weight loss.

3.1.2 Questionnaire

At this stage the researchers made a survey questionnaire. The questionnaire contains 14

questions relating to the behavior of respondents in the diet. Of the 38 respondents was only 11 people (29%) who know the needs of daily calories, and only 9 (24%) who know how to calculate daily caloric needs of the body. Number of food calories are important for regulating a person's weight, but based on the questionnaire only 8 people or 21% of the total respondents know the calories of food they eats. From the results of the questionnaire author can know the needs of the application features.

3.1.3 Identification of Application's Features

The next stage is to identify what features are needed inside the application. Based on the collection of information through observation and questionnaires, the authors conclude that the features that are required are as follows:

- Features of the user to store the required information, such as weight, height, and age.
- Features to calculate body mass index (BMI)
- Features to calculate daily caloric needs of the body.
- Features to calculate the amount of body fat.
- Information on calorie foods and beverages.
- Features to display information about the number of calories that have been consumed by the user.
- Record or log of food and drinks that have been consumed.

3.1.4 Requirements Identification Prototype System Requirements

- The application is able to provide information about the daily caloric needs of the user easily.
- The application is able to provide information about the foods's and beverage's calories that user consumed based on database of food and drinks provided.
- The application is able to provide information about calorie of foods or drinks based databases provided.

3.2 Workshop Design Phase

3.2.1 Use Case Diagram

At this stage is the application design process, while the use case of the application design is:

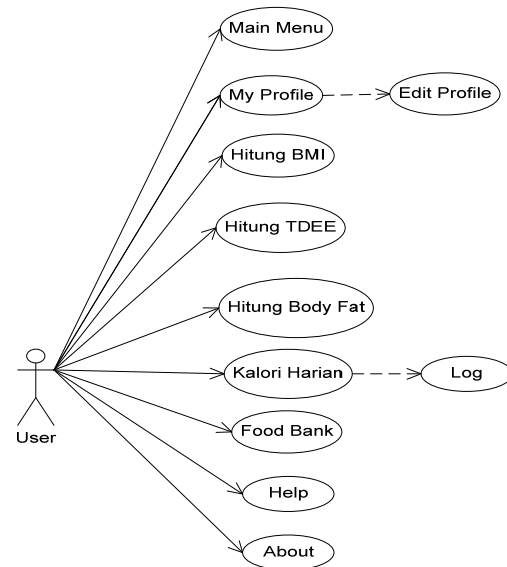


Figure 1: Use Case Diagram

3.2.2 User Interface Design

- **Interface of Main Menu Page**

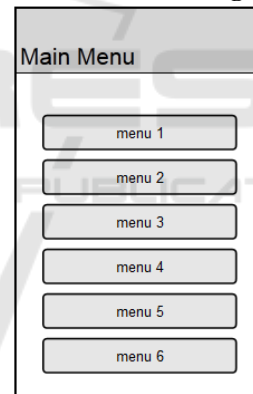


Figure 2: Interface of Main menu page

- **Interface of My Profile Page**

Figure 3: Interface of My Profile

- **Interface of BMI Page**

Figure 4: Interface of count BMI page

- **Interface of Count TDEE Page**

Figure 5: Interface of count TDEE page

- **Interface of Count Body Fat Page**

Figure 6: Interface of count Body Fat page

- **Interface of Daily Intake Page**

Figure 7: Interface of Kalori Harian page

- **Interface of Food Bank Page**

Nama	Jumlah	Kalori	Satuan

Figure 8: Interface of Food Bank page

• **Interface of Help Page**

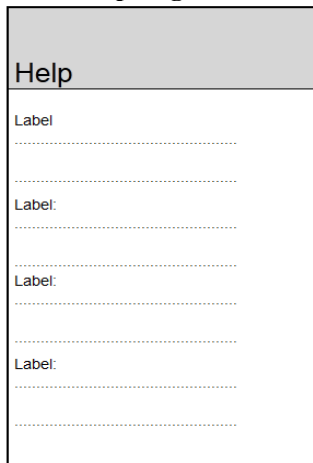


Figure 9: Interface of Help page

• **Interface About Page**

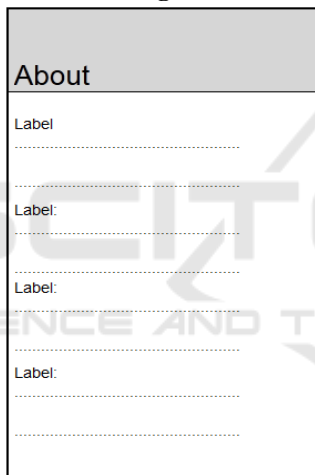


Figure 10: Interface of About Page

3.2.3 Construction Phase

At this stage, the coding of the design of the system have been performed. The Java programming language has been used to develop and XML has been used to display the layout. The authors use SQLite as a database, it is because SQLite is available by default on android, and can be used easily by simply import them as a library in the android development tool (ADT) (H, 2012). Applications used as ADT is Eclipse Juno with support of Software Development Kit (SDK).

3.3 Implementation Phase

Before the application is implemented directly on the android device, the application must be free of bugs. The bug could occur because of an error when the application coding, logic errors, or also can be caused by devices that do not support.

In this phase there are some steps done, namely:

- Write Java source code, at this stage the tools that being used is the application development software for Android, the Android Development Tools (ADT) in the form of Juno Eclipse and the Android Software Development Kit (SDK).
- Packaging process data by using the facilities provided by SDK and Eclipse.
- Running the application on android device, to perform testing on an android device directly, and make repairs when needed.

3.3.1 Software Implementation

The software used in building this application is as follows:

- Windows 7 64 bit Operating System
- Eclipse Juno
- Android SDK (Software development kit)
- Bluestack application

3.3.2 Hardware Implementation

The hardware used in the development of this application is as follows :

- Intel core i3 2,3 Ghz
- RAM 4GB
- Hardisk 750GB
- VGA 2GB

3.3.3 Interface Implementation

- **Splashscreen Interface**

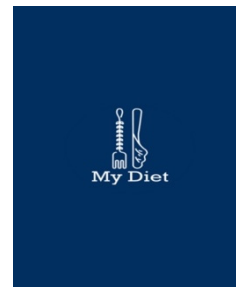


Figure 11: Splashscreen Interface

Interface splash screen is the initial interface when the application was first run.

- **Main Menu Page Interface**



Figure 12: Main Menu Page Interface

Main menu page is the main page of this application. On this page the user can choose to run the features - features that are available. When the user first run the application, it is recommended to fill the profile first in the page My Profile.

- **My Profile Page Interface**

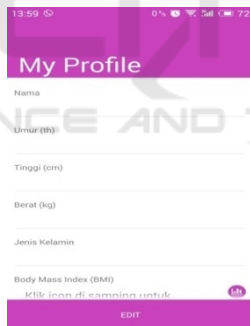


Figure 13: My Profile Page Interface

On this page the user will fill out the identity through the form provided. Users will be asked to fill out your name, age, weight, height, and gender. This data will be used by applications to run some of its features.

- **Count BMI Page Interface**



Figure 14: Count BMI Page Interface

Page Count BMI serves as a feature to count body mass index. If the user has filled out the profile, then the system will automatically fill in the required form. After that, the user needs to press the count button, and the application will be counting user's BMI and displays the results in the column provided. When the user presses the save button, the system will store the results of BMI in the shared preferences.

- **Count TDEE Page Interface**

Page Count TDEE serves as a feature to count daily caloric needs of the user. If the user has filled out the profile, then the system will automatically fill in the age, height, and weight fields. After that the user needs to fill in the gender and activity level. After that, if the user presses the count button, the application will be counting user's TDEE and displays the results in the column provided. When the user presses the save button, the system will store the result in the shared preferences.

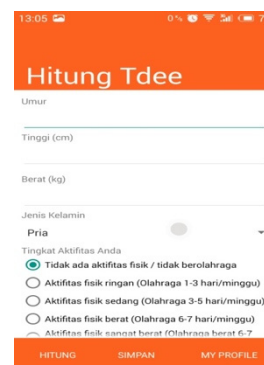


Figure 15: Count TDEE Page Interface

• **Count Body Fat Page Interface**

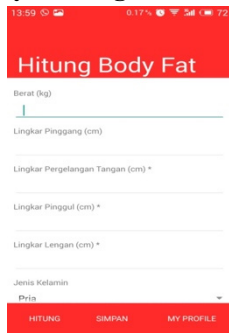


Figure 16: Count Body Fat Page Interface

Page Count Body Fat serves as a feature to count user's body fat percentage. If the user has filled out the profile, then the system will automatically fill in the fields of weight. If the user is a woman, then the user needs to fill in the waist circumference, hip circumference, and arm circumference. After that the user needs to press the count button, and the application will be counting user's Body Fat and displays the results in the column provided. When the user presses the save button, the system will store the Body Fat results in the shared preferences.

• **Daily Calorie Page Interface**

On this page the user can count the body's calorie consumption. If the user has calculated TDEE and stores the result in shared preferences, the system will display the results on screen. The system also displays the user's daily calorie ration.



Figure 17: Daily Calorie Page Interface

To use this feature, the user can just choose foods available on the spinner. By choosing a food or beverage on the spinner, the system will provide information on calories from these foods. When the "ADD" button is pressed, system will calculate calories from food or drink that user has select. After that the system will reduce the user's daily calorie

ration based on the number of calories that the user consumes, and the remaining calorie ration will be displayed. The system will keep records of food or drink that user consumes, and user can see it on Log page.



Figure 18: Log Page Interface

• **Food Bank Page Interface**

This page displays a list of foods and beverages, as well as the number of calories to the user. List of food taken from the SQLite database.



Figure 19: Interface Halaman Food Bank

• **Help Page Interface**



Figure 20: Help Page Interface

This page displays information about the. Users may not know the how to use this application, therefore the Help page provided to the user to help them understand, and can assist the user in using the application.

- **About Page Interface**

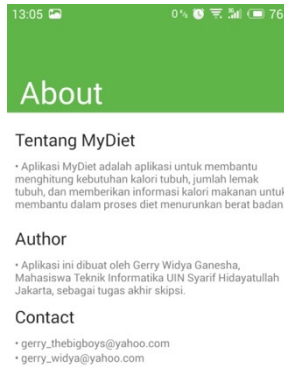


Figure 21: About Page Interface

This page provides information about the application and the author.

4 CONCLUSION

4.1 Conclusion

Based on the research and design of this, it can be concluded:

- This application is designed to help users to determine the condition of the body, as well as the number of calories needed to tell users how much calories from food eaten.
- The application is designed using eclipse program, and runs on smartphones that use the Android operating system.

4.2 Future Works

Applications built certainly still have many shortcomings, therefore there are some things that might be developed for these applications to be better and more useful, namely:

- Applications can be developed so that it has an online update system. System update function to add food database and data on the number of calories contained.

- Applications are still running on the Android operating system only. For future development may be made on other operating systems (e.g. IOS).
- Added a menu that gives information about the types of diet that exist, and how to run it.

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