DEVELOPMENT OF ANDROID BASED SMART CALORIES APPLICATION AND HOW TO BURN IT

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ABSTRACT

Balance of food consumption can determine one's health. Too much eating one type of food will make the body lack of other nutrients, so that it can cause various diseases. In the Basic Health Research (Riskesdas) data over the past five years, obese people over the age of 18 continue to experience improvement. According to WHO, obesity ranks fifth in the cause of death with 10.3%. The obesity rate in 2018 has increased to 21.8%, up 7% from 2013. The main cause of obesity is due to the number of excess calories that enter the body. So from these problems, we need a media that can help the community to implement a healthy lifestyle. This research uses descriptive research method. The software development uses SDLC waterfall. Analysis of the modeling used in object-oriented modeling using UML (Unified Modeling Language) tools, while the technology used is a smartphone camera, as well as several APIs (Application Programming Interface) including Clarifai API, Nutritionix API, and Google Fit API. Based on the implementation and testing with the black box method and the UAT (User Acceptance Test) method. So it can be concluded that from the results of interviews with adolescents aged 18-25 years who want to adopt a healthy lifestyle, 83 percent said this application could make it easier for them to start a healthy lifestyle.

Keywords : calories, health, camera, google fit, nutritionix

1. INTRODUCTION

Calories are units of energy. The body gets the energy to move from food and drinks consumed. If the body gets enough calories, the body will be healthy. Conversely, if the food and drinks consumed have calories above or below the body's calorie needs, then the body will be at risk of disease. Increasingly more and more people are less aware of their health, especially the intake of nutrients that enter the body [1].

Balance of food consumption can determine one's health. Too much eating one type of food will make the body lack of other nutrients, so that it can cause various diseases. According to WHO, obesity ranks fifth in the cause of death with 10.3%. In the Basic Health Research (Riskesdas) data over the past five years, obese people over the age of 18 continue to experience improvement. The obesity rate in 2018 has increased to 21.8%, up 7% from 2013 [2]. The leading cause of obesity is due to the number of excess calories that enter the body. So from these problems, we need a media that can help the community to implement a healthy lifestyle.

Based on the results of a questionnaire on 18 February 2019 given to respondents aged 17-25 years who want to adopt a healthy lifestyle and maintain their weight, as many as 91.9% are android users. As many as 55.1% answered that it was significant about the importance of a healthy lifestyle and ideal body weight, as many as 37.5% answered very important for the same case. As many as 63.2% of respondents did not know the daily caloric needs of the human body. The conclusion from the results of the questionnaire is people realize that healthy living is essential, but they do not know their daily calorie needs and how to live a healthy lifestyle.

Based on the results of an interview conducted on Wednesday June 26, 2019 at the Gazibu Bandung field to the people who were exercising, when they were asked the question of what difficulties they would get if they wanted to start a healthy life 7 out of 10 respondents answered feeling lazy when they had to search manual because it takes longer to get information about health, so they adopt a healthy lifestyle without direction or just as long as they exercise and only guess what foods should be avoided or consumed. When given another question about an existing application, 4 out of 10 people have tried that application, and only one person still uses applications related to diet or about health. On average, they stop using an existing form because they lack understanding of the function of the implementation or lack of recommendations on what they should do if they want to adopt a healthy lifestyle. As well as the average application does not have anything interesting besides recording their activities. Respondents claimed they needed some recommendation as a direction to start a healthy

lifestyle. And sometimes they don't know what food they are consuming.

Previously there have been several studies that have been carried out related to the application of calories or accelerometer sensors. Among them is research conducted by Taufik Rahman and Dedy Kurniawan [3]. The pedometers that they made use the Dead Reckoning method to detect footsteps using the accelerometer sensor.

According to Betti and Eko research [4] Accelerometer sensor is useful to determine the direction on the android smartphone. More precisely utilizing Sensor.Type_Accelerometer and Sensor.Type_Magnetic_Field to determine the course of the compass north, so that if the android device is rotated to the left or right, then the compass north of the android device remains in the correct north position.

2. RESEARCH CONTENT

2.1 Theoritical Basis

2.1.1 Android

Android is an operating system for Linux-based cellular phones. Android provides an open source platform for developers to create applications developed by themselves [5].

2.1.2 Kalori

Calories are units to calculate the amount of energy. Every food consumed contains calories needed by the body to do activities. Calories can be likened to fuel an engine to work. The calories in food are produced by protein, fat and carbohydrates. Fat contains the largest calories among the three components.

The body needs the energy to do activities. The calorie calculation method used in this study is Harris-Benedict. This method requires weight, height, gender, and level of physical activity to calculate calorie requirements. Categories of a person's body mass index that determine a person's body status can be seen in the following Table 1 Body Mass Index.

Table 1 Body Mass Index

BMI Scores	Category
< 17,0	Skinny, underweight
17,0 – 18,4	Thin, mild weight loss
18,5 – 25	Normal
25,1 – 27,0	Plump, Lightweight overweight
>27	Fat, overweight, heavy weight

While the formula for calculating body mass index is:

$$BMI = Weight\ (kg)\ /\ Height\ (m)\ x\ Height\ (m) \tag{1}$$

To calculate calorie requirements, values from BMR and physical activity level are needed. gender affects for BMR formula calculations. The formula for calculating BMR is :

$$BMR\ Male = 66 + (13{,}7\ x\ Weight) + (5x\ Height) - (6{,}8\ x\ Age) \tag{2}$$

$$BMR\ Female = 65{,}5 + (9{,}6\ x\ Weight) + (1{,}8\ x\ Height) - (4{,}7\ x\ Age) \tag{3}$$

For the level of physical activity can be seen in table 2.

Table 2 Level of Physical Activity

Level of Physical Activity	Scale
Not Active (Absolutely Not Exercising)	1,2
Moderately Active (Exercising 1-2x a week)	1,375
Active (Exercising 3-5 Times a Week)	1,55
Very Active (Exercising 6-7 Times a Week)	1,725

So the formula for calorie needs is :

$$Calorie\ needs = level\ of\ physical\ activity\ x\ BMR \tag{4}$$

2.1.3 API

API is a collection of functions, commands, and protocols used for specific operating systems. The API allows programmers to use standard features to interact with the operating system. API can make it easier for programmers to disassemble software and then develop it by integrating with other software. It can be said that the API is a bridge between applications. The advantage of API is that it allows an application to integrate with other applications.

2.2 Metodologi Penelitian

The method used is the descriptive method. The descriptive way is a method in examining the status of a group of people, an object, a set of conditions, a system of thought, or a class of events in the present. The purpose of this descriptive study is to make a systematic, factual and accurate description, description, or painting of the facts, properties, and relationships between the phenomena investigated [6]. The following is a research methodology such as Figure 1.
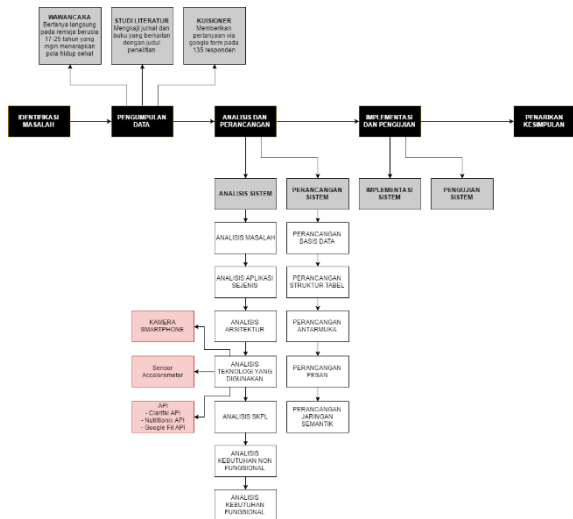
Figure 1 Research methodology

2.3 Software Development Method

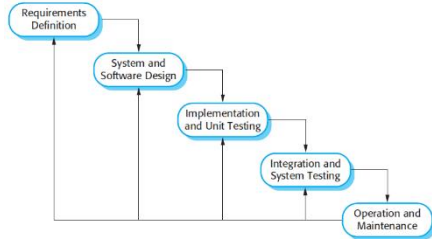The software development method used is the waterfall model. The process in Figure 2 SDLC Waterfall is as follows.

Figure 2 SDLC Waterfall

2.4 Problem Analysis

For every community who wants to implement a healthy lifestyle, it is tough to get information that related to the calorie content in the food they consume and how to burn calories that have entered the body. The existing application does not explicitly provide information related to calories and how they are burned. Problem analysis explains what problems existed before the construction of the Smart Calories application and how to burn calories. Analysis of the problem in this study are as follows :

1. The public claimed that it difficult to implement a healthy lifestyle
2. The public claims that it is difficult to get information about calories quickly and easily
3. The community claimed that it was difficult to know the right way to burn calories
4. People claim to have difficulty calculating the body's daily calorie needs.

2.5 System Architecture Analysis

Analysis of system architecture aims to identify architectures that will be built based on mobile systems. Figure 3 is a system architecture to be built.
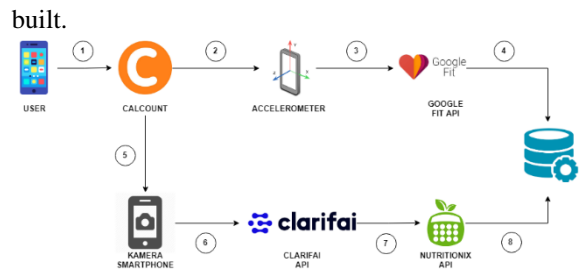

Figure 3 System Architecture

2.6 Analysis of Similar Application

Analysis of similar applications is intended to analyze the functionality and flow of existing applications. It aims to sort out the functionality and flow that will be adopted in the system under study based on the benefits that have been generated from the analyzed application and find the uniqueness of the software that will be built in this study.

Table 3 Analysis of Similar Application

No	Applications	Advantages	Disadvantages
1	Lifesum https://play.google.com/store/search?q=lifesum&c=apps	This application can display the calorie content in foods and their recipes with search methods	The method to find out the food is just a search
2	Calorie Counter By Fat Secret https://play.google.com/store/apps/details?id=com.fatsecret.android	This application can help determine the calorie content of food by using the camera on a smartphone and detailed diet planning	Does not include recommendations on how to burn calories that have entered the body
3	NutriVision https://play.google.com/store/apps/details?id=edu.ucuccs.nutrivision	This application more fully detects nutrition in food with the help of a camera	Not accompanied by a healthy lifestyle recommendation
4	BMI,BMR and Fat %	This application not only	It only calculates,

	Calculator https://play.google.com/store/apps/details?id=com.ashermobile.bmi&hl=en	calculates BMI and BMR but many other functions such as Weist to Height ratio and Body Fat percentage	does not display detailed recommendations
5	Weight Log And BMI Calculator https://play.google.com/store/apps/details?id=com.weighttracker.weightlossandbmicalculatorapp	Can store data neatly in graphical form. Accompanied by Goal	Only focus on body weight, not with calories

2.7 Technology Analysis

2.7.1 Smartphone Camera

The technology used in this application is a smartphone camera. The camera on the smartphone is used to take pictures of food to identify food and what is contained therein. To call the camera in the application, you must enter <uses-feature> in the manifest file in Android Studio.

2.7.2 Clarifai API

Clarifai API provides services to detect images with image input and response in the form of predictions based on the highest probability. Figure 4 is how the fire clarifai works.
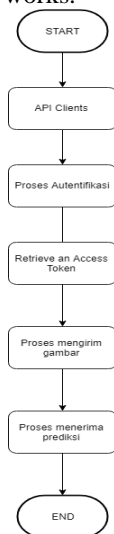

Figure 4 Flow of Clarifai API

2.7.3 Nutritionix API

Nutritionix API is used to detect calorie content in food. Data taken from food detection with a smartphone camera and Clarifai API will be checked in the Nutritionix database which has more than 6 million types of food [7]. Figure 6 is a flow of the Nutritionix API.
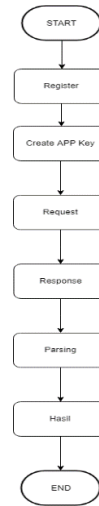

Figure 5 Flow Of Nutritionix API

2.7.4 Google Fit API

Google Fit is a service that allows users to control their body data. There are 3 parts in the Google Fit API namely Recording API, History API and Fitness API. The Google Fit API service used in this application is a recording and history service which is part of the Google Fit API to calculate footsteps and calories burned and store fitness data from its users [8].
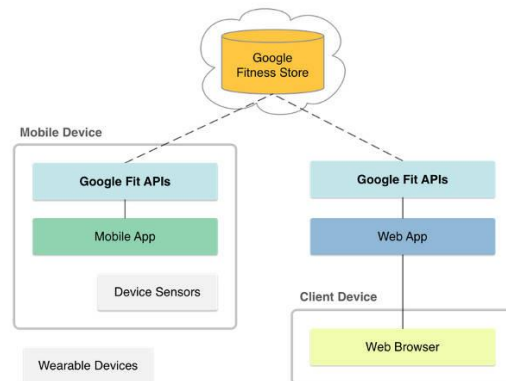

Figure 6 Google Fit API Usage Flow

2.8 Use Case Diagram

Use Case diagram is a modeling to illustrate the behavior (behavior) of the software to be made. Here is Figure 8 Use Case Diagram.
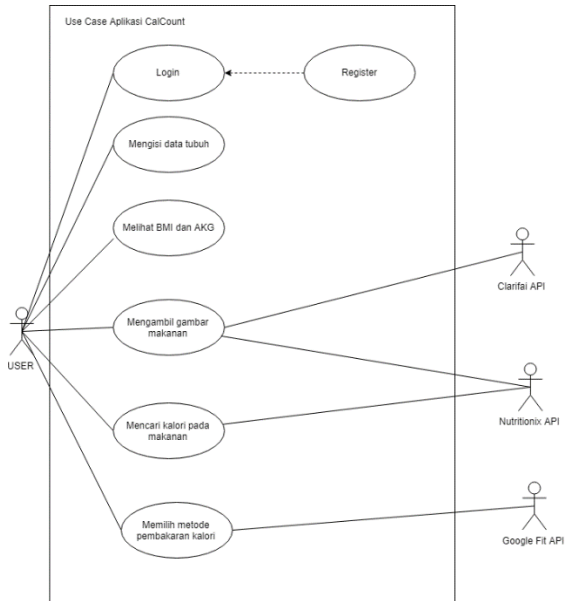
Figure 7 Use Case Diagram

2.9 Architectural Menu Design

Architectural design provides an overview of the program menu structure or blueprint of the software to be created. The purpose of this design is to build a modular program structure and describe the control relationship between program modules. Figure 9 is a menu structure design.
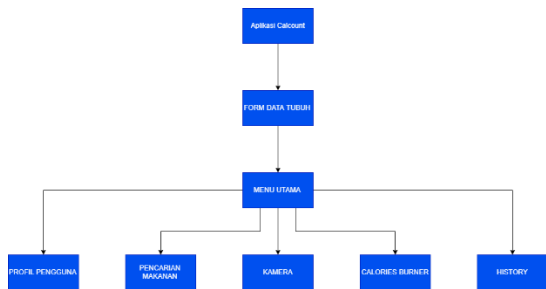

Figure 8 Architectural Menu Design

2.10 Interface Design

The interface design describes the display plan in the application so that it is easy to apply to the implementation part later. Next is the interface design that will be built.
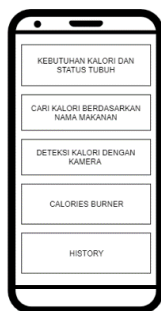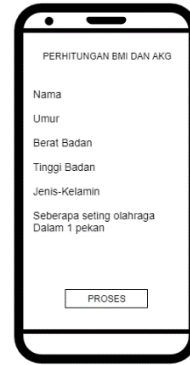

Figure 9 Main Menu Interface
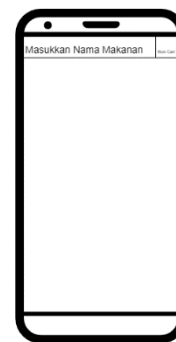

Figure 10 BMI and AKG Interface

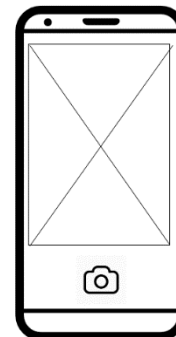**Figure 11** Search Menu Interface

Figure 12 Camera Menu Interface

Figure 13 Calories Burner Menu Interface

3. CLOSING

3.1 Conclusion

Based on the results of the design that was made, the Smart Calories application design and method of combustion are in accordance with what is expected for further testing.

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