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# Development of a Calorie Calculator Application Utilizing Height and Weight-Based Conversion

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**Abstract:** The advancement of information technology has significantly contributed to innovations in the health sector, including the development of digital tools that support nutrition management and healthy lifestyle practices. One essential aspect of maintaining health is managing daily caloric intake based on individual metabolic needs, which are influenced by factors such as age, gender, height, weight, and physical activity. However, many individuals are unaware of how to accurately calculate their caloric requirements. Therefore, a practical and accurate system is needed to provide personalized calorie recommendations. This study presents the design and development of an Android-based calorie calculator application that estimates daily energy needs using user inputs: age, gender, height, weight, and activity level. The application integrates two well-known formulas—Harris-Benedict and Mifflin-St Jeor—to calculate Basal Metabolic Rate (BMR) and determines Total Daily Energy Expenditure (TDEE) by categorizing physical activity as light, moderate, or intense. In addition, the app includes a Body Mass Index (BMI) calculator to indicate the user's nutritional status. Developed using the Kotlin programming language in Android Studio, the application is designed with a user-friendly interface to enhance user experience. Functionality testing demonstrated that the application provides accurate estimations of caloric needs and reliable BMI categorization based on user input. The outputs are consistent with results from existing online calorie calculators, confirming its precision and usability. This calorie calculator application is expected to function both as an educational and practical tool for individuals seeking to adopt a balanced diet and effective weight management strategy.

**Keywords**: Calorie Calculator, BMR, BMI, TDEE, Android, Health App, Nutrition, Weight Management.

## INTRODUCTION

Physical health and fitness are essential components of daily life. One of the key determinants of an individual's well-being is the balance between caloric intake and energy expenditure. Calories (kcal) represent the units of energy derived from food, which the body utilizes to perform vital functions. However, an imbalance in calorie consumption can lead to health problems such as obesity, malnutrition, or metabolic disorders.

With the growing public awareness of the importance of a healthy diet, there is increasing demand for tools that help individuals monitor and manage their calorie intake. One effective approach to estimate daily caloric needs is through a conversion method based on body height and weight. This method allows users to calculate their caloric requirements based on physical parameters and can be used as a guide for maintaining a healthier lifestyle and eating habits.

To support healthy living and provide a practical solution for calculating caloric needs, a digital application is needed that can automatically and accurately compute daily calorie requirements. The application will be developed to help users determine the number of calories they need based on their height and weight. With this tool, it is expected that users will be able to more easily manage their diet, maintain energy balance, and reduce health risks associated with improper caloric intake.

1. Based on the identified problem, a viable solution is to develop a "Calorie Calculator Application Based on Height and Weight Conversion." This application aims to provide a quick, accurate, and practical means for users to calculate their daily caloric needs. The application focuses solely on height and weight as input parameters, excluding age, gender, or activity level as core factors.
2. The application will be implemented as a software-based platform operating on specific systems, such as Android or web-based platforms. This study does not cover development for other operating systems such as iOS or specialized hardware devices.

## RESEARCH METHOD

### Research Design

This study applies the Research and Development (R&D) method to create a functional software product that addresses real-world problems in health and nutrition. The product developed is a mobile-based calorie calculator application for Android, designed to estimate users' daily caloric needs based on height, weight, age, gender, and physical activity level. The R&D approach is chosen because it involves a systematic process including analysis, design, implementation, testing, and evaluation.

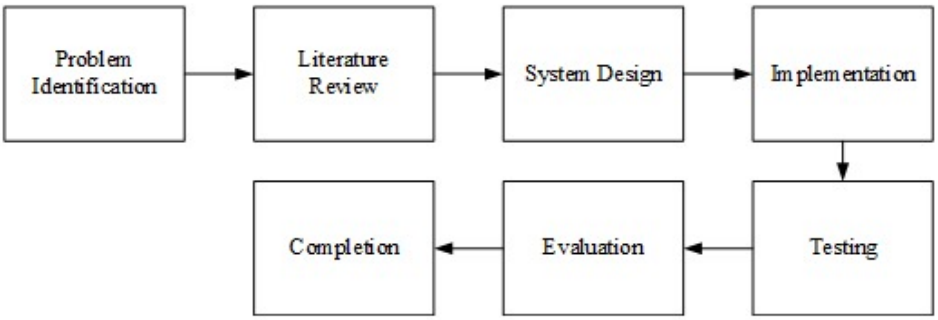


**Figure 1.** Research and Development Flowchart

**The R&D stages are as follows:**

1. Needs Analysis: Collecting user requirements and nutritional formulas, including BMR (Basal Metabolic Rate), BMI (Body Mass Index), and TDEE (Total Daily Energy Expenditure), to define application features.
2. System Design: Designing UI/UX using Figma, along with system diagrams such as flowcharts and UML.

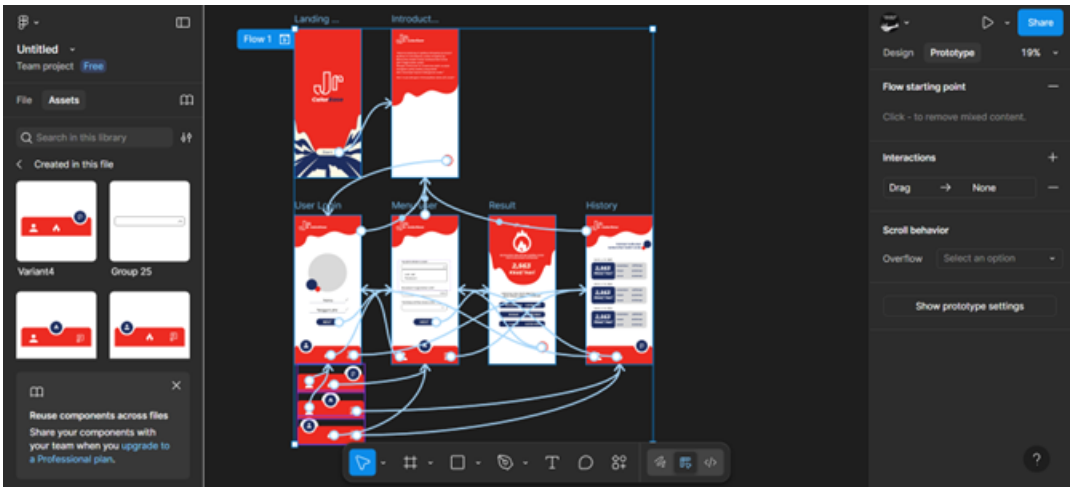

**Figure 2.** User Interface Design Overview

3. Implementation: Developing the application in Android Studio using Kotlin, aligned with previously defined functional and visual requirements.

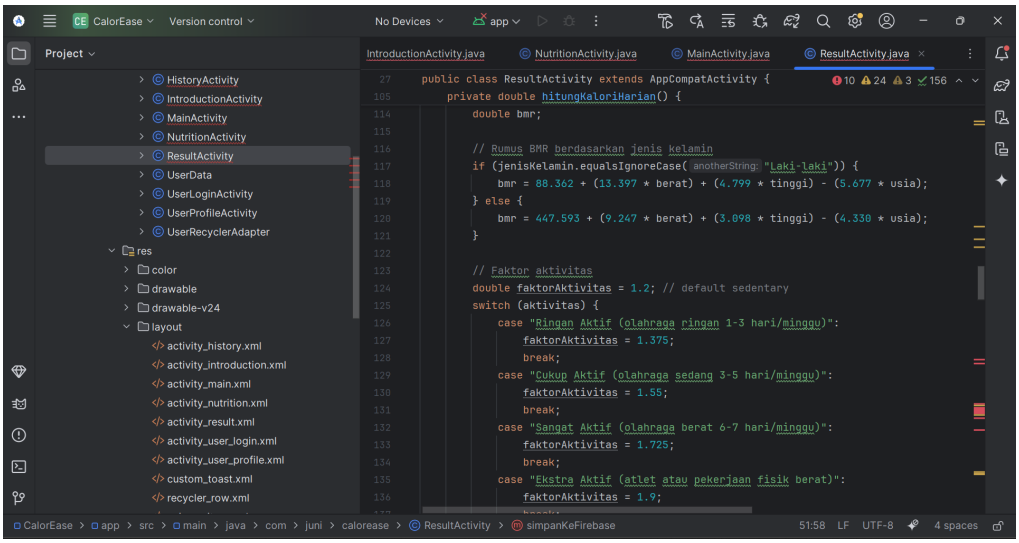


**Figure 3.** Nutrition Calculation Output Screen

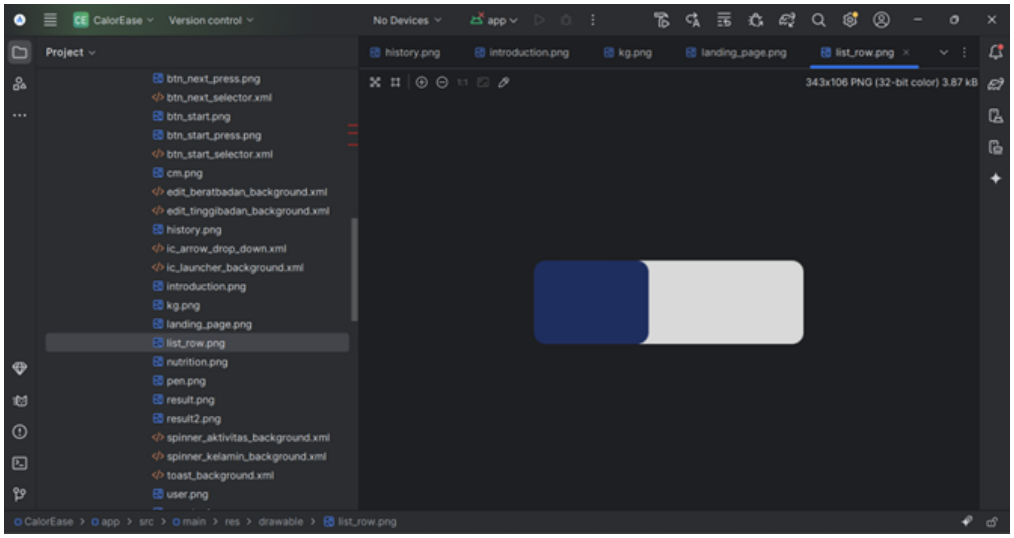


**Figure 4.** Elements that have been exported from Figma

4. Testing: Conducting black-box testing to verify system functionality and accuracy of calorie computations.

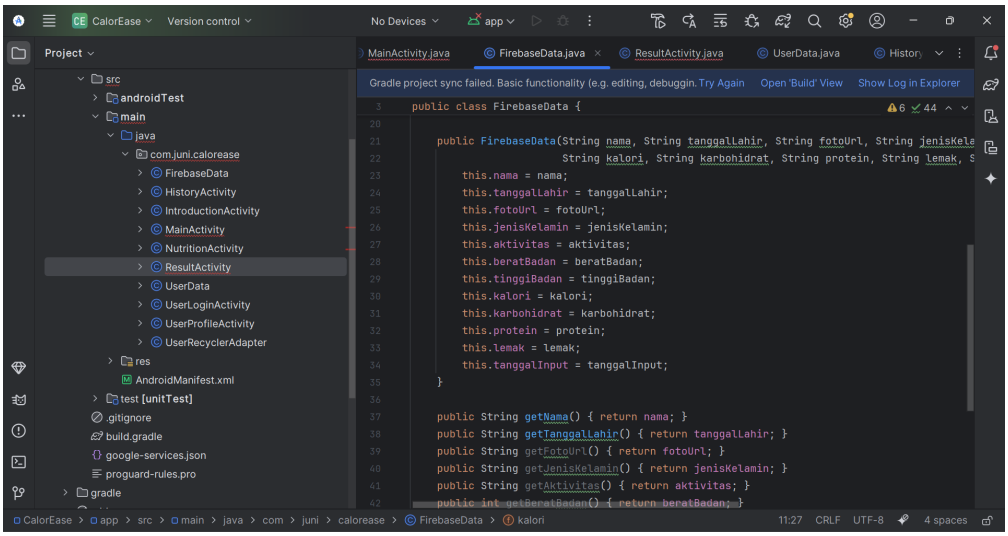


**Figure 5.** Firebase Data Structure

5. Evaluation: Performing system improvements based on test results before release.

## Type of Research

The research is classified as applied design and development research. It emphasizes the development of a practical digital tool to assist users in estimating daily energy needs. Calculations use the Mifflin-St Jeor equation for BMR, which is multiplied by a Physical Activity Level (PAL) factor to determine Total Energy Expenditure (TEE).

The TEE result is then broken down into macronutrient distribution:

1. 60% carbohydrates
2. 20% protein
3. 20% fat

Nutritional data is sourced from the Tabel Komposisi Pangan Indonesia (TKPI) by the Ministry of Health and the FAO/INFOODS Food Composition Database, ensuring reliable nutritional values for macronutrient recommendations.

## Time and Place of Research

The research was conducted over a three-month period at Koontrakan Desel, serving as the environment for both application development and implementation testing.

**Table 1.** Tools and Materials Used

| **Tools** | **Description** |
|---|---|
| Laptop / PC | Used to code and develop the application in Android Studio. |
| Android Smartphone | Used for real-device testing of the application. |
| Internet Access | Needed for referencing, downloading libraries, and accessing documentation. |
| **Materials** | **Description** |
| Android Studio | IDE for Android development. |
| Figma | UI/UX design tool. |
| Kotlin & Java | Programming languages used. |
| Firebase / SQLite | Database systems for user data storage. |
| Scientific References | Journals and books on calorie needs, BMR, and nutrition software design. |

## RESULT AND DISCUSSION

### Application Implementation Results

The development of the Android-based calorie calculator application was successfully completed using Android Studio with Kotlin as the primary programming language. The application enables users to calculate their daily caloric needs based on inputs such as weight, height, age, gender, and physical activity level. The calculation follows the Mifflin-St Jeor equation for Basal Metabolic Rate (BMR) and multiplies it by a Physical Activity Level (PAL) factor to determine Total Daily Energy Expenditure (TDEE).

Additionally, the app offers a nutritional recommendation feature that converts the macronutrient requirements into common food items (e.g., rice, chicken, tofu) using data from the Tabel Komposisi Pangan Indonesia (TKPI) and FAO/INFOODS database.

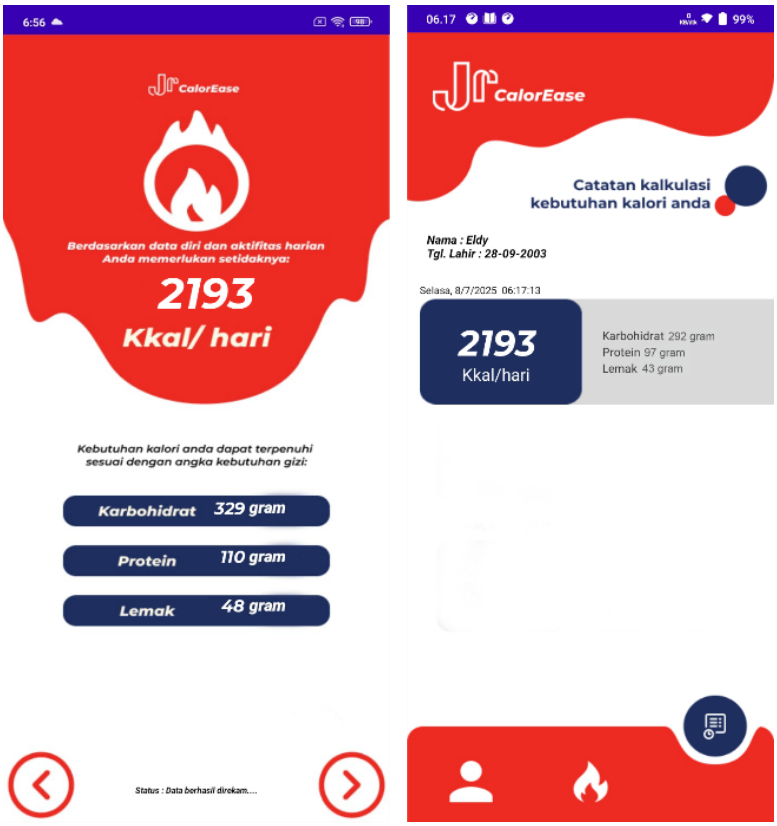


**Figure 6.** Sample Output of TDEE Calculation and Macronutrient Breakdown

### Functional Testing and Accuracy

The functional testing involved four users with varied profiles. Each user input personal data into the system, and the app generated:

1. Daily caloric needs (in kcal)
2. Macronutrient distribution (in grams)
3. Suggested food equivalents per nutrient

| User | Gender | Age | Height (cm) | Weight (kg) | Activity Level | TEE (kcal) |
|---|---|---|---|---|---|---|
| Eldy | Male | 21 | 167 | 60 | Light | 2193.64 |
| Vatkhan | Male | 22 | 164 | 54 | Very Light | 1946.63 |
| Alya | Female | 23 | 160 | 50 | Light | 1814.20 |
| Amalia | Female | 21 | 158 | 48 | Heavy | 2067.47 |

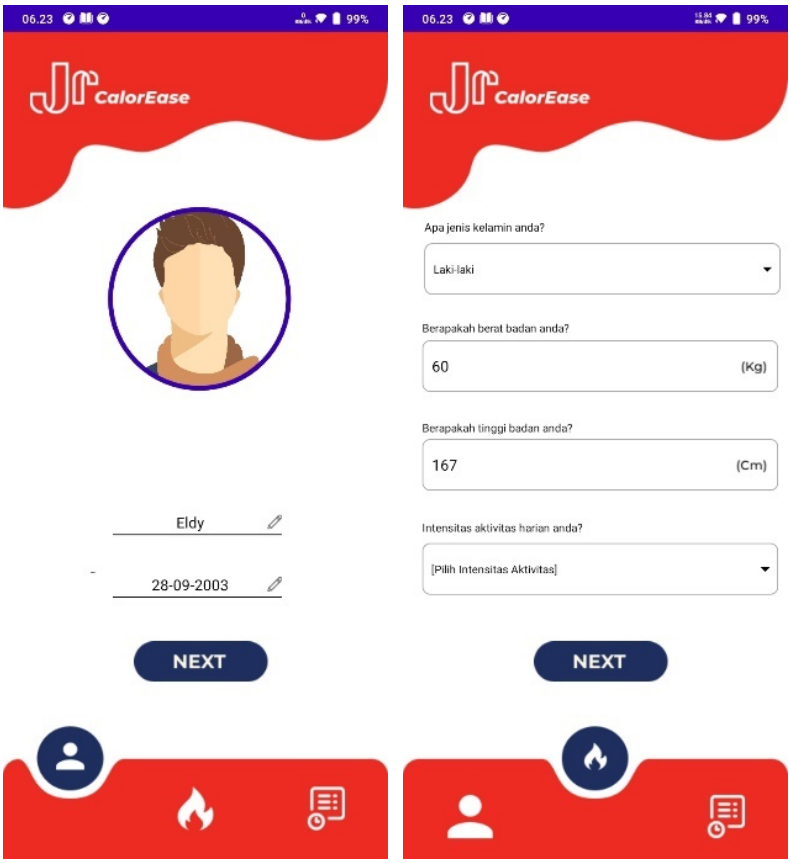


**Figure 7.** User Input and Calorie Estimation Results

The calculations performed by the application were compared to results from established online calorie calculators and showed consistently accurate values, validating the reliability of the implemented algorithm.

## Discussion

The application fulfills its intended function as a practical and educational tool for estimating calorie needs. The inclusion of macronutrient breakdown and food conversion suggestions increases its value for users seeking to manage their dietary intake.

A few notable observations:

1. The TDEE values significantly vary by activity level, even with similar weight/height. For example, Amalia's TDEE is higher than Alya's due to her "heavy" activity classification despite having a lower body mass.
2. The app's interface is intuitive and allows easy navigation between input, results, and food recommendation screens.

3. Firebase Realtime Database is used to save and retrieve user history, which supports long-term tracking and personalization.

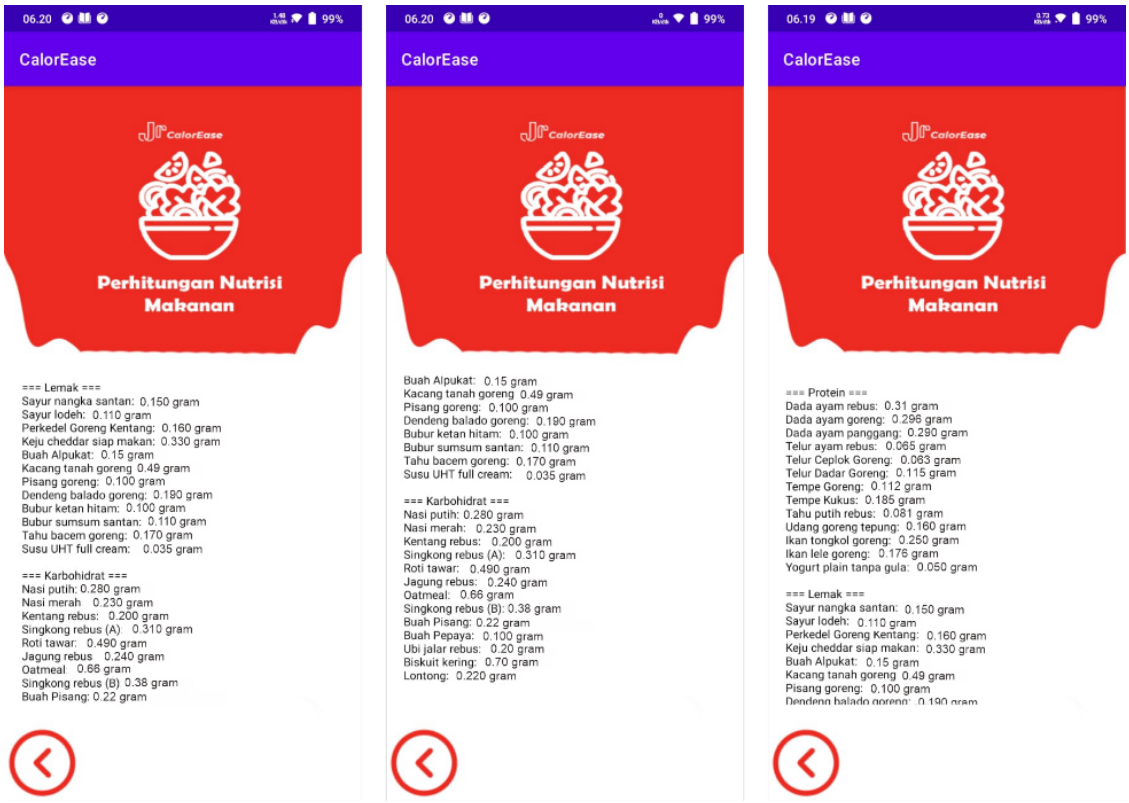


**Figure 8.** Recommended Food Quantities for Macronutrients (Based on TDEE)

This system has strong potential to support not only general users but also nutritionists in performing quick estimations and creating personalized dietary recommendations.

## CONCLUSION

This study successfully designed and developed a mobile-based calorie calculator application for the Android platform, which estimates daily caloric needs using key physical parameters such as height, weight, age, gender, and physical activity level. The system implements the Mifflin-St Jeor equation to calculate Basal Metabolic Rate (BMR) and determines Total Daily Energy Expenditure (TDEE) by incorporating the user's Physical Activity Level (PAL).

The results showed that the application provides accurate and consistent calorie estimations and macronutrient distribution when compared to established online calculators. Moreover, the application translates the nutritional needs into practical food

recommendations based on Indonesian dietary data, making it both educational and actionable for users.

Through a clean and intuitive user interface, supported by real-time data storage using Firebase, the app enables users to monitor and manage their daily energy intake efficiently. This tool is not only suitable for general users, but it may also assist nutritionists and health professionals in preliminary assessments or dietary planning.

In summary, the application serves as a reliable, science-based, and user-friendly solution for supporting healthy eating habits and personal weight management. Further development is encouraged to integrate advanced features such as dietary history tracking, user authentication, and real-time activity monitoring for dynamic calorie adjustment.

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