

Implementation of the Agile Methodology in a Diet and Bulking Mobile Application Using the Flutter Framework

Rahmat Syahrur Ramadhan¹, Nuril Lutvi Azizah², Ika Ratna Indra Astutik³, Sumarno⁴

^{1,2,3}Muhammadiyah University of Sidoarjo, Indonesia

⁴Management and Science University, Malaysia



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ABSTRACT

Objective: This study aims to develop and evaluate the FitLaksana mobile application as a digital solution for improving dietary management and physical activity to address rising health issues such as obesity and metabolic disorders. **Method:** The application was developed using the Flutter framework and Firebase database, following the Agile methodology through stages of system analysis, user interface design, feature implementation, and Black Box testing. User evaluations were conducted using a Likert scale to assess satisfaction levels regarding functionality, usability, and reliability. **Results:** All features of the FitLaksana application operated effectively, with users reporting high satisfaction levels – 50% rated the app “Agree” (score 4) and 65.38% rated “Strongly Agree” (score 5). The application was praised for its user-friendly interface, stability, and usefulness in supporting healthy lifestyle management. **Novelty:** This study introduces a comprehensive, user-centered mobile health application that integrates nutritional guidance and exercise planning, demonstrating the effective application of Agile-based development in creating practical digital health tools for self-managed wellness.

INTRODUCTION

In this era of increasingly advanced globalization, access to information has become simpler and faster. This is thanks to the rapid development of information and communication technologies, such as the internet and social media. Advances in information technology have had a positive impact on many areas of life [1]. The most important aspect of daily life, and one that should not be overlooked, is health. One of the health problems frequently faced by modern society is a lack of attention to diet and the nutritional content of the food consumed [2]. A less active lifestyle and an unbalanced diet have led to an increase in cases of obesity, malnutrition, and other metabolic disorders, both among productive-age individuals and younger generations [3]. Several mobile applications already available on the market, such as KidneyDiet, offer features for recording and providing information on the nutritional content of food. However, these applications have limitations, such as incomplete nutritional information and diet and bulking program guidelines. To address these limitations, FitLaksana has emerged as an application model similar to KidneyDiet [4]. With FitLaksana, users can plan and monitor their diets in detail, as well as receive food and physical activity recommendations that align with their goals. The advantages of this application lie in its

ease of use (user- friendly interface), online and real-time data storage which helps users monitor their health progress practically and efficiently [5].

RESEARCH METHOD

This research methodology aims to systematically explain the steps in software development. This research uses the agile model, a series of software development processes based on shared principles and emphasizing rapid developer response to change [6]. This research covers several important stages, from system analysis, design, development, testing, manufacturing, and system maintenance [7].



Figure 1. Agile Method Stages

Figure 1. This step-by-step guideline outlines the research process, enabling researchers to understand the system development process. Agile methods facilitate the development of information systems by prioritizing user satisfaction in the design of mobile-based diet and bulking applications [8]. The agile method's stages include:

Plan

Researchers plan what will be created, starting from compiling development strategies and designing system workflows so that they run systematically and efficiently.[8]

Design

Researchers start by designing the program's data flow starting from the main feature requirements, determining the database, designing the application interface, and determining the interactions between components.[8]

Develop

Develop is the stage where developers create modules and features according to design and requirements. This research uses the Flutter framework and the Firebase database.[9]

Test

This stage tests the developed application system, aiming to find errors and determine whether the program meets requirements. This stage uses the blackbox testing method.[6]

Deploy

This stage aims to distribute the application demo that has been created by the developer and will then be developed according to the type of application.[10]

Review

At this stage, researchers collect feedback from users at the deploy stage and carry

out reviews of the programs that have been created.

Launch

At this stage the application is ready to be officially published and can be used.

RESULTS AND DISCUSSION

Observation Results

Based on the results of observations that have been carried out by researchers, the following is the process of creating a system design so that the data flow in the program can be arranged in a structured and efficient manner [11].



Figure 2. Design Stages

Figure 2. The first step is creating a welcome screen when the application is first installed. The second is creating a login page for users to access the data input page. The third is creating the data input, review, and program pages. The fourth is creating the main page, search, history, and profile. The fifth is adding a feature to add food/fitness for users to the history page.

System Requirements

System design is the depiction, planning and sketching or arrangement of several separate elements into a single unit [12].

1. Flow chart

A flowchart is a symbol that describes a detailed process flow and the interrelationships between one process and another within an activity [13]. In the information systems design phase of this research, flowcharts are used to illustrate the system's workflow, from personal data input, data storage, to history display output.



Figure 3. Flowchart

From the image above, the first step when a user opens the application is a welcome screen. Second, the user is required to enter their email address and password on the login page. Once successful, they will be redirected to the personal data input page. The review page displays and provides recommendations for suitable programs for the user. After that, the user must select one program to run. The main page displays several foods and exercises suitable for the selected program. The history page, if the user adds foods or exercises, displays the results of those meals and exercises.

2. ERD

The ERD (*Entity-Relationship Diagram*) diagram that will be provided describes the relationship between entities in the system, this diagram helps visualize how different data in the system [14].

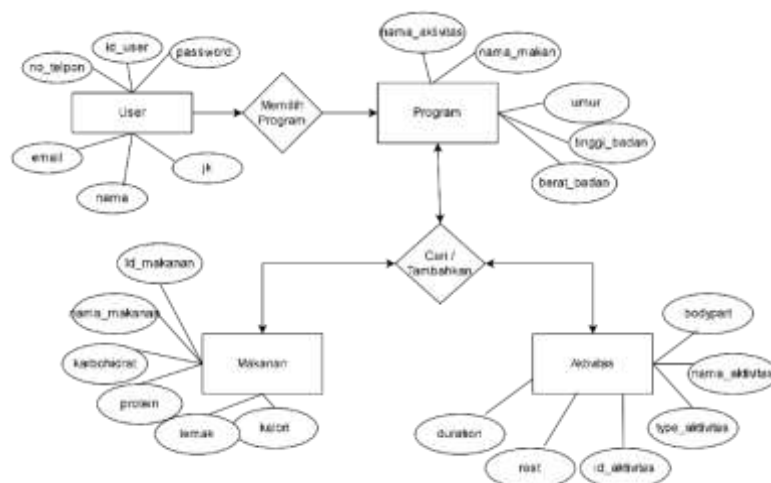


Figure 4. Entities and Relationships

Figure 4 shows how user data, diet plans, food, and activity are connected in a single information system that supports personalized healthy lifestyle needs. This diagram serves as a crucial reference in the database design process, ensuring a well-organized and efficient data flow [15].

A. Implementation

Welcome Screen

Displays the welcome screen page if the user installs the application for the first time. This page is the initial display of the FitLaksana application which is designed to give a simple but professional first impression to the user. Figure 5 welcome screen

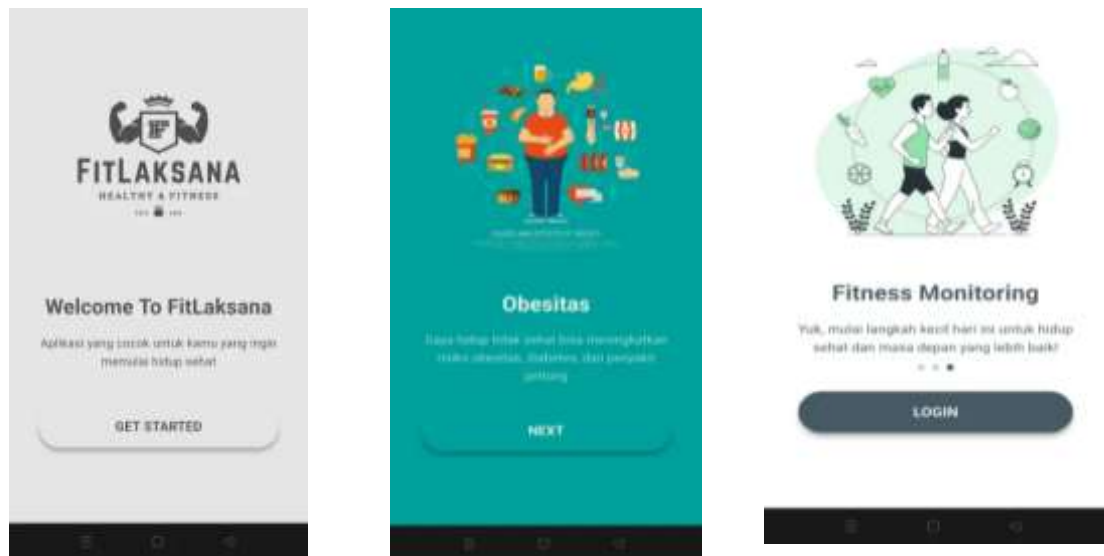


Figure 5. Welcome Screen

Login Screen

After the user passes the welcome screen, the user will be directed to the login screen, which requires the user to enter the email address and password they registered. Figure 6: Login screen



Figure 6. Login Screen

Screen List

Displaying the user registration page, the user is expected to fill in the email, password and confirm the password. Then, after the user registers, they will be directed to the personal data input page. Figure 7 Register Screen

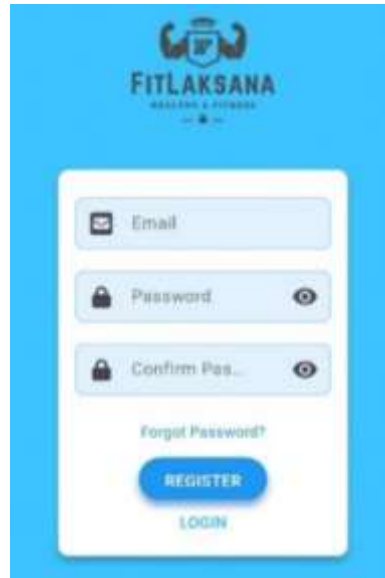


Figure 7. List Screen

Forgot Password Screen

This is the forgot password page display. When a user forgets their password, they are expected to have a registered email account, as the application will send a password reset to the registered email address. Figure 8: Forgot password screen



Figure 8. Forgot Password Screen

Data input

This is the data input page displaying the user's weight, height, age, and gender. When the user clicks save data, the data is saved to the database and then redirected to the data review screen. Figure 9: Data Input



Figure 9. Data Input

Data Review Page

This is the data review page where, after the user has filled in the previous data, a pop-up message appears, "Profile data saved successfully," displaying the data that has been entered. The application provides program recommendations and informs the user of their status, whether they are thin, normal, overweight, or obese. Figure 10 Data Review Page



Figure 10. Data Review Page

Select Program Page

This interface displays the user's preferred program, whether bulking, cutting, or maintenance. Each program selected will display meal and fitness recommendations. Figure 11: Program selection page



Figure 11. Select Program Page

Home Page

Displaying the name of the program selected by the user on the previous screen, the homepage provides food and exercise recommendations, along with optimal calorie, protein, and exercise intake for each program. An "i" icon provides information on each program. The homepage also includes several navigation icons, including search, history, and profile. Figure 12 Homepage

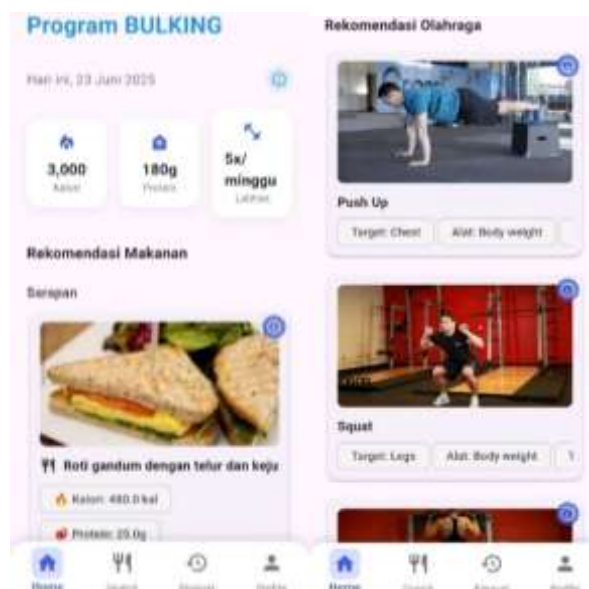


Figure 12. HomePage

Search Page

Displaying two tabs consisting of food and fitness, so if users want to search for food or exercise they want, they can fill in the search field. Figure 1 Search Page

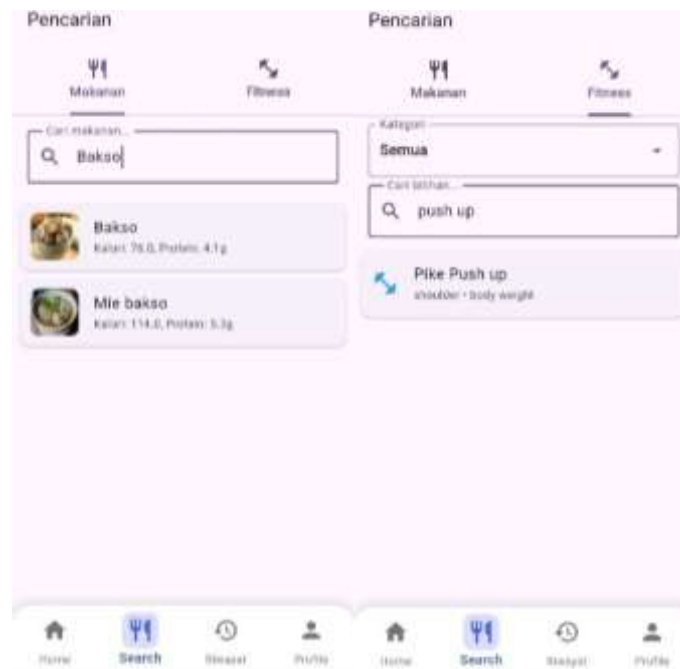


Figure 13. Search Page

History Page

Shows the user's daily log for each month, the user can add food to find out how many calories, protein, carbohydrates, and fat the user has consumed, the user can also add fitness activities to remember what the user has done. Figure 15 History Page

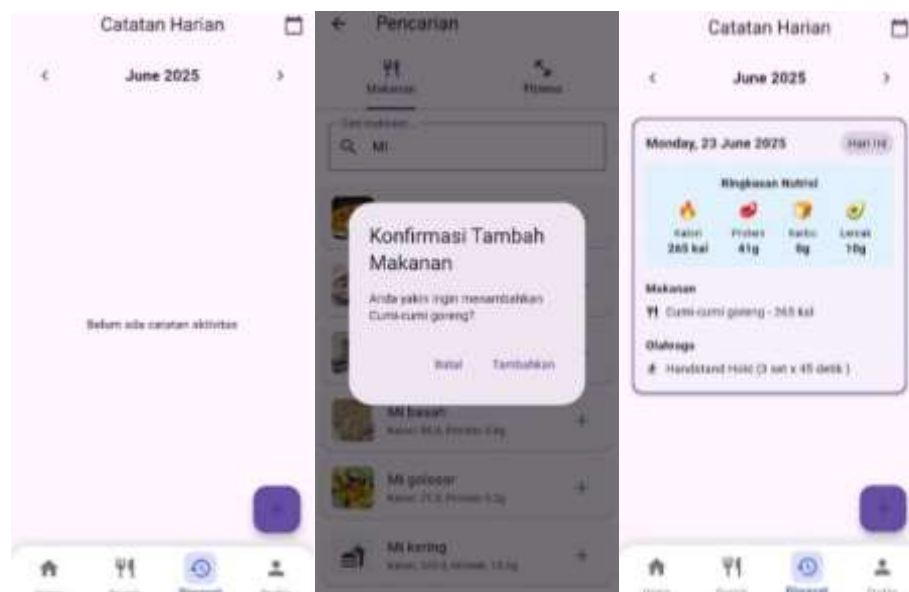


Figure 14. History Page

Profile Page

The profile page contains a data form containing the user's full name, email address, phone number, height, weight, age, and any programs they have taken. Users can add or change previously entered data on the data input screen. They can also upload a photo and log out in the upper right corner. Figure 15. Profile Page

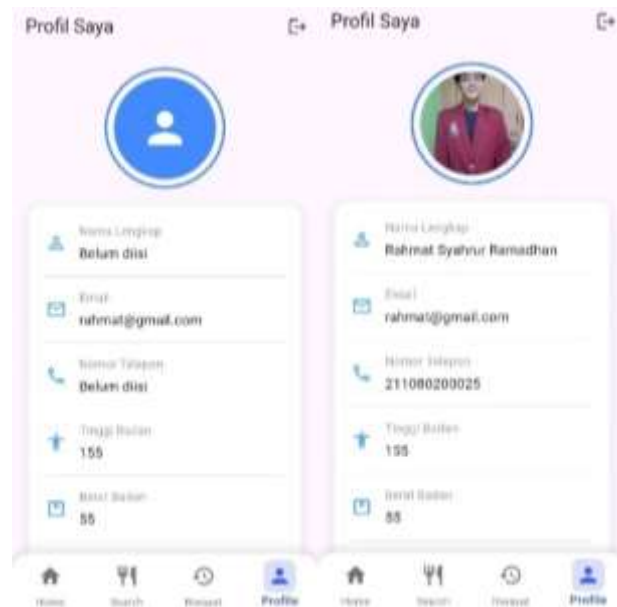


Figure 15. Profile Page

B. Testing

In the testing phase, two testing methods were carried out, namely black box testing to evaluate system functionality, and testing using a Likert scale which was carried out by distributing surveys via Google Form to respondents to measure the level of user satisfaction with the system being developed.

Black Box Testing

This test aims to evaluate the system functionality in the application with the expected end results for the user.

Table 1. Black Box Testing

No	Features tested	Testing Scenario	Expected results	Test Results
1.	Welcome Page	User clicks navigation and moves slides	The screen changes and moves to the login page.	Succeed
2.	Login Page	User fills in email and password data	Switch to data input page	Succeed
3.	Input data screen	User fills in the required data	The system stores data in a database	Succeed

No	Features tested	Testing Scenario	Expected results	Test Results
4.	Review Page	User sees his/her data	User data is displayed and recommendations are provided.	Succeed
5.	Program Page	User selects a program to run	The system saves the user-selected program in the database.	Succeed
6.	Home Page	Users see food and fitness recommendations from the program.	Displays food and fitness recommendations from selected programs	Succeed
7.	Search Page	User inputs the name of the food or fitness	The application displays the results of the user's search input.	Succeed
8.	Page History	Users add food and fitness history	The app displays user's food and fitness additions.	Succeed
9.	Profile Page	User changes or adds personal data	The system changes and adds personal data input by the user.	Succeed

Likert Scale Testing

This test aims to measure the level of user satisfaction with the system developed by creating a survey via Google Form to respondents.

Table 2. Likert Scale Testing

No	Questions	(1)	(2)	(3)	(4)	(5)
1	This application is easy to use	0%	0%	3.85%	50%	46.15%
2	This app works fine without any glitches	3.85%	15.38%	7.69%	7.69%	65.38%
3	Do you find the post-program food recommendation feature (bulking/cutting/maintenance) helpful?	3.85%	3.85%	15.38%	34.62%	42.31%
4	This application has complete features	1.54%	3.85%	38.46%	23.08%	23.08%
5	I will continue to use this app in the long run	3.85%	7.69%	19.23%	19.23%	50%

Information :

1 : Strongly Disagree

2 : Don't agree

- 3 : Neutral
- 4 : Agree
- 5 : Strongly agree

Table 2. The results of the Likert scale test show that the majority of respondents expressed positive evaluations of many aspects of the tested software. In general, respondents assigned scores of 4 (Agree) and 5 (Strongly Agree), especially for statements regarding ease of use and stability of application functions, which each obtained the highest percentages in the "Strongly Agree" category, namely 46.15% and 65.38%, respectively.

CONCLUSION

Fundamental Finding : This study highlights that social commerce transcends traditional e-commerce by leveraging participatory features of social media to foster trust, commitment, and community-driven engagement, as exemplified by Malaysia's eUsahawan program. **Implication :** The findings underscore the necessity for businesses to cultivate strong social presence and perceived trust as strategic imperatives for reducing transactional risks, enhancing consumer loyalty, and driving sustainable revenue growth in increasingly competitive digital marketplaces. **Limitation :** However, the study is constrained by its contextual focus, as cultural, technological, and infrastructural differences across regions may limit the generalizability of the results. **Future Research :** Subsequent investigations should adopt cross-country comparative analyses and longitudinal approaches to explore how varying socio-cultural and technological ecosystems influence the dynamics of social presence, trust, and consumer advocacy in social commerce environments.

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Rahmat Syahrur Ramadhan

Muhammadiyah University of Sidoarjo, Indonesia

***Nuril Lutvi Azizah (Corresponding Author)**

Muhammadiyah University of Sidoarjo, Indonesia

Email: nurillutviazizah@umsida.ac.id

Ika Ratna Indra Astutik

Muhammadiyah University of Sidoarjo, Indonesia

Sumarno

Management and Science University, Malaysia
