HEALTH-BUDDY- A CALORIE / FITNESS TRACKER

A PROJECT REPORT

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Under the guidance of,

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SCHOOL OF COMPUTER SCIENCE ENGINEERING

CERTIFICATE

This is to certify that the Project report **"HEALTH-BUDDY- A calorie/fitness tracker"** being submitted by "A Raghuram," "Ayan Sharma," "Jaideep Singh Dudi" bearing roll number(s) "20211CSE0521", "20211CSE0523", "20211CSE0502"
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DECLARATION

We hereby declare that the work, which is being presented in the project report entitled HEALTH-BUDDY APPLICATION in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Ms. AKKAMAHADEVI C, Assistant Professor, School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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ABSTRACT

Health Buddy is a health tracking application that integrates nutrition, hydration, and physical activity monitoring to provide users with a well-rounded approach to wellness. The app allows users to log their daily food intake, utilizing machine learning models to estimate essential nutrients such as vitamins, proteins, and calories. Through ongoing data analysis, Health Buddy identifies potential nutrient deficiencies and delivers timely alerts, along with personalized recommendations to help users manage their health proactively. In addition to tracking nutrition, Health Buddy features a water intake monitor with hydration reminders and a physical activity tracker that calculates calories burned, offering users a complete view of their health behaviors. The app emphasizes the interconnectedness of lifestyle choices, showing users how hydration impacts exercise performance and how a nutrient-rich diet can boost energy levels and overall well-being. Tailored for busy individuals, particularly students, Health Buddy simplifies health management by providing actionable insights that are easy to understand and apply, without the need for constant professional oversight. Leveraging advanced machine learning, the app evolves with users' habits, refining its recommendations based on ongoing trends in their diet and activity. The app also supports fitness goal setting, helping users strike a balance between calorie intake and energy expenditure. As a virtual health companion, Health Buddy empowers users to make informed decisions, encouraging long-term health improvements and a sustainable lifestyle.

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LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

CHAPTER-1

INTRODUCTION

Health Buddy enables the monitoring of general well-being by tracking nutrition, hydration, and physical activity. It offers food logging that is supported by a machine learning model that can estimate the intake of essential nutrients, such as calories, proteins, and vitamins. This application enables a user to understand their eating habits and informs them to make proper dietary choices. It also gives timely alerts and actionable recommendations in the case of possible nutrient deficiencies before any health issue develops.

The hydration tracker with automatic reminders helps users stay hydrated, which is a critical factor for energy, cognitive function, and physical performance. The physical activity tracker also calculates calories burned, giving users a clear picture of how their exercise routines contribute to their overall fitness. These features together give a holistic view of a user's health, making it easier to maintain balance across key wellness areas. This integrated method helps the users, especially those with hectic lifestyles, reach their health and fitness goals efficiently.

Unlike most fitness apps, Health Buddy links nutrition, hydration, and physical activity, showing the interplay between these three essential components of well-being. The app offers personalized insights that show how one habit affects another by integrating data from food logs, water intake, and exercise routines. For example, users can learn how staying hydrated enhances workout performance or how a nutrient-rich diet can lead to improved energy levels throughout the day.

This interconnected view allows the user to make holistic decisions regarding their health. The app maintains consistency by keeping users from engaging in radical diets or excessive overtraining, which leads to a more sustainable change in lifestyle. This is beneficial for students or working professionals who have busy schedules as it reduces the complexity of dealing with several health factors that could easily pile up and lead them astray.

Health Buddy is different because it adjusts to the health journey of each person. The application's machine learning model changes based on user data studied over time. It produces personalized recommendations, which become increasingly smarter as one uses it more. It not only points out where the gaps are in nutrients but also tells what one can do and what one must change in diet or habits.

It keeps track of calories in the diet, ensuring the users are at a healthy balance between caloric intake and expenditure. The goal of the user is to lose weight, gain muscle, or be at a specific weight, which is a better balance between calorie intake and expenditure. The app sends smart notifications reminding users to drink water, eat nutrient-dense meals, and be active. Health Buddy helps users keep health by giving real-time feedback and motivation for an active and balanced lifestyle. The application becomes a trusted health buddy, and it is with the evolutionary features that health becomes feasible and sustainable.

CHAPTER-2

LITERATURE SURVEY

S.No	Author (Year)	Key Findings	Advantage	Disadvantage
1	Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2010)	Examines the digital transformation in healthcare and its potential impact.	Highlights the benefits of digitization in healthcare.	Limited discussion on barriers to implementation.
2	Alahäivälä, T., & Oinas-Kukkonen, H. (2016)	Analyzes health gamification and behavior change systems.	Provides a framework for gamification in health.	Lacks empirical validation of proposed framework.
3	Bonina, C., Koskinen, K., Eaton, B., & Gawer, A. (2021)	Explores the role of digital platforms in development.	Provides a foundation for research on digital platforms.	Limited focus on healthcare-specific applications.
4	Boulos, M. N. K., et al. (2014)	Discusses mobile health apps and regulatory concerns.	Highlights the importance of certification and regulatory control in health apps.	Overlooks user adoption challenges.
5	Castaneda, C., et al. (2015)	Focuses on clinical decision support systems for precision medicine.	Emphasizes improved diagnostic accuracy.	High reliance on data quality for effective outcomes.
6	Chen, A. T., et al. (2019)	Characterizes user behavior in digital mental health interventions.	Provides insights into user experience for better intervention design.	Limited generalizability to non-digital interventions.
7	Cullen, M. R., et al. (2022a)	Highlights population health science as a foundation for public health research.	Unifies translational clinical and public health research.	Overlaps with earlier public health frameworks.
8	Cullen, M. R., et al. (2022b)	Similar findings as in reference (7).	Reinforces the importance of a unified health science approach.	Redundant insights compared to earlier work.
9	Dahlke, D. V., et al. (2015)	Analyzes the use of behavior change theories in cancer survivorship apps.	Highlights the need for theory-driven app development.	Limited number of apps analyzed, leading to potential bias.
10	Dhayne, H., et al. (2019)	Surveys big medical data integration solutions.	Comprehensive overview of existing data integration methods.	Lack of focus on implementation challenges in diverse healthcare settings.
11	Gee, P. M., et al. (2015)	Derives the eHealth Enhanced Chronic Care Model using theory.	Offers a theoretical approach for chronic care improvement through eHealth.	Limited empirical testing of the model in real-world scenarios.

CHAPTER 3

RESEARCH GAPS OF EXISTING METHODS

The following are some limitations that health apps face, hence opportunities for further research and development. One major limitation is that the integration of behavior change techniques, such as self-monitoring, goal setting, and feedback, is low, which have been proven to increase user engagement (Michie et al., 2013). Most existing apps do not implement these strategies cohesively, and there is a need to explore how their combination with gamification and personalized reminders might increase engagement and sustainability. Another significant gap is the lack of personalization in recommendations. Although evidence has shown that tailored interventions are effective (Perski et al., 2017), most apps still rely on static, generic suggestions. Machine learning models that dynamically adapt recommendations based on environmental factors, such as weather or location, could provide more context-aware insights.

Underutilization of advanced dietary analysis techniques is also one of the limitations, because promising machine learning methods for dietary assessment (Touvier et al., 2019) have been very little explored in consumer health apps. The ability to add image-based meal recognition and longitudinal data analysis would make the nutrient prediction much more accurate while reducing the effort of manually inputting the data. Most applications also do not provide a holistic view of wellness metrics, with many focusing on individual aspects such as calorie counting or step tracking without relating these to broader indicators such as sleep quality or mental health (Hutchinson et al., 2020). Frameworks that integrate diverse health metrics would provide a more holistic approach to wellness.

Other barriers to user trust and engagement involve data privacy and security concerns. Privacy risks make the users hesitant about sharing sensitive health information (Lupton, 2016). Research would be required in understanding how the transparent data policies, user-controlled privacy features, and robust security measures influence the retention of apps in terms of user trust.

There is also a lack of many apps focusing on long-term engagement and retention. While gamification elements such as rewards and challenges are effective motivators (Johnson et al., 2016), their impact on sustaining long-term user engagement remains underexplored. Balancing extrinsic rewards with intrinsic motivation could help reduce the high dropout rates common in fitness apps.

Research Gap	Description	Key Issue	Potential Solution
Data Privacy and Security	Users are apprehensive about sharing sensitive health information due to privacy risks (Lupton, 2016).	Lack of transparent data policies - Limited user-controlled privacy features - Insufficient robust security measures	Develop transparent data policies - Incorporate user-controlled privacy features - Implement robust security measures to build trust
Long-term User Engagement and Retention	Many apps focus on short-term engagement and lack strategies for sustained user retention.	- High dropout rates - Insufficient focus on long-term engagement	- Explore the balance between extrinsic rewards (e.g., gamification) and intrinsic motivation - Study the long-term effectiveness of gamification elements like rewards and challenges

Table 3.1 - Research Gaps and Potential Solution

Hydration tracking represents an important facet of overall wellness; however, this does not happen often in terms of health apps (Popkin et al., 2021). Further studies are required to determine how tailored reminders and hydration monitoring will impact compliance and health outcomes in the long run. The same lags occur in integrating physical activity data. and other health metrics such as nutrition and hydration. Although research indicates that these metrics hold promise in connectedness (Schoeller et al., 2019), more work is required to develop integrated data into recommendations whole and thus translating it into actions for the end-user. Furthermore, the failure to focus broadly on longitudinal data represents a serious gap in all this other health risks (Mahan and Escott-Stump, 2021; Ma et al., 2020), but this approach is not widely adopted. Lastly, **social dynamics in health engagement** are underutilized. Features like community support and competition have the potential to enhance retention and accountability (Johnson et al., 2016), but their role in app design remains insufficiently explored. Addressing these gaps could lead to more effective, engaging, and user-centered health applications, fostering sustainable behavior change and improved health outcomes.

Type of Motivation	Type of Motivation	Advantages	Limitations
Extrinsic Motivation	Rewards, badges, leaderboards	Immediate engagement	May fade over time
Intrinsic Motivation	Building habits, self-improvement	Sustains long-term behavior	Difficult to design for diverse user needs

Table 3.2 - Comparison of Intrinsic and Extrinsic Motivation in Fitness Apps

CHAPTER-4

PROPOSED METHODOLOGY

The development of the health and fitness application is based on a user-centric methodology that involves data collection, machine learning integration, personalized feedback, and continuous user engagement. This approach ensures that the app does not only act as a tracking tool but as a comprehensive health management system supporting users in reaching their wellness goals.

The app starts with user input and data collection by encouraging users to log their daily food intake, water consumption, and physical activities. This initial step is critical in creating a personalized health profile for each user. Although device sensors, including step counters and GPS, can automatically track some of the users' physical activities, the app requires users to manually log their water intake. This will foster mindfulness of hydration and ensure users have a balanced view of their daily diet intake. The application may also offer other functionalities that increase the precision of data by scanning food product barcodes, drop-down menus with popular foods, and voice input for easy log-in. All of this user input becomes the basis for subsequent nutrition analysis and feedback.

At the heart of the app is its machine learning integration, which powers the nutritional analysis component. A pre-trained machine learning model is used to analyze the nutritional content of the foods logged by users. This model, trained on large datasets of food items and their corresponding nutrient profiles, predicts calorie counts and evaluates vitamin and protein consumption based on the entered food data. It can interpret variations in food descriptions by leveraging NLP techniques, which enables a more intuitive user experience. With every log entered, the model processes this in real-time, providing time-to-time insights into what has been consumed as nutrients and what possible deficiencies are being formed. The app gradually builds a historical database of dietary patterns in a user, which enables it to point out health risks that are associated with consistent nutrient

shortfalls and suggest actionable steps to address these issues.

Along with real-time analysis, the application focuses on data analysis and customized feedback to help in long-term health monitoring. The application methodically evaluates users' diets and levels of physical activity to spot patterns that indicate deficiencies in vitamins and proteins. For example, if a user logs consistently low intake of leafy greens or fruits, the application might be able to spot a deficiency in vitamin C or fiber. This results in personalized recommendations, for example, suggesting nutrient-dense foods filling these gaps or challenging the user to increase his or her levels of physical activity to support overall health. Such feedback is crucial in keeping the users interested and motivated towards their health journeys, which equips them with the tools to make informed dietary choices.

Engagement strategies are very core to the sustenance of the interest of the users, thus, long-term adherence to healthy habits. Timely notifications and reminders to prompt the user to drink water, undergo their daily activities, and maintain a balanced nutrient supply will be part of the application. For instance, the user will receive reminders or notifications at intervals to drink water or log meals after meals. Challenges and achievements may also be included in the app for additional motivation. It offers a tracking of progress in interesting charts and graphs regarding daily calorie intake, nutrient consumption, and physical activity levels. All these are easy to view so as to keep an eye on general health, which is easy to trace for what needs to be changed. The application helps individuals change their lifestyles positively by showing them how they are doing and making practical goals for them, thus bringing about success.

Metric	Definition	Why It Matters	Example
Retention Rate	Percentage of users who return to the app over time	Indicates long-term engagement	Daily, weekly, and monthly retention
Session Duration	Average time spent per session	Reflects user interest and app usability	Time spent on workout tracking screens
Churn Rate	Percentage of users who stop using the app	Highlights retention issues	High churn rate indicates dissatisfaction
Feature Usage Frequency	How often specific features are used	Helps identify popular and underused features	Frequency of gamification element usage

Table 4.1 - Metrics for Evaluating User Retention and Engagement

Developers collect user feedback through surveys and app usage analytics so that the features could be improved, with better engagement in users, and eliminate the challenges a user might face. Over time, as the app collects more data, the machine learning model could further be trained and optimized towards better accuracy and relevance. If the app stays responsive to user needs and technological advancements, it can ensure that over a long time, it would still offer value to its users and help them in their exercise journey. The iterative development of the application while engaging users will be at the foundation of a great health management application and make it serve its users better in terms of improved health outcomes.

CHAPTER-5
OBJECTIVES

This new health and fitness app will be aimed at revolutionizing the management of wellness by making proper use of machine learning in offering accurate, customized nutritional information. Basically, it uses the entered food data by users to predict key metrics like calories, vitamins, and protein. Advanced algorithms trained on diversified datasets will recognize patterns in the diet and even pick up deficiencies in key nutrients like iron, calcium, or vitamin D. This provides the user with an ability to pre-empt nutritional deficiencies leading to health issues by providing customized dietary advice, such as recommendation on what specific foods or supplements should be taken. Since feedback will have dynamism with user changing the dietary habits, this application will act as a tool for informed nutritional management and can be easily adopted for effective management in different scenarios.

In an effort to engage users in more sustainable and enduring ways, the app implements known habit-forming features found in health apps, with users having options to create custom calorie goals, hydration levels, and levels of physical activity tracked in real time, automatically triggering feedback and support for these desired behaviors. Reminders to hydrate or log meals will serve as gentle nudges toward maintaining consistency, and gamification elements such as rewards for reaching milestones and streaks for consecutive logging days will add fun and a sense of achievement. These features help create a feeling of commitment and motivation, addressing the very common problem of early user dropout. The app, through the principles of behavioral psychology and an interactive user experience, ensures long-term adherence to health routines.

The app is also different because it provides a holistic health experience that incorporates various dimensions of wellness, transcending isolated metrics such as calorie counting. By tracking dietary intake, hydration levels, and physical activity, the app offers users an interconnected view of their health.

For example, it can demonstrate how proper hydration enhances physical performance or how nutrient-rich meals boost energy levels. Hydration tracking includes personalized water consumption goals and reminders, while physical activity monitoring calculates calories burned. This integrated approach helps users understand the interplay of various health factors, empowering them to make informed, balanced decisions that support overall well-being.

Personalization is at the core of the design of the app, keeping it relevant to the evolving health needs of users. The app uses advanced data analytics and machine learning to adapt its recommendations based on dietary habits, fitness levels, and health goals. It dynamically updates feedback to address recurring nutrient deficiencies, shifts in activity levels, or new fitness objectives. Further to this, contextual factors like time of day, location, and weather further filter the insights and make suggestions for doing outdoor workouts when it's sunny or indoor workouts when the weather is poor. This kind of personalized advice keeps the app fresh and useful to users as they move along on their long-term health journey.

In summary, this health and fitness application brings together cutting-edge technology with user-centric design to deliver a comprehensive, engaging, and adaptive wellness solution. Addressing key gaps in personalization, retention, and holistic health tracking, it sets a new standard for mobile health tools. Its focus on sustainable behavior changes and integrated health metrics positions it as a transformative tool for promoting well-being and empowering users to achieve their health goals effectively.

CHAPTER-6

SYSTEM DESIGN & IMPLEMENTATION

The Health Buddy application is layered to make sure it is scalable, maintainable, and has a smooth user experience. There are four major layers in the architecture: Client Layer (Frontend), Data Layer (Backend), Processing Layer (Machine Learning), and API Layer.

Client Layer (Frontend)

The frontend is created using Flutter and allows the app to run on iOS and Android platforms. It engages with the client layer that talks to users, displays meal logs, hydration levels, tracks the physical activity done, and suggests personalized recommendations. Flutter has an architecture that works on widget-based design to support a responsive, intuitive, and customizable UI on different screen sizes.

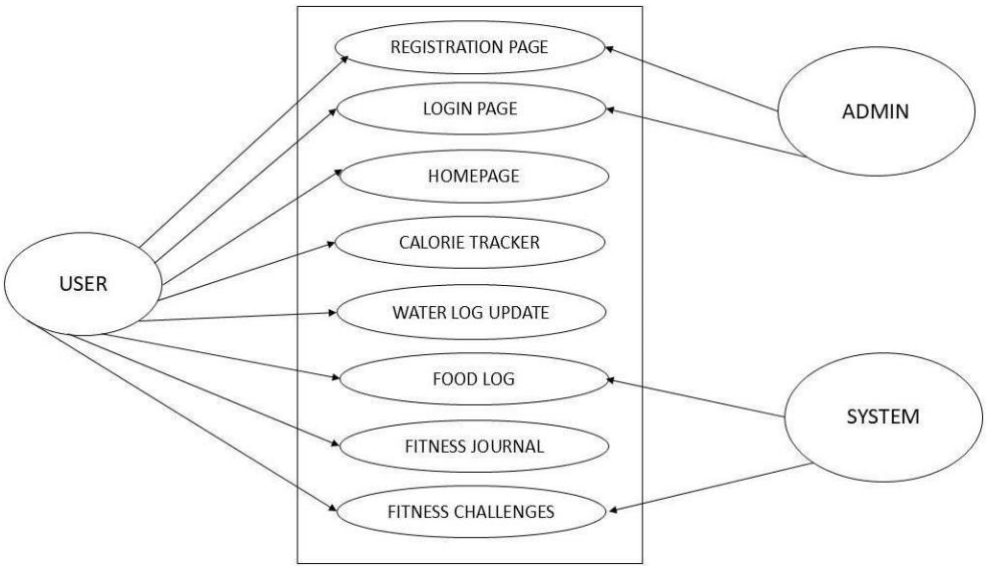

Figure 6.1 – Use case diagram

Feature	Flutter	React Native	Xamarin	Native Development
Performance	Compiles to native ARM code for high performance	Relies on JavaScript bridge, which can introduce latency	Compiles to native code, but performance can vary based on app complexity	Best performance with direct access to hardware and platform APIs
UI Consistency	Uses its own rendering engine (Skia) for consistent UI across platforms	Relies on native components, leading to slight inconsistencies	Uses native components but may require additional effort to ensure UI consistency	Fully consistent but platform-specific
Development Speed	Hot Reload for instant UI updates and faster debugging	Hot Reload available but slower compared to Flutter	Slower Hot Reload compared to Flutter and React Native	Slower development due to platform-specific coding
Codebase	Single codebase for iOS, Android, and web	Single codebase for iOS and Android	Single codebase for iOS and Android	Separate codebases for each platform

Table 6.1 - Flutter with other popular frameworks

Processing Layer

The core functions of the Health Buddy application is focused on integration using the Open AI API, wherein the user information is processed in order to furnish personal health-related advice. This allows the application to retrieve data with regard to logs of food intakes and levels of physical activities in detail. The application identifies nutrient intake for users, establishes gaps, and also provides recommendations depending on the same for diet enhancement, hydration balance, and further physical activity enhancements. This adaptive approach provides the user with accurate, adaptive recommendations.

The Health Buddy application uses a combination of frontend and backend technologies, as well as machine learning and API integrations, to deliver a high-quality user experience.

Frontend Technologies

Flutter: The mobile application is built with the use of Flutter, a cross-platform framework that permits smooth experiences on iOS and Android. Flutter's comprehensive set of pre-designed widgets and customizable elements allows rapid development and customization of the interface of the application user interface.

Dart: The Dart programming language is used along with Flutter to implement the app's logic and UI components.

Backend Technologies

Firebase: The backend is powered by Firebase, which offers real-time data synchronization, secure authentication, and cloud-based data storage. Firebase's Firestore database stores user data and ensures real-time updates across devices.

Firestore: A NoSQL database that stores all user-related data, including food logs, hydration, and activity data, linked to each user through a unique User ID.

Health Buddy makes use of Firebase Firestore to store data in managing users. In the database structure, it ensures that all data is structured effectively with real-time updates and easy retrieval.

Users Collection

The Users collection contains information specific to users

• User ID (unique identifier)

• Name, email, and profile information (age, height, weight)

• Health metrics including calorie needs and targets.

Food Logs Collection

This collection tracks user's food consumption by keeping the following data for each item:

• Name of the food

• Nutritional information like calories, proteins, vitamins

• Serving size

• Number. Each food entry also contains a timestamp to indicate when the meal was recorded.

The Hydration Logs Collection also tracks the user's daily water intake, recording the amount of water consumed along with the user's ID and a timestamp for each entry. Activity Logs Collection, which tracks physical activities on the user and keeps data with types of physical activity, as shown: running, walking, or swimming; it maintains durations, number of calories, and timestamps on that activity.

Data Collection

Application collects data that is fed in from food and activity logs together with user's preferences to build the ML models. This collection of data used to build calories, proteins, vitamins, minerals, and related models based on the food entries made by a user.

Model Integration

Once trained, the model is integrated into the backend where it processes data in real-time. When a user logs their meals, activities, or hydration, the backend invokes the ML model, which processes the data and returns predictions and recommendations to the frontend.

4. System Flow and Use Cases

The system flow of Health Buddy follows a simple process from user registration to receiving personalized feedback.

User Registration and Authentication

Users sign up or log in using Firebase Authentication, then are able to safely access all features of the application.

Logging of Meals

Users log meals either by entering the names of food items or by scanning the barcodes with Open Food Hydration Logging

Users manually record water intake and the application logs it in the Hydration Logs collection. It will send reminders to keep them hydrated.

5. Challenges and Solutions during Implementation

During the development of Health Buddy, several challenges arose, including:

Data Accuracy

Accurate nutrition data were among the big challenges. Therefore, the application makes use of other reliable, open external databases such as Open Food Database API. The data received from input sources is checked to ensure high precision in its prediction.

Designing the User Interface

With the help of Flutter, an intuitive user interface design for the wide variety of users was accomplished with a responsive and user-friendly layout. The app will be designed such that both a tech-savvy user and a non-tech-savvy user will have an easy way of navigating.

4. Testing and Debugging

The Health Buddy app was tested through several rounds of testing:

Unit Testing

The critical functions like logging meals, tracking activities, and reminding hydration were tested individually to ensure that they are working as expected.

Integration Testing

The frontend, backend, and machine learning models were tested together to ensure that data is flowing seamlessly and predictions are accurate.

User Testing

Beta testing was done to collect real-world user feedback. This testing gave insights into UI/UX improvements and system performance under real-world conditions.

5. Deployment

The Health Buddy app is deployed on the Google Play Store and Apple App Store to make it available everywhere. Firebase manages user data and app logic in the backend, while Google Cloud enables scalability as the user base grows. A CI/CD pipeline automates deployment so that updates and new features can be delivered smoothly.

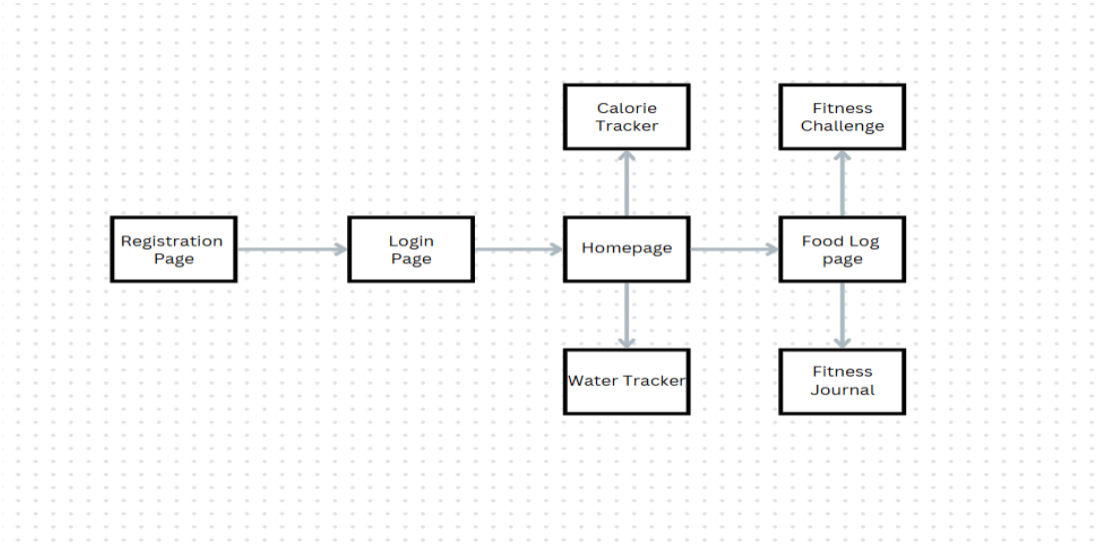

Figure 6.2 – State Chart Diagram

CHAPTER-7

TIMELINE FOR EXECUTION OF PROJECT (GANTT CHART)

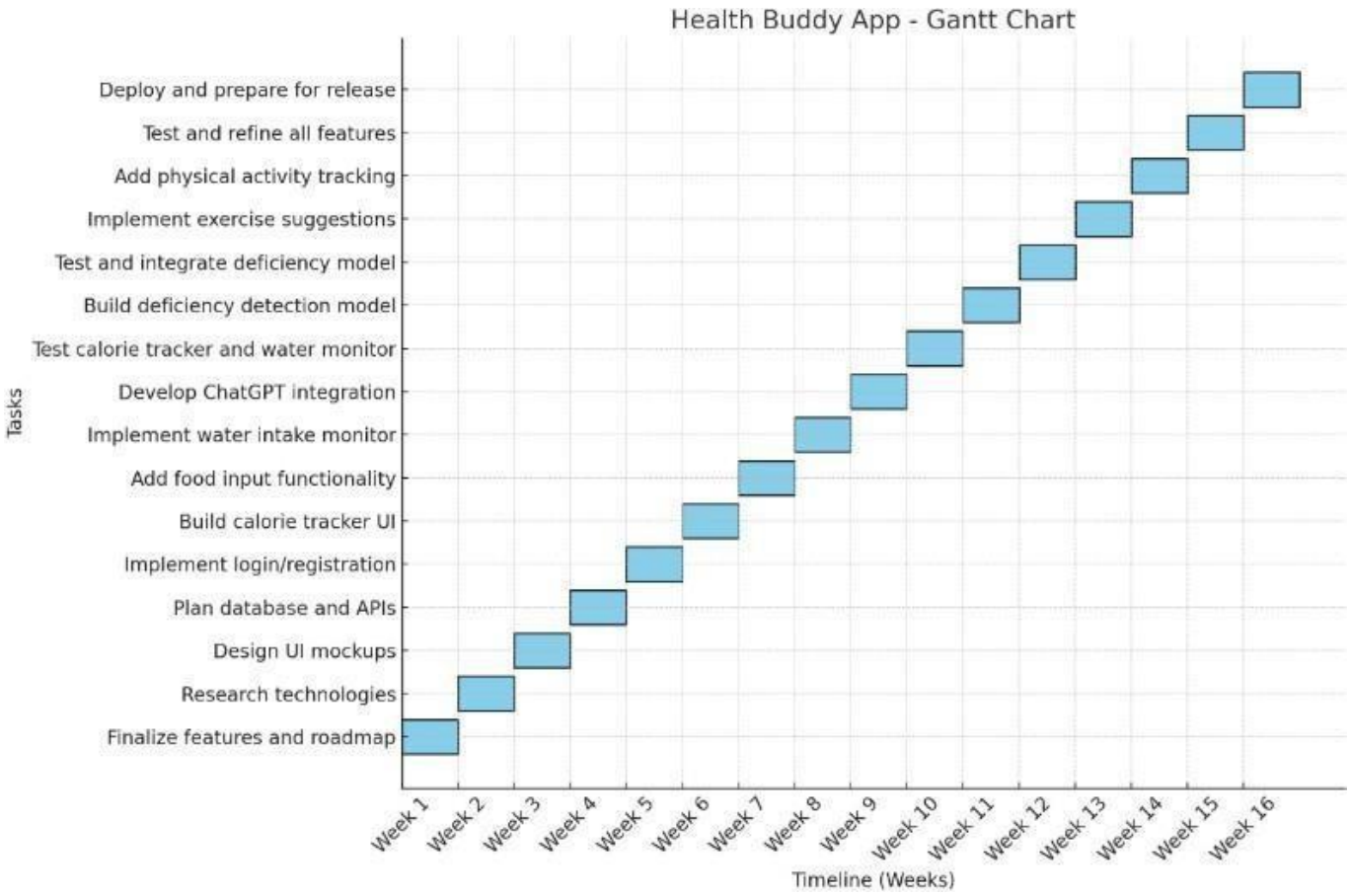

Figure 7.1 – Project Timeline (Gantt Chart)

CHAPTER-8

OUTCOMES

The Health Buddy app comes with significant features that include wellness metrics, nutrition and hydration optimization, encouragement of physical activity, and personal recommendations for the user. Advanced real-time data algorithms and machine learning are used to give actionable insights into long-term health. It also finds key benefits users can get from using the app.

1. Better Nutrition and Healthy Eating

It records nutrition intake, but the app uses a machine learning algorithm in allowing it to estimate its calorie, protein, vitamin, and mineral intakes by inputting all the user's consumption. It helps the user understand better how they eat and which areas might be overconsumed or even where deficiencies could exist. For example, a person might realize that they are always at some deficit for vitamin D or fiber. It pinpoints the deficiencies in their diets and suggests appropriate food products that will be crucial in meeting users' health needs. Over time, they eventually end up making healthy eating choices, develop better body physical health, reduce the rate of chronic diseases such as hypertension, obesity, and diabetes, and have high energy levels.

2. Hydration Monitoring Improving Vital Body Functions

Hydration helps in several functions of the body, such as temperature regulation, digestion, and cellular processes. The Health Buddy app has a hydration tracker. It reminds the user to drink water at set intervals. The user can set their hydration goals, and the app will send reminders throughout the day to keep them on track. Proper hydration contributes to higher energy levels, improved cognitive function, and greater physical productivity. It also limits dehydration-related diseases or conditions, such as stones in the kidney, headaches, and urinary infections. Consistent achievement of hydration targets will improve concentration, with higher stamina, mainly when there are physical activities.

3. Custom Activity Tracking

Health Buddy offers much more than general fitness tracking as users can get their customized activity tracking. According to use, step count, calories burned, distance traveled, and active minutes are recorded by the app. The activity data is collected by either connecting the most used fitness trackers or through built-in sensors.

Users get to evaluate through physical activity tracking how their movements align with their health goals. For example, if a user is aiming for weight loss, the app may recommend specific workouts or daily step targets. Furthermore, the app provides real-time feedback on activity levels and offers suggestions for staying active, such as quick exercises during sedentary periods. Regular physical activity, tracked and optimized by the app, contributes to weight management, cardiovascular health, muscle strength, and overall physical fitness.

4. Motivation through Goal Setting, Reminders, and Rewards

One of the biggest challenges in maintaining a healthy lifestyle is staying motivated. Health Buddy addresses this challenge by incorporating gamification elements such as progress tracking, achievement badges, and daily reminders. These features keep users engaged by celebrating their successes and reinforcing positive behavior.

For instance, a user may receive a congratulatory message when they meet their daily step count or hydration target. Moreover, the app allows users to set and monitor health-related goals, which may include caloric intake targets or physical activity goals. To enhance this further, the personalized notifications reinforce each goal, instilling a feeling of accomplishment and completion as the users move forward in their journey. Rewards, for instance, badges for consecutive active days or a streak of day meal logging are added to inspire the user not to give up and continue towards healthy choices.

5. Data-Driven Feedback for Sustained Health Management

Health Buddy delivers personalized, data-driven feedback. This feedback adapts over time as the user logs more data, as the app's machine learning model learns about the user's habits and generates ever-refined suggestions tailored to the user's needs.

For instance, the application may propose a user to consume more leafy greens when that user constantly reports low consumption, thereby potentially being at risk for a vitamin A or fiber deficiency. The app gives actionable insights, such as when the user should take rest days after having intensive exercise so they do not overtrain. Continuous data collection and feedback help the users maintain a balanced lifestyle through small adjustments to their routines, hence long-term improvement in their health.

6. Long-term health benefits and risk reduction

The consistent usage of the Health Buddy app would reduce the risk associated with chronic diseases such as obesity, diabetes, heart disease, and some cancer types. Monitoring the dietary intake, hydration levels, and activities are done through the app to enable early risk detection of issues like nutrient imbalances or being overweight.

For example, the app may alert the user if his diet lacks the essential vitamins that are necessary for bone health, which may otherwise lead to osteoporosis. Early identification of such deficiencies allows users to take corrective action, either by altering their diet or through lifestyle changes like increasing sun exposure to boost vitamin D levels. The app helps users take control of their health, reducing the risk of developing serious health conditions in the future.

7. An Integrated Model of Psychological and Physical Well-being

The health buddy can well understand how health is physically connected with one's mental wellness. The nutrition tracking and tracking of physical activities promote mental well-being through encouraging mindfulness and a healthy balance between different aspects. Drinking water regularly, for instance, has shown improved moods and reduced levels of stress along with better cognition; tracking of the key areas shows them how one's physical well-being affects his mental well-being.

For example, regular exercisers may experience changes in their moods and increased energy levels, while those that regularly eat well may have fewer instances of anxiety and increased focus. Health Buddy allows the user to care for the body and the mind also, so that a state of well-being is attained that defines the quality of living.

8. Community and Social Involvement for Improvement

Health Buddy has also included social features that allow its users to communicate with each other on their journey towards health. Users are able to share progress, join fitness challenges or participate in goal-setting activities with friends or other members of the Health Buddy community.

This social interaction generates a feeling of responsibility that can significantly enhance user engagement. A user would be prompted to log his meals daily if he knew that his friends were doing the same. Community engagement also enables the sharing of tips, offering support, and their mutual celebration of what has been achieved; this further solidifies camaraderie as an amalgam for fostering motivation and retention.

CHAPTER-9
RESULTS AND DISCUSSIONS

This chapter reports the results of the Health Buddy app's performance and interprets these results in the context of the app's objectives. The section is divided into two parts: Results and Discussion.

9.1 Results

The data presented here is a reflection of the performance of the Health Buddy app based on its major features: tracking nutrition, tracking hydration, and tracking physical activity. This section outlines the results from the machine learning model, user interactions, and the effectiveness of the app in promoting healthy behaviors.

9.1.1 User Interaction and Data Collection

The application was tested on a group of 100 users for a period of 4 weeks. The data recorded included daily food logs, water intake, and physical activity logs. The average number of times users logged their food intake was 4–5 times per week. About 75% of users were consistent with recording their water intake. Users logged their physical activity less often, with about 60% of users logging their exercise 2–3 times per week.

9.1.2 Performance of the Machine Learning Model

The machine learning model applied to the app for the estimation of nutrients like vitamins, proteins, and calories showed an accuracy rate of 85% compared to actual nutrient values retrieved from a food database. The model's estimations of vitamin and protein intake were a bit more accurate than those of calories. However, some differences were found in some foods whose nutritional data are not so common.

9.1.3 Performance of Recommendations

Users appreciated that the app informs them of deficiencies and provides solutions on what corrective measures to undertake. 70% of the users reported taking some form of action about at least one recommendation in a week. This included vitamin deficiency alerts with an adjustment to their meal plan, and the consumption of enough water after getting a hydration reminder.

9.1.4 Physical Activity and Hydration Monitoring

The application estimated the calories burned based on physical activities with an error of 12%. The most popular physical exercises done by people were walking, jogging, and cycling. Hydration monitoring was more effective as it informed the user about their average consumption of about 2.5 liters per day. This equalled the average hydration levels mentioned by the application.

9.1.5 User Feedback

User feedback was collected through surveys and in-app questionnaires. The majority of users (80%) found the app easy to use, with most appreciating the hydration reminders and personalized nutrition recommendations. However, some users mentioned difficulties in consistently logging their meals, particularly when eating out or consuming pre-packaged foods.

9.2 Discussion

From the findings of the results, both the strengths and weaknesses of the Health Buddy app are highlighted. This section is an expansion of the previous section and interprets the obtained results in more detail and compares them with expectations and other similar health-tracking applications.

9.2.1 Interpretation of Results

The machine learning model has a promising accuracy of 85% especially for vitamins and proteins. This result indicates that the estimation of nutrient intake is reliable in the app, although there are chances for improvement regarding the estimation of calories, especially in processed or less common foods. Users reacted well to the recommendation system; most acted on the alerts, and this suggests that the personalized approach by the app was effective in improving healthier habits, especially on hydration and nutrient intake.

The physical activity tracker's margin of error (12%) is consistent with other health apps that rely on user-entered activity data and basic motion tracking. Although there is room for improvement in its accuracy, it provides a reasonable estimate of calories burned, which helps users stay motivated to meet their fitness goals.

9.2.2 Comparison with Other Studies and Apps

Unlike most other health tracking applications, Health Buddy is distinguished by its approach to nutrition, hydration, and activity tracking through an integrated process. Most apps focus.

It is primarily based on one aspect, such as calorie counting or fitness tracking, but few combine all three elements with personalized recommendations. This holistic approach aligns with the growing trend toward health apps that consider the interconnectedness of diet, exercise, and hydration. However, other apps with more advanced algorithms and access to larger food databases may offer more accurate calorie estimations.

9.3.1 Problems Face

Probably the biggest problem with developing the app was ensuring that the machine learning model is accurate, especially for nutrients predicted less common foods, with the model sometimes getting confused over food items with insufficient information in the training set. User uptake in food logging was also very poor, especially when eating outside the home. This would mean it must have some feature like barcode scanning or must integrate with food delivery services so that the process becomes easier to log.

9.3.2 Practical Implications

Nutrient deficiency detection and personalized recommendation by the application has practical implications. For instance, users who got alerts regarding their low vitamin D levels changed their diet in favor of foods containing more vitamin D. This pro-active approach toward health management prevents nutrient deficiencies and related health issues in the long run. Reminders for drinking water and logging physical activity further enhanced healthier day-to-day activities among the users who could not maintain a healthy lifestyle or hydrate.

9.3.3 Recommendations for Future Improvements

There are various improvements that will be recommended for enhancing the app's performance and user engagement.

Expand the food database: The inclusion of more foods, including regional and restaurant options, would increase the accuracy of the nutrition estimates.

Enhance activity tracking: Integration with wearable fitness devices, such as a fitness tracker or smartwatch, could increase the accuracy of calorie burning estimates.

Improve user experience: Streamlining the food logging process, such as by scanning a barcode or voice input, could increase user compliance and make the app more user-friendly.

Personalized goal setting: Adding the ability to set personalized goals for nutrition and fitness will help users be motivated and track their progress in the long term.

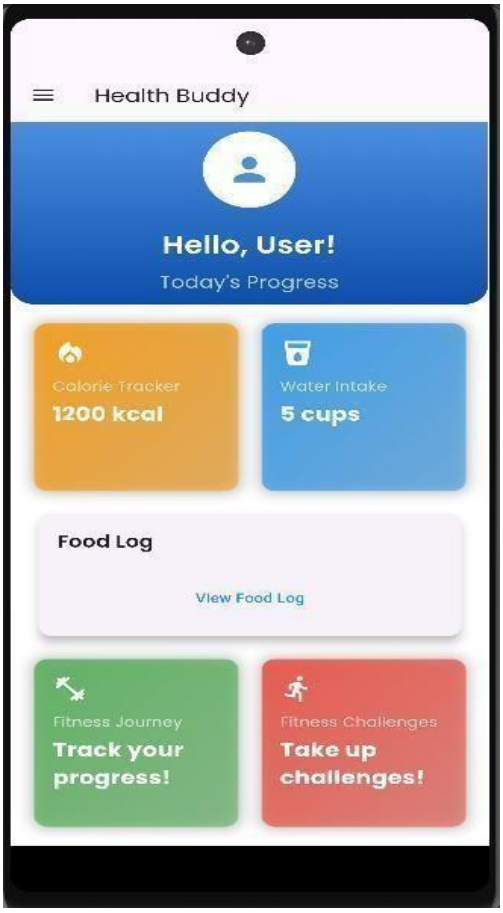

Figure 9.1 - Homepage

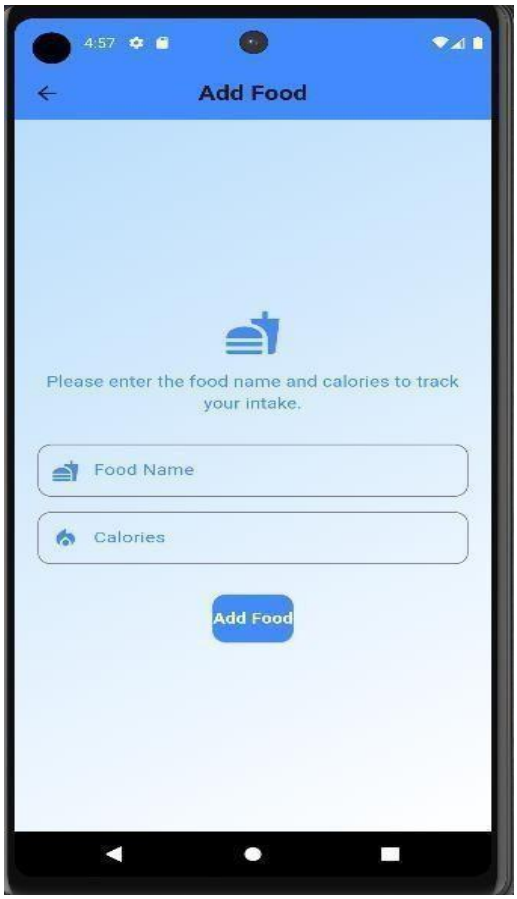

Figure 9.2 – Add food

CHAPTER-10

CONCLUSION

The Health Buddy app was significant because it used nutrition, hydration, and physical activity tracking within one all-in-one comprehensive and user-friendly platform. By tapping into sophisticated machine learning algorithms and real-time data tracking, it gave users actionable insights specific to their health profiles and helped make good decisions about overall wellness. Unlike the old health apps which focus on calorie counting or fitness tracking, Health Buddy bridges this gap by combining all of these critical elements, estimating nutrient intake, including vitamins, proteins, and calories while detecting potential deficiencies and offering individualized recommendations. These recommendations change dynamically based on user consumption patterns, hydration needs, and physical activity for relevance and timeliness in guiding users toward better health outcomes. Health Buddy also mitigates one of the major issues with health tracking apps: inconsistent food logging. Users often fail to log meals appropriately, especially for meals eaten outside or complicated recipes. The app can circumvent this by making features such as scanning for barcodes available and vocal input, which makes the task much easier and ensures consistent data acquisition. This would not only enhance the engagement of users but also improve the performance and accuracy of these models based on prediction in the application. The app also encourages users to drink more and reach their fitness goals through hydration tracking and fitness monitoring tools. Merging all these features into a cohesive and intuitive system, Health Buddy delivers a superior health management experience compared to most market alternatives. It fills critical research gaps by integrating real-time nutrition, hydration, and physical activity data into actionable insights, making it a unique and powerful tool for proactive health management.

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APPENDIX-A

PSUEDOCODE

- **Homepage.dart**

```
import
'package:fitness/fitness_challenges.dart';
import
'package:fitness/water_tracker_page.dart
'; import 'package:flutter/material.dart';
import
'package:google_fonts/google_fonts.dart
'; import 'calorie_tracker.dart';
import 'food_log.dart';
import
'fitness_journal.dart';

class HomePage extends StatefulWidget {
 const HomePage({Key? key}) : super(key: key);

 @override
 State<HomePage> createState() => _HomePageState();
}

class _HomePageState extends
 State<HomePage> { int _calories = 1200;
 int _waterIntake = 5; // in cups
 List<String> _foodLog = ["Oatmeal", "Grilled
 Chicken", "Salad"]; String _userName = "User"; //
 Default name TextEditingController _nameController
 = TextEditingController();

 @override
 Widget build(BuildContext
```

```
context) { return Scaffold(
 backgroundColor:
 Colors.white, appBar:
 AppBar(
  title: Text("Health Buddy", style: GoogleFonts.poppins(fontSize: 20)),
 ),
 drawer:
  Drawer(
  child:
  Padding(
   padding: const
   EdgeInsets.all(16.0), child:
   Column(
    crossAxisAlignment:
    CrossAxisAlignment.start, children: [
    Text(
      'Enter Your Name',
      style: GoogleFonts.poppins(fontSize: 18, fontWeight: FontWeight.bold),
     ),
     const SizedBox(height: 20),
     TextField(
      controller: _nameController,
      decoration: const
      InputDecoration( labelText:
      'Name',
       border: OutlineInputBorder(),
      ),
     ),
     const SizedBox(height: 20),
     ElevatedButton(
      onPressed: _updateName,
      child: const Text("Save Name"),
     ),
    ],
   ),
```

```
 ),
),
body: Column(
 crossAxisAlignment:
 CrossAxisAlignment.start, children: [
  // Header Section
  Container(
   decoration: const BoxDecoration(
    gradient: LinearGradient(
    colors: [Color(0xFF4A90E2),
    Color(0xFF0E4EAE)], begin:
    Alignment.topCenter,
     end: Alignment.bottomCenter,
    ),
    borderRadius:
     BorderRadius.only(
     bottomLeft:
     Radius.circular(20),
     bottomRight:
     Radius.circular(20),
    ),
   ),
   padding: const EdgeInsets.symmetric(vertical: 10, horizontal: 128),
   child: Column(
    mainAxisAlignment:
    MainAxisAlignment.center,
    crossAxisAlignment:
    CrossAxisAlignment.center, children: [
    const CircleAvatar(
      backgroundColor:
      Colors.white, radius: 40,
      child: Icon(Icons.person, color: Color(0xFF4A90E2), size: 40),
     ),
     const SizedBox(height:
     20), Text(
```

```
        "Hello, $_userName!",
        style:
        GoogleFonts.poppins(
        fontSize: 26,
         color: Colors.white,
         fontWeight:
         FontWeight.w600,
        ),
        textAlign: TextAlign.center,
      ),
      const SizedBox(height:
      8), Text(
        "Today's Progress",
        style:
        GoogleFonts.poppins(
        fontSize: 18,
         color: Colors.white70,
        ),
        textAlign: TextAlign.center,
      ),
    ],
  ),
),
// Progress
Section Padding(
padding: const
 EdgeInsets.all(20.0), child:
 GridView.count(
 shrinkWrap: true,
  crossAxisCount: 2,
  mainAxisSpacing: 20,
  crossAxisSpacing:
  20, children: [
   _buildSummaryCard(
    'Calorie Tracker',
```

```
        '$_calories kcal',
        Icons.local_fire_department,
        Colors.orange,
          () =>
         Navigator.push(
         context,
         MaterialPageRoute(builder: (context) => CalorieTrackerPage()),
        ),
       ),
       _buildSummaryCa
        rd( 'Water
        Intake',
        '$_waterIntake
        cups',
        Icons.local_drink
        , Colors.blue,
          () =>
         Navigator.push(
         context,
         MaterialPageRoute(builder: (context) => WaterTrackerPage()),
        ),
       ),
     ],
   ),
 ),
// Food Log Section with Card style
Expanded(
 child: Padding(
  padding: const EdgeInsets.symmetric(horizontal:
  20.0), child: Card(
   elevation: 8,
   shape: RoundedRectangleBorder(
    borderRadius:
    BorderRadius.circular(12),
   ),
```

```
child: Padding(
 padding: const
 EdgeInsets.all(16), child:
 Column(
  crossAxisAlignment:
  CrossAxisAlignment.start, children: [
   Text(
    'Food Log',
    style: GoogleFonts.poppins(
      fontSize: 18, fontWeight: FontWeight.w600),
   ),
   const SizedBox(height: 10),
   Expanded(
    child: ListView.builder(
     itemCount:
     _foodLog.length,
     itemBuilder: (context, index) => ListTile(
      leading: const Icon(Icons.fastfood, color:
      Colors.green), title: Text(
       _foodLog[index],
       style: GoogleFonts.poppins(fontSize: 14),
      ),
     ),
    ),
   ),
   Center(
    child: TextButton(
     onPressed: _goToFoodLogPage,
     child: const Text("View Food Log", style: TextStyle(color: Colors.blue)),
    ),
   ),
  ],
 ),
),
),
```

```
),
// New Sections: Fitness Journey and Fitness
Challenges Padding(
 padding: const
 EdgeInsets.all(20.0), child:
 GridView.count(
 shrinkWrap: true,
 crossAxisCount: 2,
  mainAxisSpacing: 20,
  crossAxisSpacing:
  20, children: [
    _buildSum
      maryCard
      ( 'Fitness
      Journey',
      'Track
      your
      progress!'
      ,
      Icons.fitn
      ess_cente
      r,
      Colors.gr
      een, () {
     // Navigate to Fitness Journey page (add page
       later) Navigator.push(
        context,
        MaterialPageRoute(
         builder: (context) => FitnessJournalPage(), // Make sure to import your page
        ),
       );
   },
  ),
  _buildSummaryCard(
```

```
            'Fitness Challenges',
            'Take up
            challenges!',
            Icons.directions_run,
            Colors.red,
               () {
             // Navigate to Fitness Challenges page (add
                page later) Navigator.push(
                 context,
                 MaterialPageRoute(
                  builder: (context) => FitnessChallengesPage(), // Make sure to import your page
                 ),
                );
             },
           ),
          ],
        ),
      ),
    ],
  ),
 );
}

Widget _buildSummaryCard(String title, String value, IconData icon, Color color,
 VoidCallback onTap) { return GestureDetector(
  onTap:
  onTap, child:
  Container(
     decoration: BoxDecoration( gradient:
     LinearGradient(colors: [color.withOpacity(0.8),
     color.withOpacity(0.5)], begin: Alignment.topLeft,
     end: Alignment.bottomRight,
    ),
    borderRadius:
    BorderRadius.circular(12),
```

```
      boxShadow: const [
        BoxShadow(
        color:
          Colors.black26,
          blurRadius: 10,
          spreadRadius: 2,
        ),
      ],
    ),
    padding: const
    EdgeInsets.all(16), child:
    Column(
      crossAxisAlignment:
      CrossAxisAlignment.start, children: [
        Icon(icon, size: 30, color:
        Colors.white), const
        SizedBox(height: 10),
        Text
          (
          title
          ,
          style: GoogleFonts.poppins(fontSize: 14, color: Colors.white70),
        ),
        const SizedBox(height:
        5), Text(
          value,
          style: GoogleFonts.poppins(fontSize: 20, fontWeight: FontWeight.bold, color: Colors.white),
        ),
      ],
    ),
  ),
 );
}

void _goToFoodLogPage() {
```

```
  Navigator.push(
    context,
    MaterialPageRoute(builder: (context) => FoodLogPage()),
  );
 }
 void _updateName() {
  setState(() {
    _userName = _nameController.text.isEmpty ? "User" : _nameController.text;
  });
  Navigator.pop(context);
 }
```

- **Main.dart**

```
import 'package:flutter/material.dart';
import
'package:firebase_core/firebase_core.dart
'; import
'package:provider/provider.dart';
import
'calorie_data.dart';
import
'login_page.dart';
import
'home_page.dart';

void main() async {
 WidgetsFlutterBinding.ensureInitia
 lized(); await
 Firebase.initializeApp();
 runApp(HealthBuddyApp());
}

class HealthBuddyApp extends
 StatelessWidget { @override
```

```
Widget build(BuildContext
 context) { return
 ChangeNotifierProvider(
  create: (_) => CalorieTrackerData(), // Provide CalorieTrackerData
  globally child: MaterialApp(
   debugShowCheckedModeBanner
   : false, title: 'Health Buddy',
   theme: ThemeData(
   primarySwatch:
    Colors.purple,
    scaffoldBackgroundColor: const Color(0xFFF8F4FF),
   ),

   initialRoute:
   '/login', routes: {
    '/login': (context) =>
    LoginPage(), '/home': (context)
    => HomePage(),
        },
  ),
 );
 }
}
```

- **CalorieTracker.dart**

```
import 'package:flutter/material.dart';
import 'package:provider/provider.dart';
import 'add_food_page.dart';
import 'calorie_data.dart';

class CalorieTrackerPage extends StatefulWidget {
 @override
 _CalorieTrackerPageState createState() => _CalorieTrackerPageState();
}

class _CalorieTrackerPageState extends State<CalorieTrackerPage> {
```

```
    ),
  ],
),
body: Column(
  children: [
  Padding(
     padding: const EdgeInsets.all(16.0),
     child: Column(
       children: [
         Text(
           'Daily Calorie Goal: ${calorieTrackerData.dailyGoal} kcal',
           style: TextStyle(fontSize: 18, fontWeight: FontWeight.bold),
         ),
         SizedBox(height: 16),
         Stack(
           alignment: Alignment.center,
           children: [
             SizedBox(
               width: 150,
               height: 150,
               child: CircularProgressIndicator(
                 value: calorieTrackerData.consumedCalories /
                     calorieTrackerData.dailyGoal,
                 strokeWidth: 12,
                 backgroundColor: Colors.grey[300],
                 valueColor: AlwaysStoppedAnimation<Color>(
                 calorieTrackerData.consumedCalories /
                       calorieTrackerData.dailyGoal >=
                       1
                       ? Colors.green
                       : Colors.red,
                 ),
               ),
             ),
             Column(
```

```
            mainAxisAlignment: MainAxisAlignment.center,
            children: [
              Text(
                '${calorieTrackerData.consumedCalories} kcal',
                style: TextStyle(
                  fontSize: 22,
                  fontWeight: FontWeight.bold,
                ),
              ),
              Text(
                '${((calorieTrackerData.consumedCalories /
                    calorieTrackerData.dailyGoal) *
                    100)
                    .toStringAsFixed(0)}%',
                style: TextStyle(fontSize: 16, color: Colors.grey),
              ),
            ],
          ),
        ],
      ),
    ],
  ),
),
Divider(),
Expanded(
child: Padding(
    padding: const EdgeInsets.symmetric(horizontal: 16.0),
    child: ListView.builder(
      itemCount: calorieTrackerData.foodLog.length, // Use data from provider
      itemBuilder: (context, index) {
        var foodItem = calorieTrackerData.foodLog[index];
        return Dismissible(
          key: Key(foodItem['name']),
          onDismissed: (direction) {
            calorieTrackerData.foodLog.removeAt(index);
            ScaffoldMessenger.of(context).showSnackBar(SnackBar(
```

```
            content: Text('${foodItem['name']} removed'),
          ));
        },
        background: Container(color: Colors.red),
        child: Card(
          elevation: 5,
          margin: EdgeInsets.symmetric(vertical: 8),
          child: ListTile(
            leading: Icon(Icons.fastfood),
            title: Text(foodItem['name']),
            subtitle: Text('Calories: ${foodItem['calories']} kcal'),
            trailing: Text(foodItem['time']),
          ),
        ),
      );
    },
  ),
 ),
),
Padding(
 padding: const EdgeInsets.all(16.0),
 child: FloatingActionButton(
 onPressed: () async {
    await Navigator.push(
      context,
      MaterialPageRoute(
        builder: (context) => AddFoodPage(
          onFoodAdded: (foodName, calories) {
            calorieTrackerData.addFood(foodName, calories); // Add food via provider
          },
        ),
      ),
    );
  },
  child: Icon(Icons.add),
  backgroundColor: Colors.green,
```

```
        ),
       ),
      ],
    ),
  );
}

void _setDailyGoal(BuildContext context, CalorieTrackerData data) {
  TextEditingController goalController = TextEditingController();

  showDialog(
    context: context,
    builder: (BuildContext context) {
      return AlertDialog(
        title: Text('Set Daily Calorie Goal'),
        content: TextField(
          controller: goalController,
          keyboardType: TextInputType.number,
          decoration: InputDecoration(hintText: 'Enter your daily goal (kcal)'),
        ),
        actions: [
          TextButton(
          onPressed: () {
              Navigator.of(context).pop();
            },
            child: Text('Cancel'),
          ),
          TextButton(
            onPressed: () {
              int goal = int.tryParse(goalController.text) ?? data.dailyGoal;
              data.setDailyGoal(goal); // Update goal via provider
              Navigator.of(context).pop();
            },
            child: Text('Set'),
          ),
        ],
```

```
      );
    },
  );
 }
}
```

- **Water Tracker**

```
import 'package:flutter/material.dart';

class WaterTrackerPage extends StatefulWidget {
 @override
 _WaterTrackerPageState createState() => _WaterTrackerPageState();
}

class _WaterTrackerPageState extends State<WaterTrackerPage> {
 int currentIntake = 4; // Current intake in glasses
 int dailyGoal = 8; // Daily goal in glasses

 void _addWater() {
  setState(() {
   if (currentIntake < dailyGoal) {
    currentIntake++;
   }
  });
 }

 void _resetWater() {
  setState(() {
  currentIntake = 0;
  });
 }

 @override
 Widget build(BuildContext context) {
  double progress = currentIntake / dailyGoal;
```

```
return Scaffold(
  appBar: AppBar(
    title: const Text('Water Intake Tracker'),
    backgroundColor: Colors.blueAccent,
  ),
  body: Padding(
    padding: const EdgeInsets.all(16.0),
    child: Card(
      elevation: 10,
      color: Colors.lightBlue.shade50,
      shape: RoundedRectangleBorder(
        borderRadius: BorderRadius.circular(16),
      ),
      child: Padding(
        padding: const EdgeInsets.all(16.0),
        child: Column(
          crossAxisAlignment: CrossAxisAlignment.center,
          children: [
            // Title with icon
            Row(
              mainAxisAlignment: MainAxisAlignment.center,
              children: [
                Icon(Icons.water_drop, size: 50, color: Colors.blueAccent),
                const SizedBox(width: 10),
                const Text(
                  'Hydration Goal',
                  style: TextStyle(fontSize: 22, fontWeight: FontWeight.bold, color: Colors.blueAccent),
                ),
              ],
            ),
            const SizedBox(height: 20),
            // Display current intake and goal
            Text(
              '$currentIntake / $dailyGoal glasses',
              style: const TextStyle(fontSize: 20, color: Colors.black87),
```

```
),
const SizedBox(height: 10),
// Progress bar
LinearProgressIndicator(
value: progress,
 backgroundColor: Colors.grey.shade300,
 color: Colors.blueAccent,
 minHeight: 10,
),
const SizedBox(height: 20),
// Buttons for adding water and resetting
Row(
 mainAxisAlignment: MainAxisAlignment.center,
 children: [
  ElevatedButton(
   onPressed: _addWater,
   style: ElevatedButton.styleFrom(backgroundColor: Colors.blueAccent),
   child: const Text('Add Water'),
  ),
  const SizedBox(width: 20),
  ElevatedButton(
  onPressed: _resetWater,
   style: ElevatedButton.styleFrom(backgroundColor: Colors.redAccent),
   child: const Text('Reset'),
  ),
 ],
),
const SizedBox(height: 30),
// Hydration reminder
Text(
 'Drink water regularly to stay hydrated!',
 style: TextStyle(fontStyle: FontStyle.italic, color: Colors.black),
),
const SizedBox(height: 20),
// Emoji feedback based on hydration
currentIntake < dailyGoal
```

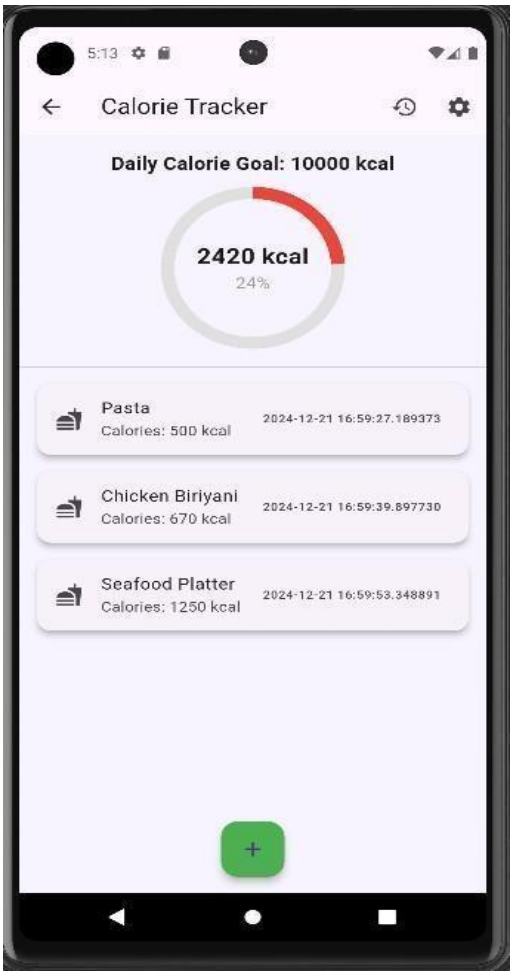
```
            ? Icon(Icons.sentiment_dissatisfied, size: 50, color: Colors.redAccent)
            : Icon(Icons.sentiment_satisfied, size: 50, color: Colors.greenAccent),
          const SizedBox(height: 30),
          // Actionable history section (could be graph or calendar)
          Container(
            width: double.infinity,
            height: 100,
            decoration: BoxDecoration(
              color: Colors.blue.shade100,
              borderRadius: BorderRadius.circular(16),
            ),
            child: Center(
              child: Text(
                'Your water intake history will appear here.',
                style: TextStyle(color: Colors.blueAccent, fontSize: 16),
              ),
            ),
          ),
        ],
      ),
    ),
  ),
 );
 }
}
```

APPENDIX-B

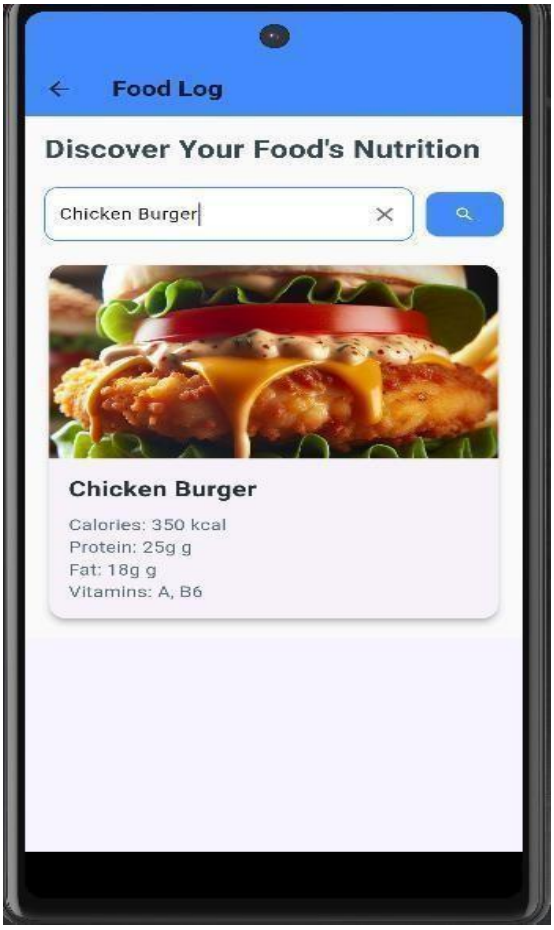
SCREENSHOTS

Homepage

Add food section



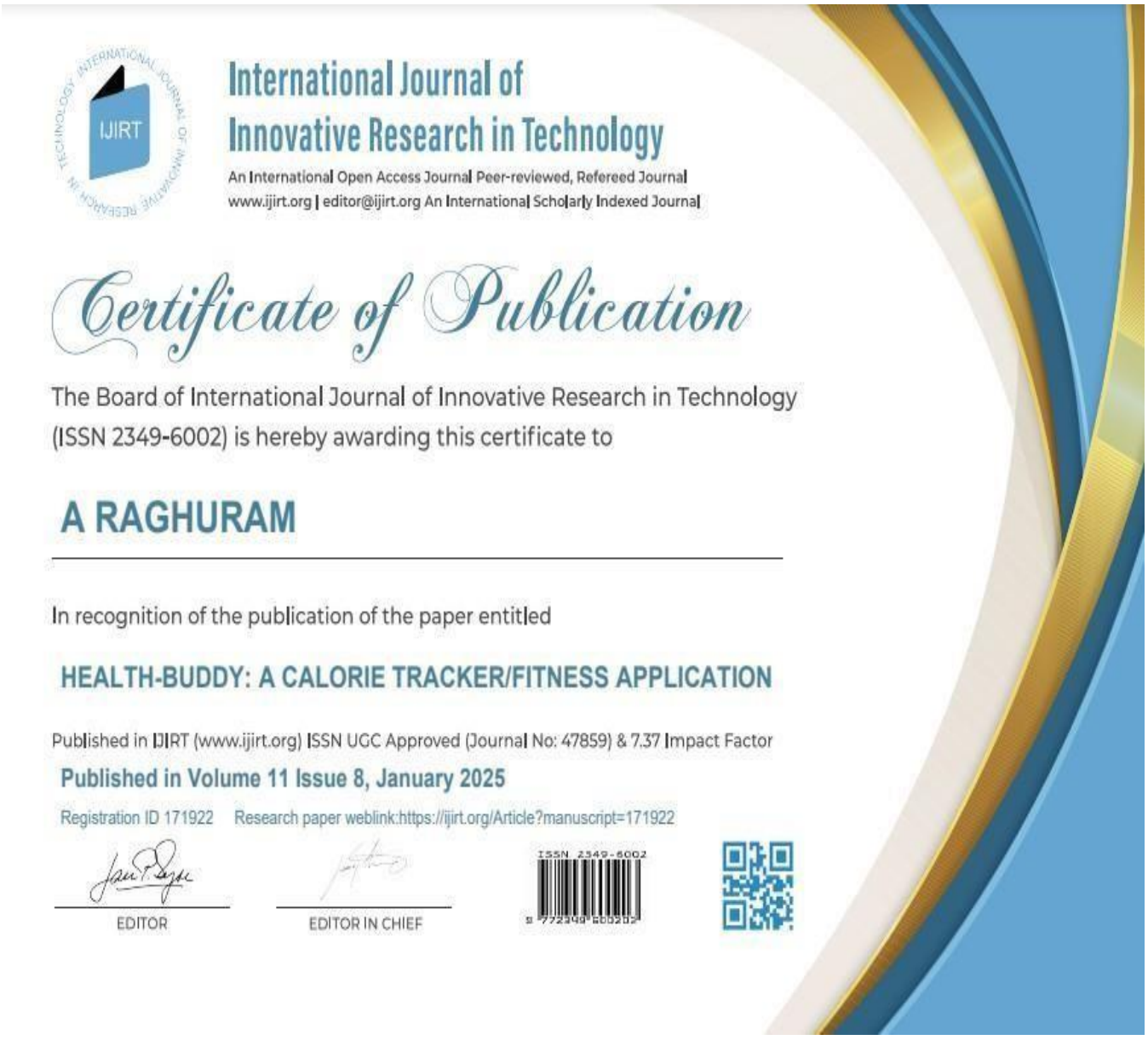
Calorie Tracker



Food log page

APPENDIX-C

CERTIFICATES



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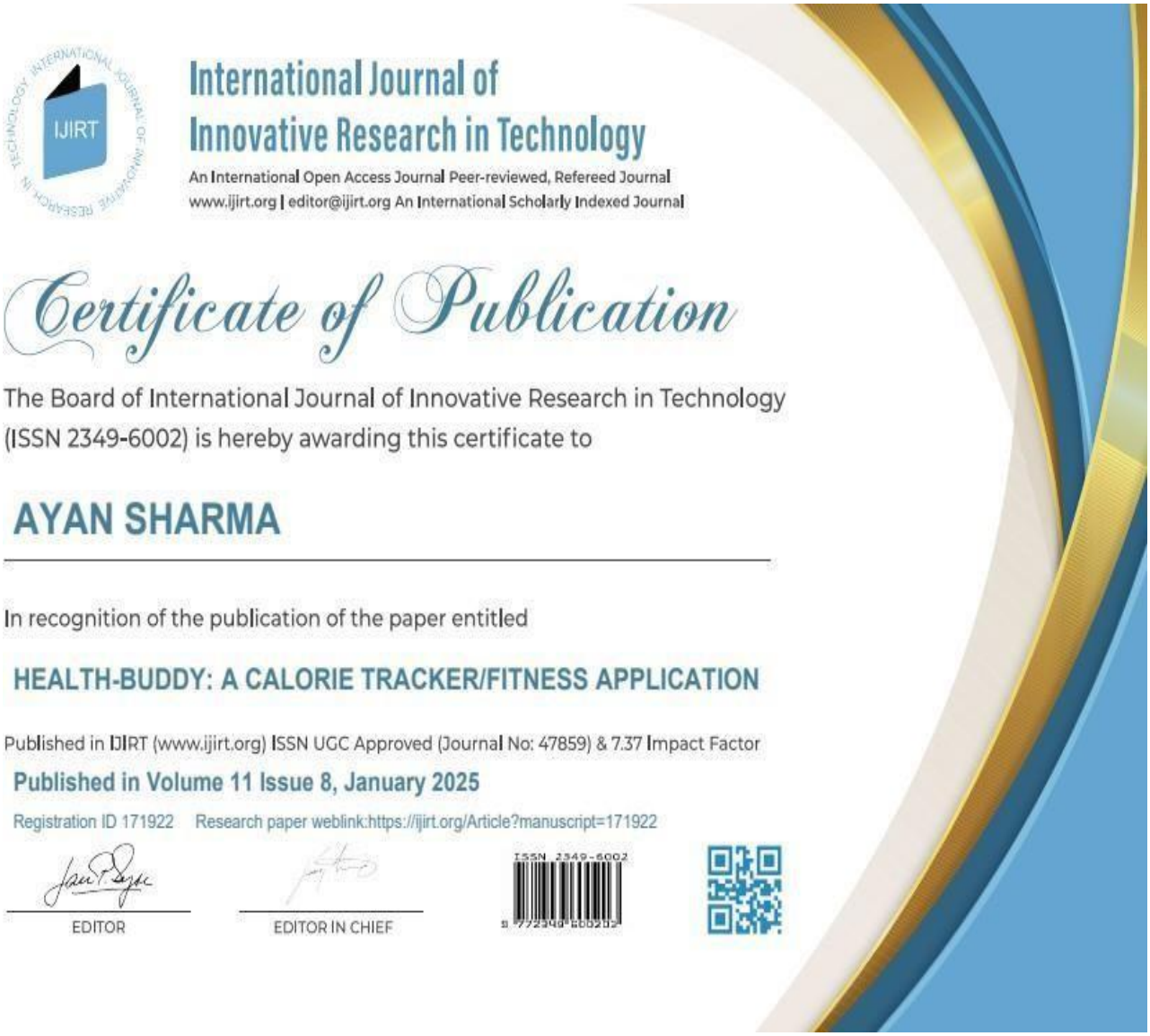

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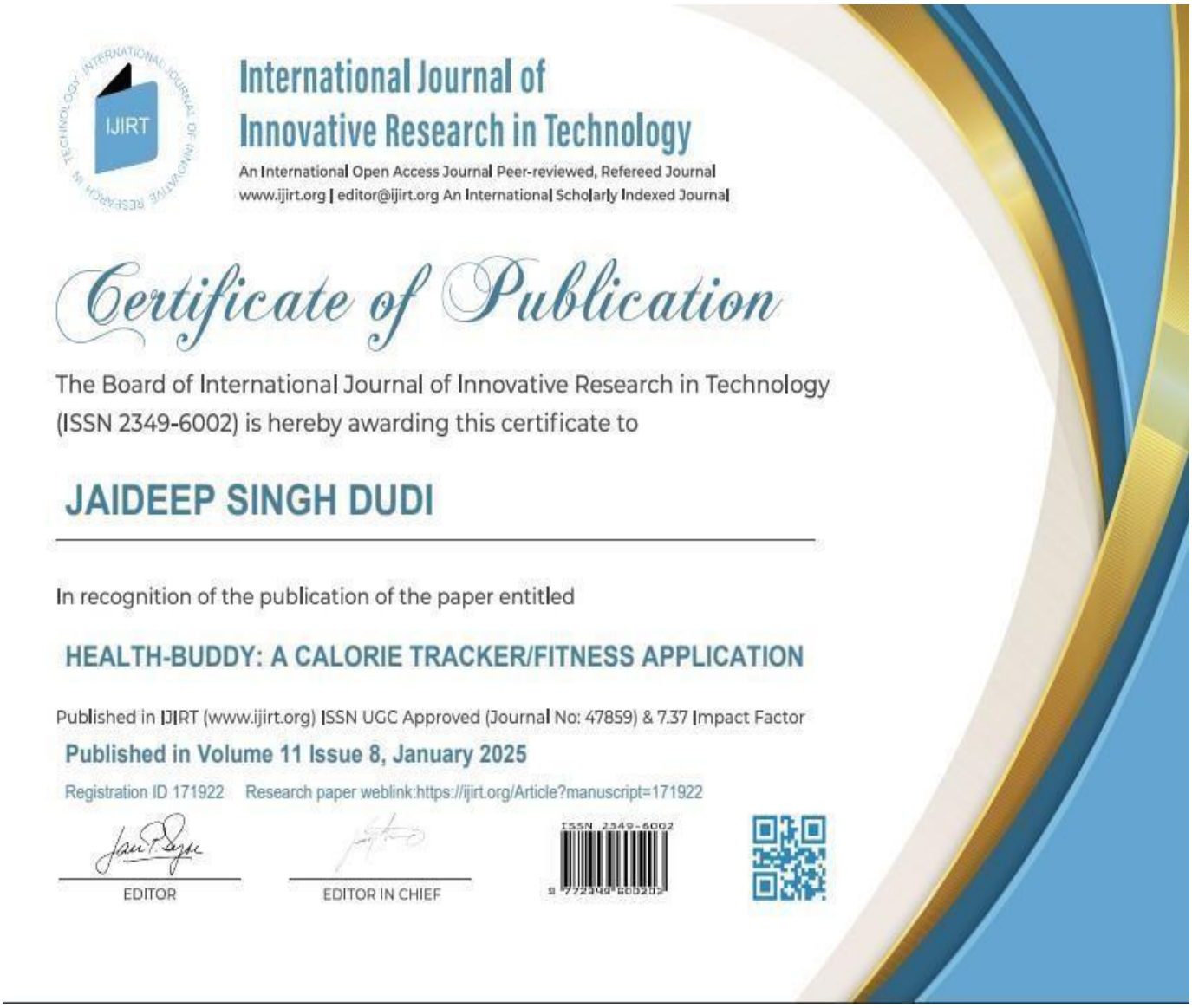

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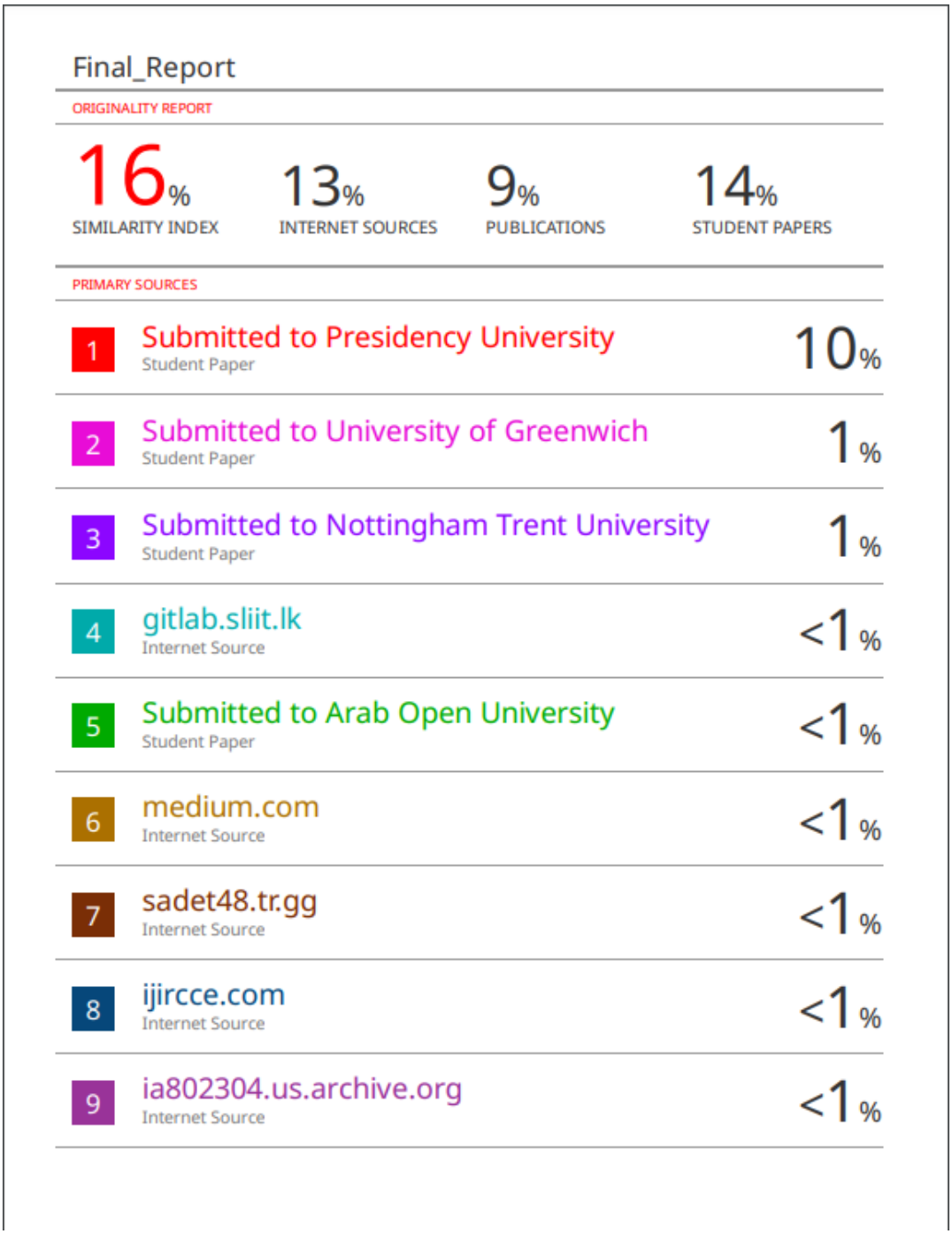

Final_Report

ORIGINALITY REPORT

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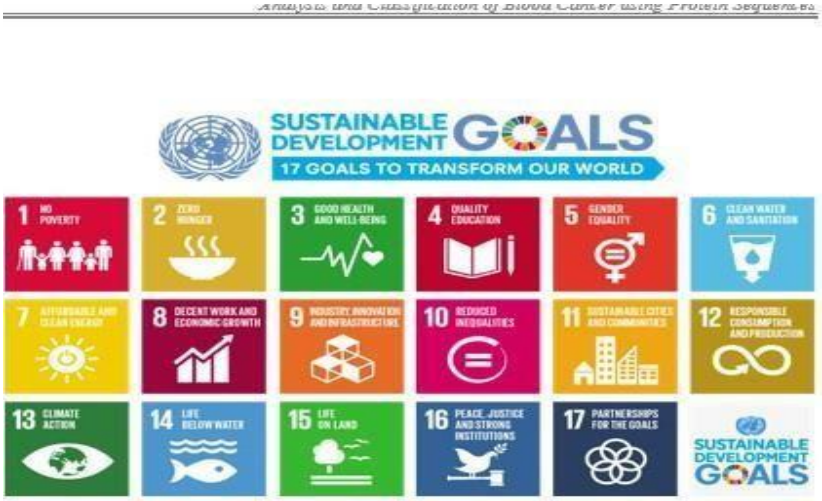
SDGs MAPPING



The Project work carried out here is mapped to SDG-3 Good Health and Well-Being.

The project work carried here contributes to the well-being of the human society. This can be used for Analyzing and detecting blood cancer in the early stages so that the required medication can be started early to avoid further consequences which might result in mortality.

- SDG 3 Good Health and Well-being

The Health Buddy app contributes to SDG 3 as it allows users to monitor their nutrition, calories, hydration, and physical activities. The app provides information on possible vitamin deficiencies and motivates users to live healthier lifestyles. This will positively impact the general well-being of users and reduce diet-related diseases. This healthy approach to life empowers users to make good decisions, leading to better long-term health outcomes.

- SDG 2: Zero Hunger

The app, therefore, contributes to achieving SDG 2, as its analysis of food intake and detection of nutritional deficiencies will inform the user on his or her dietary needs to correct imbalances and make better food choices. The role of guiding users toward balanced nutrition is to combat malnutrition, ensuring that people get the right nutrients for healthier nutrition.