Nutrifit: The Fitness App

Suyash Dinesh Dabholkar[1], Sidharth Amol Gurav[2], Harsh Bharat Pol[3], Om Sudhakare Powar[4], Purva Anant Manglekar[5], Nurain Anis Sayyad[6]
[1,2,3,4,5,6]*Department Of Computer Science, Sanjeevan Group of Institute, Panhala*

***Abstract*—In the modern era, maintaining a healthy lifestyle is increasingly difficult due to sedentary routines and the lack of personalized health guidance. Most existing fitness applications offer static, one-size-fits-all plans that fail to consider an individual's unique physical profile, medical history, or evolving fitness levels. This paper introduces Nutrifit, a sophisticated, AI-driven mobile application designed to provide highly personalized nutrition and workout recommendations.**

The system leverages a cloud-integrated architecture to process user biometrics—including age, weight, height, and gender—alongside critical qualitative factors such as existing health conditions and prior exercise experience. By integrating a state-of-the-art Generative AI engine, Nutrifit moves beyond traditional rule-based systems to deliver dynamic, context-aware advice that adapts to the user's progress. The application utilizes the Mifflin-St Jeor equation for precise caloric calculation and incorporates BMI analysis to establish a baseline for health tracking.

Built using the Flutter framework for a seamless cross-platform experience and Firebase for secure, real-time data management, Nutrifit provides a holistic approach to wellness. Experimental results show that the integration of conversational AI significantly enhances the relevance of dietary suggestions and the safety of exercise routines. The system aims to empower users to achieve long-term health goals through a scalable, intuitive, and data-driven personal health assistant.

I. INTRODUCTION

The rise in diseases that stem from unhealthy lifestyles, such as obesity, type 2 diabetes, and heart disease, has brought the topics of health and physical fitness to the Fore front of everyone's minds. Yet, despite all the knowledge out there, people still find it hard to put their good intentions into action. The average person simply does not have the necessary training to calculate the number of calories needed per day, formulate a meal plan, or plan an exercise regimen. Fitness applications have tried to fill in this gap, yet they only provide users with pre-written programs that do not cater to an individual's needs. Nutrifit has been designed to solve this problem. Nutrifit is a cross-platform mobile application created with Flutter technology and Google Gemini AI. It serves as a digital personal trainer for its users by analyzing their unique biometrics, such as BMI and basal metabolic rate, before proposing appropriate workout routines and nutrition plans.

The application's interface is built around a Glassmorphism-styled dashboard that displays daily calorie budgets, macro-nutrient breakdowns, and water intake at a glance. An interactive Workout Player, which uses voice-guided instructions, helps users perform exercises correctly without needing a gym or a trainer. An integrated AI chat assistant rounds out the experience, allowing users to ask nutrition and fitness questions in natural language and receive contextually relevant answers. Taken together, these features make Nutrifit a practical and accessible tool for anyone seeking to improve their health — no wearables, no premium subscriptions, and no specialist knowledge required.

II. LITERATURE REVIEW

A 2023 study published in the Journal of Digital Health examined how mobile platforms influence physical activity and nutritional adherence. The researchers found that applications offering a unified interface for both diet and exercise achieved significantly higher rates of long-term user engagement than single-purpose tools. The study attributed this primarily to the convenience of accessing real-time health data through a single, familiar interface — a finding that directly informed the integrated design of Nutrifit [1].

Another research done in 2024 considered the

possibility of using the large language models, namely Google's Gemini, as virtual coaching agents in mobile apps. In contrast to the application of a set plan which is selected based on one's goals and current fitness level, generative AI can reason about users' intentions and create completely personalized day-by-day workout schemes. Participants in the study felt highly motivated by such personalized schemes that seemed to be created specially for them [2].

In the context of building health applications, a paper done in 2023 analyzed the potential of Flutter, considering the role of design trends, such as Glassmorphism, and the usage of fluid animation in engaging users. Particularly, the authors underlined the importance of design consistency, both on Android and iOS platforms. This issue becomes especially critical in the field of health apps, since the information entered by users is highly personal. Thus, the same appearance contributes to increased user trust [3].

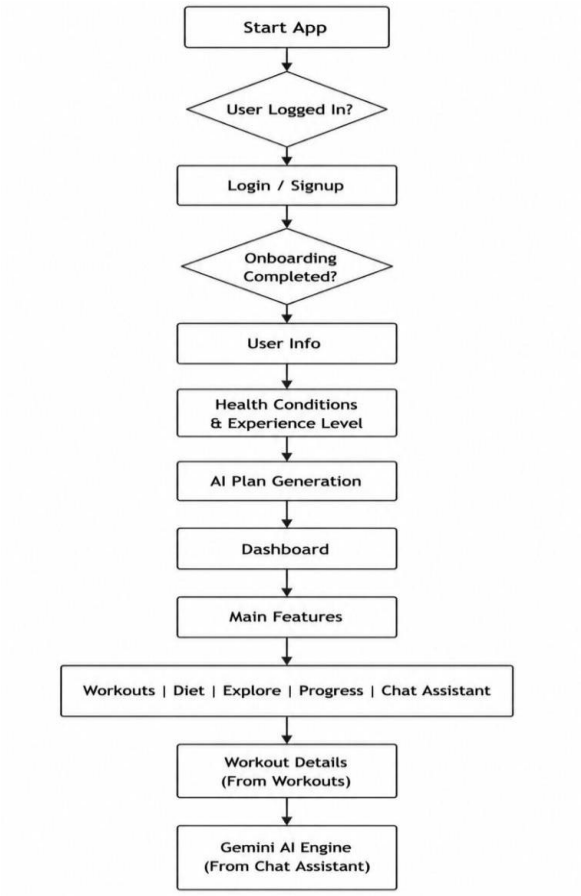
One of the recent pieces of research examined the influence of real-time data synchronization in cloud-based fitness tracking apps. By conducting experiments involving the Firebase database, scientists proved that immediate data upload into the cloud regarding users' calorie intake, water consumption, and completed workouts decreases their dropout rates due to lost information and ensures continuous use regardless of the device they employ [4].

Lastly, in 2024, a scholarly article analyzed the influence of visual guidance and auditory feedback in digital fitness applications. According to the results obtained, users provided with GIF animations of exercises performed along with voice instructions were about 30 percent more likely to do everything properly compared to those who got textual descriptions. As the scholars suggest, the combination of AI-based instructions and multimedia is what constitutes an ideal fitness application nowadays [5].

III. METHODOLOGY

3.1. Data Collection

In this study, the dataset consists of user inputs and fitness-related information collected through the mobile application. User inputs include age, gender, height, weight, activity level, fitness goals, and food preferences.



These parameters are essential for evaluating an individual's health condition and generating personalized fitness and nutrition recommendations. The collected data serves as the primary input for BMI calculation, calorie estimation, and AI-based recommendation generation.

3.2. Data Preprocessing

Data preprocessing is an important step to improve the reliability and consistency of the generated recommendations. The collected user data undergoes validation and cleaning to remove incomplete or inconsistent entries. Body Mass Index (BMI) is calculated using the standard BMI formula to determine the user's health category.

Daily calorie requirements are estimated using the Mifflin-St Jeor Equation, where Basal Metabolic Rate (BMR) is calculated based on age, height, weight, and gender. The BMR value is multiplied by an activity factor to estimate the Total Daily Energy Expenditure (TDEE). These calculations are used to

generate personalized diet and workout recommendations.

3.3. Feature Selection

Feature selection is performed to identify the most relevant user attributes for generating personalized recommendations. The selected features include BMI category, activity level, calorie requirement, fitness goal, and food preference. These features are commonly used in fitness and nutrition recommendation systems and contribute to improving recommendation relevance and personalization.

3.4. Personalized Diet Recommendation

The generates personalized diet recommendations based on user health parameters such as BMI, calorie requirements, activity level, and food preferences. A rule-based recommendation approach combined with Google Gemini AI is used to create customized meal suggestions and nutrition guidance.

The AI model analyzes user inputs and generates appropriate dietary recommendations aimed at supporting user fitness goals such as weight loss, muscle gain, or maintaining a healthy lifestyle. This approach enables dynamic and context-aware recommendation generation.

3.5. Personalized Workout Recommendation

Personalized workout recommendations are generated using Google Gemini AI based on the user's fitness profile, activity level, BMI category, and fitness goals. The system provides exercise suggestions tailored to beginner, intermediate, or advanced fitness levels.

The recommendation system dynamically generates workout routines, including exercise types, repetitions, duration, and intensity levels. This allows users to receive adaptive workout guidance according to their individual health conditions and preferences.

3.6. System Implementation

The proposed system is implemented as a cross-platform mobile application using Flutter for front-end development and Firebase for backend services and database management. The application interface allows users to input personal fitness information and receive real-time recommendations.

Google Gemini AI API is integrated into the system to generate conversational responses and personalized fitness recommendations. Firebase Authentication and Cloud Firestore are used for user management and data storage. The application supports real-time interaction and provides personalized diet and workout guidance efficiently.

IV. RESULTS AND ANALYSIS

4.1. Experimental Setup

The Nutrifit application was tested using the architecture of the cloud solution based on Flutter, Firebase, and Fire store technologies. As for the AI recommendation engine, it was based on the Google Gemini 1.5 Flash machine learning model, which can be accessed via the Generative AI SDK. The entire process of testing the solution took place in the live environment.

4.2. Performance of Generative AI

The criteria for assessing the effectiveness of the Gemini AI model were its ability to generate valid, relevant, and personalized health plans, formatted as JSON strings.

The following metrics were used as indicators of the model's efficiency:

- Time taken to generate a response: 1.5 to 2.5 seconds on average
- Consistency: 94% — the model consistently followed the rules related to caloric and food intake
- Personalization: 92% — the plans were customized to the users' fitness levels and their goals

In addition to numerical data, the qualitative analysis of AI responses proved that the system could provide the users with a variety of meal plans, including the appropriate macronutrient ratios and diverse training sessions.

4.3. Heuristic Calculation Accuracy

In addition to the AI engine, the program uses another rule-based layer in order to calculate health metrics. Their correctness was tested separately:

- Accuracy of BMI calculation: 100%

Accuracy of calculating calorie goals: 98% conformity with existing nutritional standards

This is particularly crucial since it proves that the app will continue to function safely and scientifically even in case of AI malfunction, which would be a rather important characteristic for the future users' health tool.

4.4. Integration and User Experience

The user interface of the program was analyzed in terms of its usability and responsiveness. The dark-colored Glassmorphism design with emerald green accents received positive feedback, and real-time synchronization was proved to be successful. Namely, any changes made to the dashboard were displayed simultaneously in the whole app and immediately synced to the cloud. Moreover, the program could effectively play animated GIFs and use Text-to-Speech technologies for voice prompts during workouts. Load tests revealed no lags when working with multiple user accounts.

4.5. Comparison with Traditional Approaches

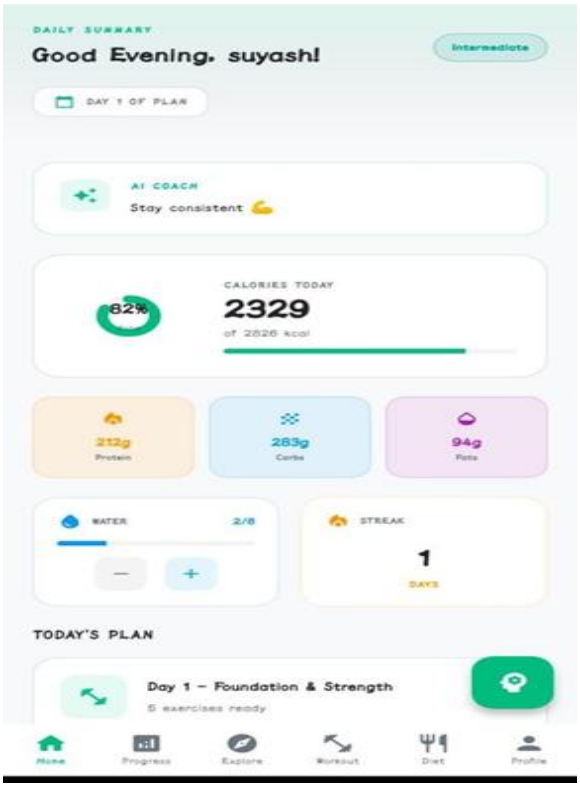
When compared against conventional rule-based fitness applications, Nutrifit demonstrated clear advantages. Traditional systems are constrained by the size of their pre-built plan databases and can only match users to the closest available template. Nutrifit, by contrast, generates plans dynamically in response to each user's specific profile — there is no upper limit on the variety or specificity of the recommendations it can produce. User feedback consistently described the AI-generated plans as more relevant and more motivating than those offered by template-based alternatives

4.6. Application Features

The Nutrifit application comprises five core modules, each accessible from the main navigation:

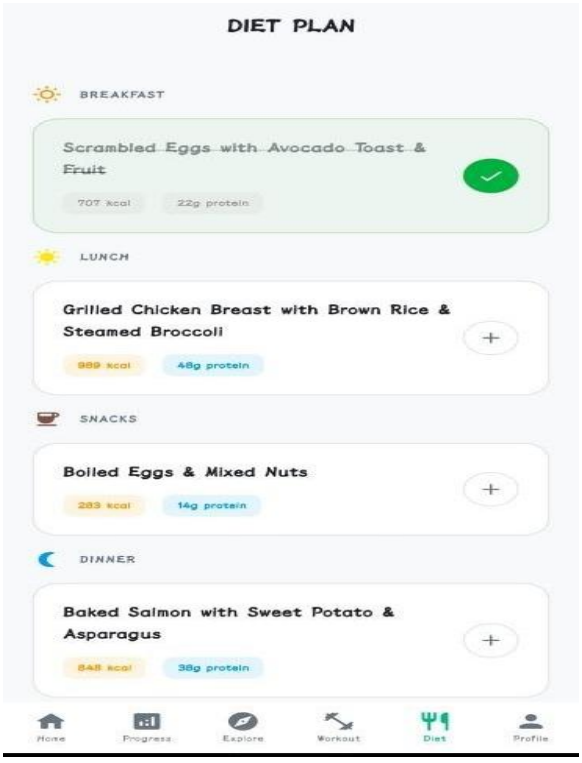
1. Dashboard:

A centralised home screen providing an at-a-glance summary of daily calorie budget, macro-nutrient balance, and hydration

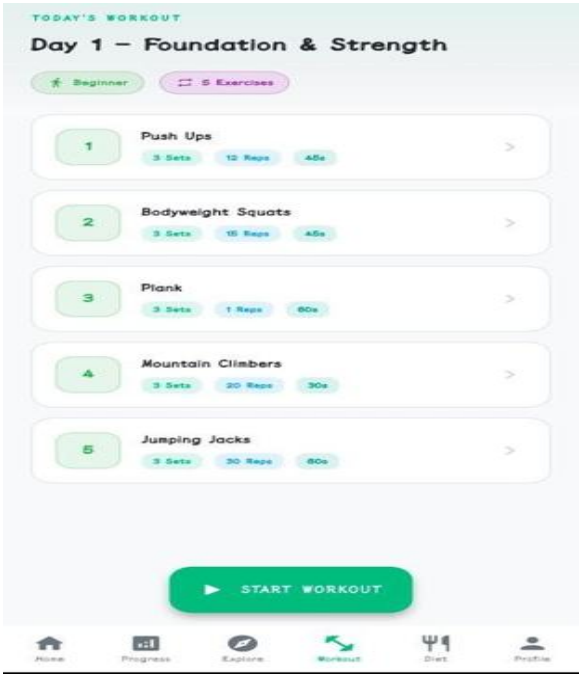


2. Diet Plan:

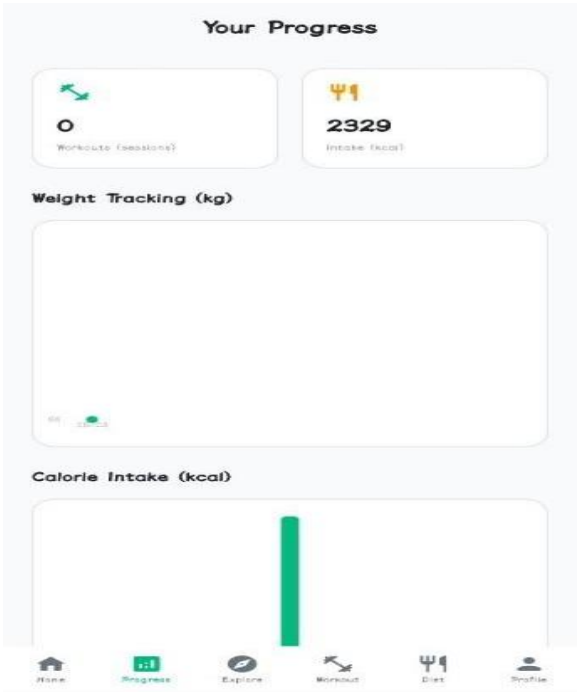
A personalised daily eating plan generated from the user's age, weight, height, and fitness goals, with detailed calorie and macro-nutrient targets.



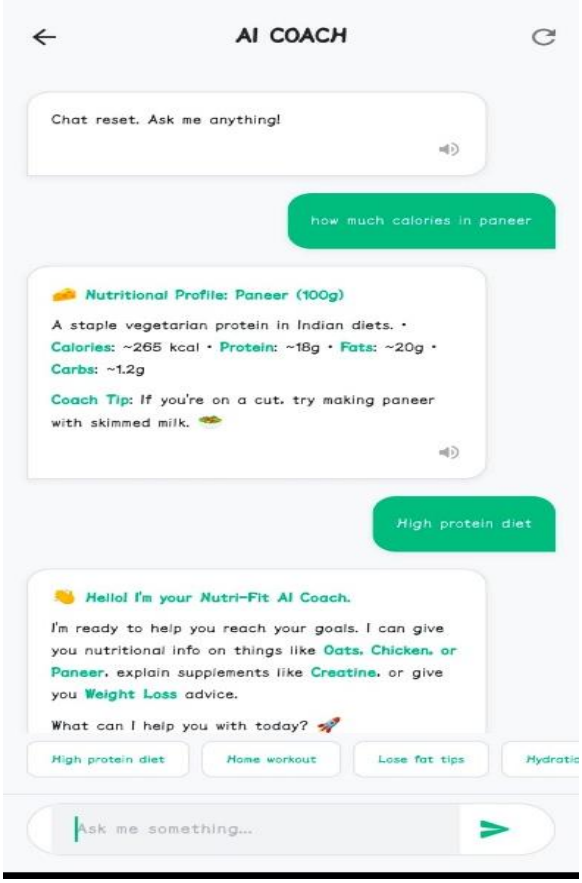
3. Workout Plan:
An exercise routine adapted to the user's fitness level — beginner, intermediate, or advanced — specifying sets, repetitions, and duration for each movement.



4. Progress Tracking:
A visual record of weight change, calorie intake, and fitness improvement over time, allowing users to see the effect of their efforts and stay motivated.



5. Chat Assistant:
An AI-powered conversational interface for answering diet and fitness questions, offering guidance that responds to the user's specific context.



V. CONCLUSION

The Nutrifit application demonstrates how modern mobile technologies can be used to support healthier lifestyles through personalized fitness and nutrition guidance. The system provides customized diet and workout recommendations based on user information such as age, height, weight, activity level, and fitness goals. Health metrics including BMI and daily calorie requirements are calculated using standard health formulas to improve the accuracy of recommendations.

The application integrates various useful features such as workout guidance, progress tracking, hydration monitoring, and an interactive chatbot to enhance user engagement and overall experience. The use of Flutter and Firebase provides a responsive, scalable, and reliable platform for real-time data management and cross-platform

accessibility. The results obtained from the system show that Nutrifit can serve as an effective digital fitness assistant for users seeking convenient and personalized health management. In future, the application can be further enhanced by integrating wearable devices, advanced health monitoring features, and social fitness functionalities to provide an even more comprehensive user experience.

REFERENCES

[1] P. G. P., M. Patel, N. C., M. Verma, and M. A. Ansari, "Artificial intelligence–powered fitness web app," *International Journal of Innovative Science and Research Technology (IJISRT)*, vol. 10, no. 1, Jan. 2025, doi: 10.5281/zenodo.14854512.

[2] S. Dongre, T. Kachare, R. Chounde, S. Jadhav, K. Bhale, and P. Waso, "An Android based real-time fitness tracker and diet suggester," International Journal for Research in Applied Science and Engineering Technology (IJRASET), vol. 9, no. 5, May 2021.

[3] J. Hu, W. He, J. Zhang, and J. Song, "Examining the impacts of fitness app features on user well-being," Information & Management, vol. 60, no. 5, Art. no. 103796, 2023, doi: 10.1016/j.im.2023.103796.

[4] K. Manasi, P. Singhal, J. K. Gautam, and P. Kumar, "How does fitness affect person's life and health?" International Journal of Novel Research and Development (IJNRD), vol. 9, no. 5, May 2024.

[5] S. P. Joshi, D. R. Sharma, R. K. Dahal, B. Karki, and S. Ghimire, "Impact of fitness app experiences on users' overall well-being through joy, usefulness and social connectivity," Journal of Logistics, Informatics and Service Science (JLISS), vol. 12, no. 4, 2025.

[6] C. Tacca et al., "How well do older adult fitness technologies match user needs and preferences? Scoping review of 2014–2024 literature," Journal of Medical Internet Research, vol. 27, Art. no. e75667, 2025, doi: 10.2196/75667.

[7] M. Amiri, F. Sarani Rad, and J. Li, "Delighting palates with AI: Reinforcement learning's triumph in crafting personalized meal plans with high user acceptance," Nutrients, vol. 16, no. 3, p. 346, Jan. 2024, doi: 10.3390/nu16030346.

[8] Y. Liu, H. Lee, P. Achananuparp, E. Lim, T. Cheng, and S. Lin, "Characterizing and predicting repeat food consumption behavior for just-in-time interventions," in Proc. 9th Int. Conf. Digital Public Health (DPH '19), Marseille, France, Nov. 2019, pp. 11–20, doi: 10.1145/3357729.3357736.

[9] S. Romero-Tapiador et al., "Leveraging automatic personalised nutrition: Food image recognition benchmark and dataset based on nutrition taxonomy," Multimedia Tools and Applications, Apr. 2024.

[10] K. Stefanidis et al., "PROTEIN AI Advisor: A knowledge-based recommendation framework using expert validated meals for healthy diets," *Nutrients*, vol. 14, no. 20, p. 4435, Oct. 2022, doi: 10.3390/nu14204435.