# Food and Calorie Tracking with BMI using Django

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**Abstract** – *The Food and Calorie Tracker website is a comprehensive platform developed with Django, designed to assist users in monitoring and managing their dietary habits. It features secure user registration and authentication, along with robust data management capabilities. Users can log their daily food intake, access detailed nutritional information, and calculate their Body Mass Index (BMI). The platform offers an intuitive interface for meal logging, viewing nutritional summaries, and tracking progress over time, all aimed at promoting healthier eating habits and enhancing overall wellness. In addition to these core features, the Food and Calorie Tracker integrates with external APIs, providing users with up-to-date nutritional data for a wide range of foods. This ensures that users have access to accurate and comprehensive information. The platform also offers personalized recommendations based on individual dietary preferences and goals, helping users make well-informed choices about their meals. With features like progress tracking and visualizations, users can easily monitor their improvements and stay motivated on their journey to better health. The website's responsive design ensures it is accessible across various devices, making it a convenient tool for managing dietary habits anytime, anywhere.*

*Keywords: Calorie Tracking, Nutritional Information, Dietary Management, Health Monitoring, BMI Tracking, APIs.*

## I. INTRODUCTION

Food and calorie tracking is a structured method for monitoring dietary intake, aimed at enhancing health and achieving specific nutritional objectives. By keeping a record of what you consume throughout the day, you can gain valuable insights into your eating patterns, make better-informed food choices, and maintain a balanced diet that meets your individual needs.

Today, many people use digital tools such as mobile apps and websites to facilitate food and calorie tracking. These tools streamline the process with features like extensive food databases, barcode scanning for easy input, and automatic nutrient analysis. Users can quickly log their meals and receive immediate feedback on calorie content and nutritional value, which helps them adhere to their dietary plans.

This practice is particularly beneficial for individuals looking to manage their weight, improve their overall nutrition, or address specific health conditions such as diabetes or hypertension. Consistent logging of food intake allows individuals to identify trends, recognize potential dietary pitfalls, and make adjustments to support a healthier lifestyle. Additionally, food and calorie tracking can aid in recognizing nutrient deficiencies or excesses, allowing users to fine-tune their diet for optimal health.

Beyond individual health benefits, this approach can foster a greater understanding of the relationship between diet and wellness, encouraging more mindful eating habits. It can also be an educational tool, helping users learn about portion sizes, nutrient density, and the impact of different foods on their bodies.

Overall, food and calorie tracking is an effective strategy for gaining control over nutritional intake, supporting long-term health and wellness goals, and promoting a more informed and conscious approach to eating. Whether for weight management, nutritional improvement, or overall health maintenance, this practice empowers individuals to make proactive choices that contribute to a healthier, more balanced life.

## II. LITERATURE SURVEY

In 2018, Benjarat Tirasirichai, Peeraya Thanomboon Pimpaknat Soontorntham, Worapan Kusakunniran "Bloom Balance: Calorie Balancing Application with scientific Validation" [1] proposed calorie counter, separated into the intake-calorie and burned-calorie counters. Calorie was calculated by using the consumed food daily and walking/running steps worked out daily. For the future work of this project, the Bloom Balance should be able to provide more types of exercises or activities, apart from walking and running. Also, the food database should be expanded.

In 2017, Nor Aziah Amirah Nor Muhammad, Chin Poo Lee, Kian Ming Lim, Siti Fatimah Abdul Razak "Malaysian Food Recognition and Calorie Counter Application" [2] explored

the idea to add auto recognition feature into a calorie counter application while identifying the challenges faced to perform recognition on Malaysian traditional food. It quickly snaps a picture and record their calorie intake. The improved system can be commercialized to specific target audiences like tourists, patients and other relevant users who would attain benefit from this system.

In 2018, Md. Nasfikur R. Khan*, W. Faarhin Durdana, Robin Roy, Gobinda Poddar, Sabrina Ferdous, A K Ehsanul Haque Mashuk "Health Guardian – A Subsidiary Android Application For Maintaining Sound Health" [3] came up with the app which notify about the calorie level in a food and monitor the amount of calorie burned after performing exercise. It provided the identification of food calories you consume. A major improvement would be to synchronize this app with more food categories, and to implement a different section of feedback or suggestion.

In 2015, Shahreen Kasim, Faten Azmira Zakaria "Daily Calorie Manager for Basic daily use" [4] approached an overview on food calories contained in most of Malaysian foods also they checked their calorie activities in order to burn out their excess calories. This application had limitations in allowing the user to add another calorie detail of foods and activities. Also suggestion box for the user to suggest the data of foods or activities to be added in the list.

In 2016, Shirmohammadi "Food calorie measurement using deep learning neural network" [5] proposed system runs on smartphones, which allow the user to take a picture of the food and measure the amount of calorie intake automatically. Further it can be increase the database of images and use the approach to test mixed food portions.

In 2016, R Pawan Sai, Suma Bapanapalle and Praveen K, Sunil MP "Pedometer and Calorie Calculator for Fitness Tracking Using MEMS Digital Accelerometer" [6] proposed system calculated the number of steps taken by the person and displaying the total distance travelled by the person. They used mathematical formula to calculate total calories and displayed on a LCD.

In 2014, P. Parisa, S. Shervin, Rana Al-Maghrabi, "Measuring Calorie and Nutrition From Food Image" [7] introduced that, the system used the built-in camera of such mobile devices and recorded a photo of the food before and after eating it to measure the consumption of calorie and nutrient components. Future work is to cover more food types from a variety of cuisines, mixed food or even liquid food.

In 2015, McAllister, H. Zheng, R. Bond, and A. Moorhead, "Semi-automated system for predicting calories in photographs of meals" [8] determined a ground truth data set by correlating weight of a food item with its area in cm2. The dataset could be plotted on a regression model and used to determine calorie content of future portions. Also it allowed users to manually draw around the food portion using a polygonal tool. The data collection process could be improved by lowering the gram increments to 5 gram portions instead of 10 grams to help increase accuracy.

In their study" Health Monitoring with Smartphone Sensors and Machine Learning Techniques," I. Kusuma, Rahul, and Shyamapada Mukheerjee [9] described a method for monitoring one's health using smartphone sensors and machine learning

Ragavarshini et al. [10] suggested an artificial intelligence-based method for using the Internet of Things (IoT) to monitor and forecast physical fitness. They investigated how to monitor fitness levels and forecast outcomes by combining IoT sensors with machine learning approaches. They used machine learning algorithms and sensor data to track and forecast health-related variables.

"TrainERAI-Live Gym Tracker Using Artificial Intelligence," created by Saleem and Nunes [11], centered on the application of AI for real-time gym tracking

In order to assess gym actions and give users individualized feedback, they used machine learning algorithms. Haleem et al. discussed" [11] Deep-LearningDriven Techniques for Real-Time Multimodal Health and Physical Data Synthesis." To enable thorough health monitoring and analysis, they used deep learning algorithms to synthesis multimodal health and physical data in real-time

In a fitness application, V. Das et al. [12] investigated the use of machine learning approaches to categorize users. Their study centered on applying machine learning algorithms to build user profiles based on behavior patterns and individual preferences

Vairavasundaram, Subramaniyaswamy, et al. [13] presented a dynamic physical activity recommendation system that uses deep learning and is 3 delivered by a mobile fitness app in 2022

By providing customized exercise suggestions based on user data, they aimed to improve the entire fitness tracking experience. Nipas, Marte, [14] et al. presented a work on estimating calories burned using supervised machine learning regression techniques in 2022

Their research aims to develop models that accurately forecast caloric expenditure based on input variables, assisting in the development of trustworthy fitness tracking gadgets. Challagundla, Yagnesh, et al.[15] 2023 examined the application of deep learning embedders and machine learning algorithms for screening citrus infections.

Their work demonstrates how machine learning can be used to evaluate and extract important information from insights of variety of datasets. Using an automated fitness tracker, Kansal, Kunal, Rudresh Sharma, and Rajinder Sandhu (2022) [16] illustrated how machine learning may be used to build complete fitness monitoring systems. Their software tracked many fitness parameters, including as caloric expenditure, to help users reach their fitness objectives.

A machine learning method for monitoring heartbeat utilizing information from several sensor streams was investigated by Hayat, Umar, et al. in 2023 [16].

A virtual dietitian was introduced in 2022 as a precision nutrition tool for gym and fitness aficionados by Garcia, Manuel B., et al. Their study highlighted the value of individualized dietary counseling in addition to fitness monitoring [17] , emphasizing the possibility for incorporating several facets of health and wellbeing into holistic apps

A study was done in 2022 by Richard Moye and colleagues [18] to determine how often HBCU students actually use smartwatches for physical activity.

According to Özdoğan, Yardımcı & Özçelik (2012) [19], the nutritional behaviors of university students are not as desired, and changing these behaviors can increase their quality of life and reduce nutrition-related health problems that may occur in the future.

s. In addition, it has also been observed that the behaviors of the same age group affect each other while forming nutritional behaviors in the young age group (Pelletier, Graham & Laska, 2014) [20].

## III. TOOLS AND TECHNOLOGIES USED

### Python:

- Python is a high-level programming language known for its simplicity and readability. It's widely used in web development for server-side logic, data processing, and scripting.

- Usage: In our website, Python likely powers the backend logic, including data processing for calorie tracking, BMI calculations, and integration with APIs.

### Django:

- Django is a high-level Python web framework that promotes rapid development and clean, pragmatic design. It follows the Model-View-Template (MVT) architecture.

- Usage: Django is used to build the backend of our website, handling requests, database interactions (like storing user data and food information), and rendering templates.

### API (Application Programming Interfaces):

- APIs define protocols and tools for building software and applications. They specify how software components should interact.

- Usage: Our website likely integrates with external API to fetch nutritional information from databases or services, enhancing the accuracy and range of data available to users.

### HTML, CSS, and JavaScript:

- Essential for structuring web content, styling its presentation, and adding interactivity to enhance user experience on your website.

- Usage: Used collectively to structure, style, and add interactivity to web pages for optimal user experience on your website.
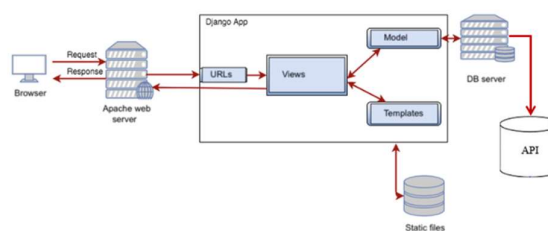


**Figure 1.** Architecture Diagram

## IV. MODULES DESCRIPTION

**User Authentication:** The User Authentication module is responsible for managing secure user access to the platform. It includes features for user registration, where new users can create an account by providing necessary details such as email, username, and password. The module also handles login functionality, enabling users to access their accounts with valid credentials. Authentication mechanisms, such as two-factor authentication (2FA) and encryption, are implemented to ensure that user data and access are protected from unauthorized access. This module is crucial for maintaining the integrity and security of the user's personalized data and settings.

**Food Logging:** The Food Logging module allows users to record their daily food intake with ease. Users can add various food items, specify portion sizes, and log the time of consumption. The system may include a searchable database of food items to facilitate quick logging, and it can allow for manual entry of custom foods. This module can also include features such as meal categorization (breakfast, lunch, dinner, snacks) and the ability to log multiple servings or composite dishes. The data collected in this module serves as the foundation for calorie and nutritional analysis.

**Calorie Tracking:** The Calorie Tracking module utilizes the data from the Food Logging module to calculate the user's daily caloric intake. It provides real-time feedback on how the logged foods contribute to the user's energy consumption, helping users to stay within their daily caloric goals. This module can also track historical data, allowing users to see trends in their eating habits over time. It may offer visual aids like charts or graphs to help users better understand their caloric intake and its alignment with their health objectives.

**Nutritional Information:** The Nutritional Information module offers detailed insights into the nutritional content of logged food items. It provides information on macronutrients, including protein, carbohydrates, and fats, as well as micronutrients such as vitamins and minerals. This module helps users understand the nutritional quality of their diet and make informed decisions about their food choices. It may include features like nutrient breakdowns, daily recommended values, and alerts for high or low intake of certain nutrients. This information is vital for users who have specific dietary goals or restrictions.

**BMI Calculator:** The BMI (Body Mass Index) Calculator module allows users to calculate their BMI using their height and weight inputs. The BMI is a widely used indicator to assess whether an individual is underweight, normal weight, overweight, or obese. This module can provide users with a clear understanding of their weight status in relation to standard health guidelines. It can also track changes in BMI over time, offering insights into how lifestyle changes are impacting their weight and overall health.

**Goal Setting:** The Goal Setting module empowers users to establish personal health and fitness goals, such as weight management, improved nutrition, or increased physical activity. Users can set specific, measurable, achievable, relevant, and time-bound (SMART) goals, which the system can help them track. This module can offer progress tracking features, motivational messages, and reminders to help users stay focused and motivated. It may also include personalized recommendations and tips to support users in achieving their goals.

**Profile:** The Profile module serves as a central hub for users to manage their personal information, preferences, and settings within the application. Users can update their details, such as name, email, and profile picture, and adjust preferences like notification settings, privacy options, and data sharing permissions. This module enhances the user experience by allowing users to customize their interactions with the platform and ensures that their data is accurate and up to date. It may also include features for managing subscriptions, viewing usage history, and accessing help and support resources.

# V. IMPLEMENTATION

A calorie is a unit used to express the amount of energy. In general, calories are used to indicate the amount of energy contained in food. Calories can be obtained from the intake of nutrients that contain nutrients, such as carbohydrates, fats, proteins, and alcohol (Boyle & Long, 2010). The Harris-Benedict method emerged from a study by James Arthur Harris and Francis Gano Benedict, published in 1919 by the Carnegie Institution of Washington. James Arthur Harris and Francis Gano Benedict are worldrenowned nutritionists, whose formulas are renowned for the completeness of the results they can achieve. HarrisBenedict is a method used to estimate an individual's Basal Metabolic Rate (BMR) and daily kilocalorie requirements. BMR is the minimum rate of energy expenditure per unit time by humans at rest. Precise measurement requires a strict set of criteria to be met. This criterion includes being in a disturbed physical and psychological state, in a neutral environment. If the BMR value is multiplied by the amount corresponding to the individual's activity level. The amount that the resulting is the recommended intake of kilocalories each day to maintain body weight. BMR affects the body's calorie burn rate and determines whether an individual will maintain, gain, or lose weight. The process in calculating calories using the Harris Benedict method is: AMB (Basal Matabolism Number) is the minimum energy requirement required by the body.

| | |
|---|---|
| Man | = 66 + (13,7 x BB) + (5 x BB) – (6,8 x U) |
| Woman | = 655 + (9,6 x BB) + (1,8 x TB) – (4,7 x U) |
| Description : BB | = weight (kg) |
| TB | = height (cm) |
| U | = Age (year) |

In addition, it is stated how to determine the needs of carbohydrates, proteins, and fats according to WHO are: 60-75% of total energy needs or residual energy needs come from protein and fat. If the energy requirement in a day is 2450 kcal, then the energy derived from carbohydrates should be 1470-1838 kcal or 368-460 grams of carbohydrates. 1015% of total energy requirement. If the energy requirement in a day is 2450 kcal, the energy derived from protein should be 245-368 kcal or 61-92 grams of protein. 10-25% of total energy needs. If the energy requirement in a day is 2450 kcal, the energy derived from fat should be 245-613 kcal or 27-68 grams.

The formula for calculating the needs of carbohydrates, proteins, and fats for adults:

**Woman**
Energy = 655 + (9,6 x Weight) + (1,8 x Height) – (4,7 x Age)
Carbohydrate = 65 % x Energy : 4
Protein = 15 % x Energy : 4
Fat = 20 % x Energy : 9

**Man**
Energy = 66 + (13,7 x Weight) + (5 x Height) – (6,8 x Age)
Carbohydrate = 65 % x Energy : 4
Protein = 15 % x Energy : 4
Fat = 20 % x Energy : 9

The purpose of this writing is to build a calorie counter application to find out familiarity in setting eating patterns and calorie intake and knowing the relevance of the *Craker* application as a medium for regulating diet and calorie intake.

# VI. APPLICATIONS

**Mobile Apps:**

**HealthifyMe:** A popular mobile app that offers users the ability to log their meals, track calorie intake, and monitor nutritional information.

**Cronometer:** A nutrition tracker app that offers detailed nutrient tracking, allowing users to log food intake and track macronutrients, vitamins, and minerals.

**Websites:**

**MyNetDiary:** A website offering detailed food logging, meal planning, and weight management tools, accessible from any device with an internet connection.

**FatSecret:** A website that allows users to track their food intake, monitor their diet and exercise, and access a community of people with similar health goals.

**Wearable Devices and Voice Assistants:**

**Fitbit**: Wearable fitness trackers that sync with a mobile app to provide real-time data on calorie expenditure, food intake, and physical activity.

**Apple Watch**: Smartwatches that integrate with the Health app to offer users the ability to track daily calorie intake, fitness levels, and receive health notifications.

**Amazon Alexa with MyFitnessPal**: Users can log food and get nutritional information using voice commands via their Amazon Alexa devices.

# VII. RESULTS WITH DESCRIPTION

**3.1.1 Login Menu Page:** The login page serves as the entry point for users to access their accounts on the Food and Calorie Tracker website. It requires users to enter their registered email address and password, ensuring secure access to personal data.
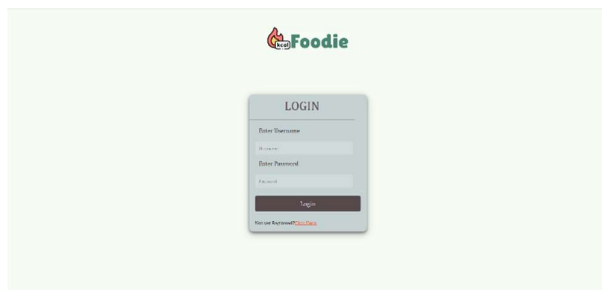


**Figure 2.** Login Page

**3.1.2 Home Page:** The home page is the central hub of the Food and Calorie Tracker website, providing users with easy navigation to key features. It includes links to the Calorie Finder, Calorie Tracker, BMI Calculator, and Profile Page. The user-friendly layout ensures quick access to all essential tools and personalized health information, facilitating seamless user interaction and efficient dietary management.
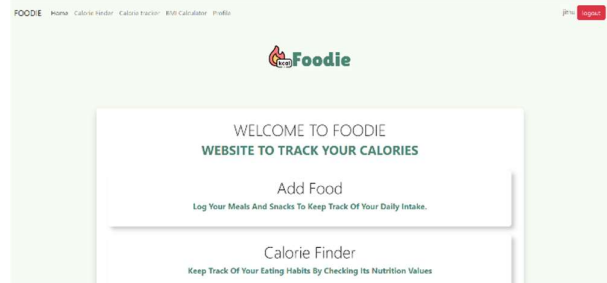


**Figure 3.** Home Page

**3.1.3 Calorie Finder Page:** The Calorie Finder page provides users with detailed calories and nutritional information for various food products. By entering the name of a food item, users can quickly access comprehensive data on calorie content, macronutrients, vitamins, and minerals. This tool aids in making informed dietary choices, supporting users in managing their nutritional intake effectively.
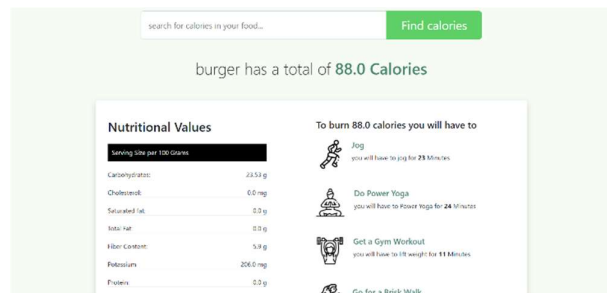


**Figure 4.** Calorie Finder Page

**3.1.4 Calorie Tracker Page:** The Calorie Tracker page allows users to log their daily food intake and monitor their calorie consumption. By entering meals and snacks, users can track their calories in real-time, helping them stay within their dietary goals. The page provides an overview of daily, weekly, and monthly calorie intake, promoting effective dietary management and healthier eating habits.
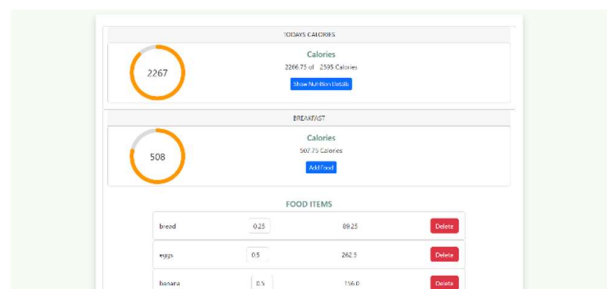
**Figure 5.** Calorie Tracker Page

**Figure 7.** Admin Page

## VII. CONCLUSION

**3.1.5 Profile Page:** The Profile Page allows users to manage their personal information and account settings. Users can update their details, view their activity history, and customize preferences. This page serves as a personalized hub, enabling users to tailor their experience and securely manage their data within the Food and Calorie Tracker website.
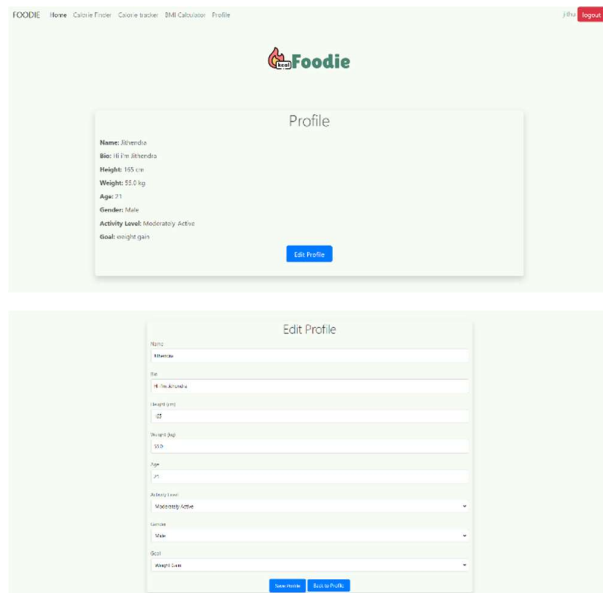


**Figure 6.** Calorie Tracker Page

**3.1.6 Admin Page:** The Admin Page offers administrators control over managing the website's food database. Administrators can add new food items, including detailed nutritional information, and delete existing entries as needed.
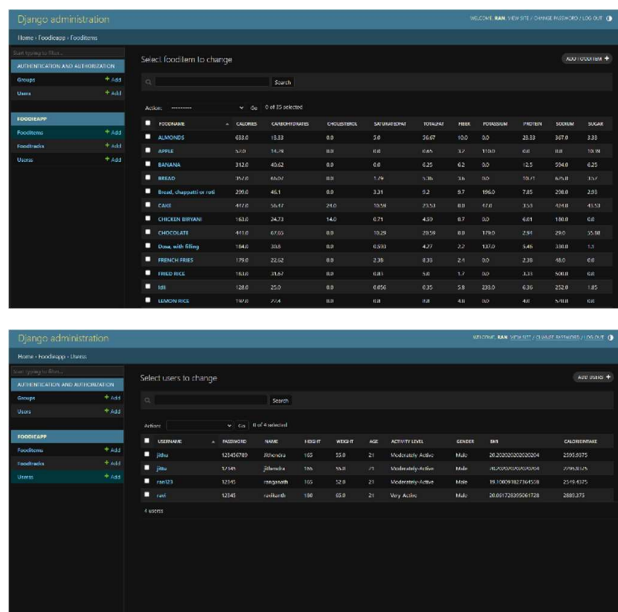


In summary, the Food and Calorie Tracker website is an invaluable resource for individuals looking to take control of their dietary habits and overall health. By offering comprehensive tools for food logging, users can easily keep track of their daily intake, while detailed nutritional information empowers them to make healthier choices. The inclusion of a BMI calculator provides an additional layer of health monitoring, enabling users to assess their weight status and make necessary adjustments. The platform's goal-setting and progress tracking features not only enhance user motivation but also provide a structured pathway toward achieving personal health and fitness objectives. This website is instrumental in fostering greater health awareness, supporting personalized nutrition management, and helping users stay on track with their wellness journeys. Through these features, the platform significantly contributes to the promotion of healthier lifestyles and improved well-being for its users.

Furthermore, the Food and Calorie Tracker website is designed to be an effective tool for users who want to improve their health through better dietary management. The platform's comprehensive approach, which includes food logging, meal planning, and detailed nutritional information, makes it an essential resource for tracking and understanding daily caloric and nutrient intake. The inclusion of a BMI calculator provides users with valuable insights into their health status, allowing for better monitoring of fitness progress. The goal-setting and progress tracking features motivate users to stay focused on their health objectives, providing a clear and structured way to achieve their targets. By simplifying the process of dietary tracking and offering critical health insights, this platform supports users in maintaining a healthy lifestyle and plays a significant role in promoting overall wellness..

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