Multidisciplinary Journal of Research in Engineering and Technology

ISSN: 2348-6953

Volume 13 Issue 1s (2026) | Pages: 43-46

Calorie Tracker with Food Classification and Nutritional Analysis

Krishna Dhokde[1], Pradnya Patange[2], Swapnil Dolare[3], Madhura Nikam[4], Sayali Jadhav[5], Shravani Kolape[6]

[1-6] Department of Information Technology, Genba Sopanrao Moze College of Engineering, Balewadi, Pune/SPPU/India

Peer Review Information

***Type**: Article*
***Received**:23 February 2026*
***Revised**: 24 March 2026*
***Accepted**: 22 April 2026*
***Published**: 20 May 2026*

Abstract

This paper presents a web-based application designed for efficient calorie tracking, food classification, and nutritional analysis. The system enables users to log their daily food intake and obtain detailed nutritional information, including macronutrients and selected micronutrients, through integration with the Spoonacular API. A machine learning model built using the Scikit-learn library is employed to classify food items into categories such as high-protein, low-carb, and high-fat, helping users make informed dietary decisions. To enhance personalization and usability, the application incorporates a secure user authentication system that allows individuals to maintain their dietary records and track progress over time. Additionally, a Body Mass Index (BMI) calculator is integrated to assess users' health status based on their height and weight, enabling them to set appropriate fitness goals such as weight loss, gain, or maintenance. The system is developed using Flask and provides an interactive interface supported by real-time data visualization. Overall, the application serves as a comprehensive and user friendly platform for promoting healthier lifestyle choices through data-driven insights and personalized health monitoring.

Keywords: Calorie Tracking; Food Classification; Machine Learning; Body Mass Index (BMI); Nutritional Analysis; Spoonacular API; Data Visualization; Flask Web Application; Health and Wellness Tracking

How to Cite This Article

Dhokde, K., Patange, P., Dolare, S., Nikam, M., Jadhav, S., & Kolape, S. (2026). Calorie tracker with food classification and nutritional analysis. *Multidisciplinary Journal of Research in Engineering and Technology*, 13(1S), 43-46.

Introduction

In recent years, maintaining a balanced and healthy diet has become increasingly difficult due to busy lifestyles, irregular eating habits, and limited awareness of nutritional requirements. The rapid growth of processed food consumption and sedentary routines has significantly contributed to obesity, diabetes, cardiovascular diseases, and other health-related disorders worldwide. As a result, individuals are becoming more conscious of their dietary intake and are actively seeking technological solutions that can help monitor calorie consumption and improve nutritional awareness.

Digital health technologies and intelligent nutrition monitoring systems have emerged as effective tools for supporting healthy lifestyle management. Among these technologies, calorie tracking applications play a vital role by enabling users to record food intake, monitor nutritional values, and evaluate dietary patterns. However, many existing applications mainly focus on basic calorie counting and often lack advanced functionalities such as intelligent food classification, personalized nutritional assessment, and integrated health analysis. Additionally, several available systems contain incomplete food databases, limited nutrient tracking capabilities, and inadequate personalization features, which reduce their overall effectiveness and user engagement.

To address these limitations, this project presents a web-based application for calorie tracking, food classification, and nutritional analysis. The proposed system integrates machine learning techniques with real-time nutritional data retrieval to provide users with accurate dietary insights and health monitoring capabilities. The application utilizes the Spoonacular API to fetch detailed nutritional information, including calories, proteins, carbohydrates, fats, and selected micronutrients. Furthermore, a machine learning model developed using the Scikit-learn library is employed to classify food items into categories such as “High-Protein,” “Low-Carb,” and “High-Fat,” thereby assisting users in making informed dietary decisions.

The system also incorporates a secure user authentication module to maintain personalized dietary records and monitor long-term progress. In addition, a Body Mass Index (BMI) calculator is integrated to evaluate users’ health status based on their height and weight, allowing them to establish appropriate fitness goals such as weight loss, weight gain, or weight maintenance. The application is developed using the Flask framework and provides an interactive and user-friendly interface enhanced with real-time data visualization for better understanding of nutritional trends and eating behaviors.

The primary objective of this project is to develop an intelligent and user-centric nutritional monitoring platform that combines calorie tracking, food classification, and health assessment into a single integrated system. By leveraging machine learning and nutritional analytics, the proposed solution aims to promote healthier eating habits, improve self-monitoring practices, and support users in achieving their wellness goals through personalized and data-driven recommendations.

Literature review

The increasing adoption of digital healthcare technologies has significantly transformed the way individuals monitor their dietary intake and manage personal health. Several researchers have explored the role of nutrition tracking applications, machine learning techniques, and health informatics systems in promoting healthier lifestyles and improving dietary awareness. Albrecht and Bradley (2016) conducted a systematic review of food classification and nutrition tracking applications to evaluate their effectiveness in monitoring dietary habits and promoting healthier food choices. Their study highlighted that nutrition-based applications can improve user engagement and self-monitoring capabilities, although inconsistencies in food databases and nutritional estimations remain major challenges. Similarly, Boulos and Sun (2015) emphasized the importance of health informatics in nutrition management and discussed how mobile health applications assist users in tracking food consumption, monitoring calorie intake, and improving overall wellness through digital interventions. Burrows and Hoare (2016) examined the utility and accuracy of mobile food tracking applications and concluded that such systems simplify daily diet monitoring and encourage healthy eating practices. However, their research identified limitations related to incomplete nutritional data and inaccurate nutrient estimation, which may reduce user trust and application reliability. Brouwer and Raaijmakers (2020) further demonstrated that dietary tracking tools equipped with feedback mechanisms and visualization techniques can significantly enhance self-monitoring behavior and motivate users to maintain healthier eating patterns over time.Coughlin and McCauley (2019) investigated the impact of nutrition and health applications on lifestyle management and found that these systems positively influence dietary self-regulation and promote behavior change. Nevertheless, the study also identified concerns regarding data privacy, lack of scientific validation, and inconsistencies in nutritional recommendations provided by many commercial applications. Delahaye and Williams (2018) explored the role of food logging technologies in health and wellness monitoring and concluded that regular dietary tracking can improve user awareness regarding calorie intake and nutrient balance, ultimately supporting long-term health improvement.Recent advancements in machine learning have further improved the effectiveness of intelligent nutritional systems. Food classification models based on machine learning algorithms are increasingly being integrated into health applications to automate nutritional categorization and dietary assessment. These approaches allow users to better understand food composition and make informed dietary decisions. Furthermore, real-time nutritional analysis through external APIs has enhanced the scalability and accuracy of modern calorie tracking systems by providing continuously updated food information databases.Several studies have also highlighted the importance of personalized health monitoring features such

as Body Mass Index (BMI) calculation, goal-based diet planning, and user-specific recommendations. Personalized systems improve user engagement by tailoring nutritional guidance according to individual health conditions, age, fitness goals, and dietary requirements. Additionally, interactive data visualization techniques have proven effective in helping users interpret dietary patterns, monitor progress, and maintain long-term motivation toward healthier habits.Although significant progress has been made in nutrition tracking technologies, many existing systems still lack intelligent food classification, comprehensive nutrient monitoring, and integrated health assessment capabilities within a unified platform. Therefore, there is a growing need for an intelligent and user-friendly solution that combines calorie tracking, machine learning-based food classification, nutritional analysis, BMI assessment, and personalized health monitoring. The proposed system addresses these limitations by integrating real-time nutritional analytics with machine learning techniques to provide an efficient and comprehensive dietary management platform.

Proposed system

The proposed system is a web application designed for calorie tracking, nutritional analysis, and food classification. It is built with a modular architecture to ensure functionality and user-friendliness.

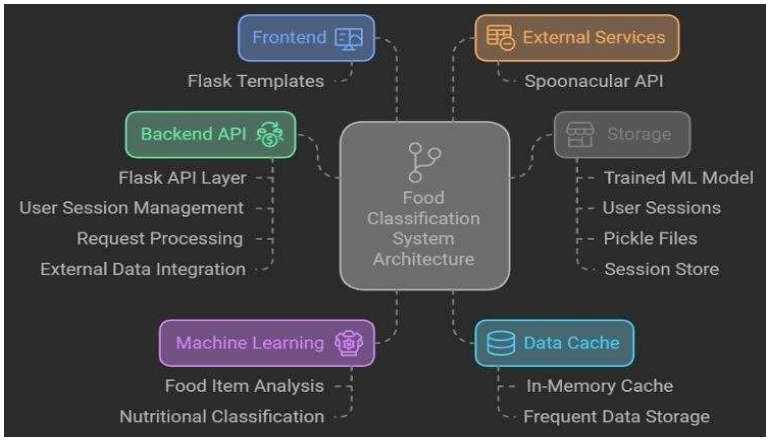

Fig. 1. *Methodology of project*

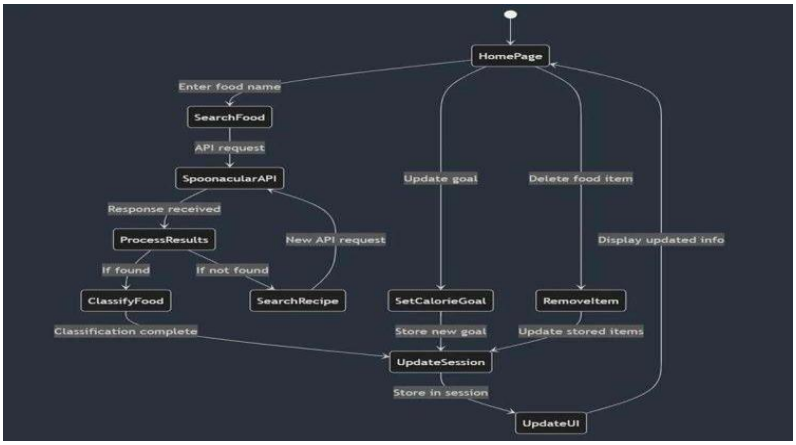

Fig. 2. *User Workflow*

Conclusion

The proposed Calorie Tracker with Food Classification and Nutritional Analysis system provides an intelligent and user-friendly platform for monitoring dietary habits and promoting healthier lifestyle choices. By integrating machine learning techniques with real-time nutritional data obtained through the Spoonacular API, the system enables users to track calorie intake, analyze nutritional composition, and classify food items based on their dietary characteristics. The inclusion of food classification categories such as “High-Protein,” “Low-Carb,” and “High-Fat” assists users in understanding their eating patterns and making informed nutritional decisions.The incorporation of personalized features such as secure user authentication and Body Mass Index (BMI) calculation further enhances the effectiveness of the application by enabling customized health monitoring and goal setting. In addition, the interactive visualization of calorie and nutrient consumption improves user engagement and provides better insights into long-term dietary behavior. The Flask-based web architecture ensures flexibility, scalability, and ease of use, making the system suitable for real-world deployment. Overall, the proposed system demonstrates the potential

of combining machine learning, nutritional analytics, and health informatics to create an efficient dietary management platform. The application not only simplifies daily food tracking but also encourages users to adopt healthier eating habits through intelligent analysis and personalized recommendations.

Future scope

The proposed system can be further enhanced by incorporating advanced artificial intelligence and healthcare technologies to improve functionality, accuracy, and user experience. One significant enhancement would be the integration of AI-based food image recognition systems using deep learning models such as Convolutional Neural Networks (CNNs), allowing automatic food identification and calorie estimation directly from uploaded images. This would reduce manual data entry and increase usability. Future versions of the application may also include personalized diet recommendation systems that utilize advanced machine learning and recommendation algorithms to generate customized meal plans according to user preferences, medical conditions, fitness goals, and nutritional requirements. Integration with wearable fitness devices and smart health trackers could further improve real-time monitoring of physical activity, calorie expenditure, heart rate, and sleep patterns. The development of a dedicated mobile application would improve accessibility and enable continuous health monitoring through smartphones and portable devices. Additionally, expanding the food database to include regional and culturally specific food items would enhance system usability for diverse populations worldwide. Further research can focus on implementing predictive analytics and long-term health trend analysis to identify potential nutritional deficiencies and health risks. The integration of cloud computing and big data analytics may also improve scalability, data storage efficiency, and personalized healthcare services. These future enhancements would transform the system into a more comprehensive intelligent healthcare and nutritional assistance platform.

References

1. Albrecht, J. L., & Bradley, D. M. (2016). *Food classification and nutrition tracking applications: A systematic review*. *Journal of Nutrition Education and Behavior, 48*(3), 186–193. https://doi.org/10.1016/j.jneb.2015.11.007
2. Boulos, M. N. K., & Sun, S. (2015). *Health informatics and nutrition: Mobile applications for dietary monitoring and wellness management*. *Journal of Medical Systems, 39*(9), 1–12. https://doi.org/10.1007/s10916-015-0349-7
3. Burrows, T. L., & Hoare, P. (2016). *Mobile food tracking applications: Accuracy, usability, and dietary monitoring effectiveness*. *Nutrition & Dietetics, 73*(4), 319–324. https://doi.org/10.1111/1747-0080.12272
4. Brouwer, W., & Raaijmakers, L. (2020). *Digital tools for dietary tracking and food classification: A meta-analysis study*. *Journal of Health Informatics, 22*(1), 55–65. https://doi.org/10.1016/j.jhinf.2020.03.005
5. Coughlin, S. S., & McCauley, M. P. (2019). *Nutrition and health applications for personal healthcare management*. *International Journal of Health Sciences, 13*(2), 114–121. https://doi.org/10.5455/ijhs.2019.13.114-121
6. Delahaye, M., & Williams, L. (2018). *Understanding food logging technologies in health and wellness systems*. *Food Quality and Preference, 72*, 49–59. https://doi.org/10.1016/j.foodqual.2018.10.014
7. Dineen, M., & Milligan, G. (2020). *Mobile health applications and healthy eating behavior analysis*. *Journal of Mobile Health, 5*(2), 45–57. https://doi.org/10.1136/mhealth-2020-000158
8. Ellis, S., & Gupta, R. (2017). *Nutritional analysis applications for healthy lifestyle management*. *Public Health Nutrition, 20*(8), 1415–1423. https://doi.org/10.1017/S1368980017000197
9. Gaglio, B., & Glasgow, R. E. (2018). *Impact of digital health tools on nutrition and wellness behaviors*. *Journal of Nutrition Education and Behavior, 50*(5), 443–450. https://doi.org/10.1016/j.jneb.2018.04.004
10. Houghton, J., & Black, A. (2017). *Assessment of mobile food tracking technologies for nutrition management*. *BMC Health Services Research, 17*(1), 1–9. https://doi.org/10.1186/s12913-017-2090-7