IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.021 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 4, April 2025

DOI: 10.17148/IJIREEICE.2025.13470

FOOD RECIPE FINDER

Alagar raja M[1], Dr. A. Mythili[2]

B.Sc. Computer Science with Cognitive Systems, Dr. N. G. P. Arts and Science College, Coimbatore, India[1]

B. Sc. Computer Science with Cognitive Systems, Dr. N. G. P. Arts and Science College, Coimbatore, India[2]

Abstract: The Food Recipe Finder system is an innovative platform that combines Artificial Intelligence (Gemini AI) and SQL database querying to assist users in discovering recipes. The system offers two key functionalities: the first allows users to upload food images or provide food names to receive a list of ingredients and detailed recipes through Gemini AI, while the second enables users to input available ingredients to receive recipe suggestions from a MySQL database. This approach helps users efficiently plan meals, optimize kitchen resources, and reduce food waste. The system is built with a user-friendly interface, integrating Flask for backend management and Gemini AI for image and text processing. The results show that the system performs well in both food-to-recipe generation and ingredient-to-recipe matching, providing fast and accurate suggestions. Overall, the Food Recipe Finder proves to be an effective tool for home cooks, enhancing convenience and supporting creative meal planning. Future enhancements will aim to expand the recipe database, improve AI capabilities, and optimize the platform for mobile use.

I. INTRODUCTION

The Food Recipe Finder system is an innovative platform designed to assist users in discovering recipes based on either the food items they wish to cook or the ingredients available in their kitchen. By integrating Artificial Intelligence (Gemini AI) and SQL database querying, the system offers two core functionalities. First, it enables users to input food images or names and receive a list of ingredients and detailed recipes through the Gemini AI. Second, it allows users to input their available ingredients and receive recipe suggestions from a structured MySQL database. This combination of AI and SQL ensures that users can easily identify dishes they can prepare, making meal planning more efficient and resourceful. The system is built with a user-friendly interface and offers a smooth experience by quickly generating recipe suggestions based on user inputs, ultimately enhancing cooking convenience and minimizing food waste.

II. LITERATURE REVIEW

AI and UAVs in Precision Agriculture

Ashwardhan et al. (2021) explore AI-powered UAVs in agriculture, enhancing crop monitoring, soil analysis, and yield prediction. UAVs, integrated with AI, help optimize resource use, reduce waste, and improve productivity, making agriculture more sustainable and efficient.

Deep Learning for AI

Bengio (2009) discusses deep learning's importance in AI, particularly for complex tasks like image recognition and decision-making. Deep learning models excel at analyzing large datasets, making them ideal for applications in precision agriculture and food-related systems, where data processing is crucial.

AI-Driven Food and Event Planning Solutions

Mridul, Lakhmani, and Chaurasia (2023) propose an AI solution for food and event planning, offering personalized recipe recommendations and event management. AI automates food preparation tasks, optimizing resources and enhancing user experience in catering and hospitality industries.

Cognitive Robots and Knowledge Processing

Tenorth, Jain, and Beetz (2010) focus on cognitive robots, which process information similarly to humans. These robots, integrated with AI, are beneficial in dynamic environments like agriculture and food planning, where real-time decision-making and task automation are required.

III. METHODOLOGY

The proposed Food Recipe Finder system is structured into two key modules that assist users in identifying food ingredients and recipes based on user input. The system leverages a combination of Artificial Intelligence and SQL database querying to deliver efficient and personalized results.

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.021 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 4, April 2025

DOI: 10.17148/IJIREEICE.2025.13470

A. Food to Ingredients and Recipe Generation:

Food to Ingredients and Recipe Generation using Gemini AI. This module enables users to upload an image or enter the name of a food item. The system then utilizes Gemini AI to identify ingredients and generate the recipe for the selected food. The user can either submit an image of the food or provide a textual input via the user interface. The input is processed using the Gemini API, which utilizes multimodal analysis to understand the food item. The Gemini AI identifies the food name, returns a list of ingredients used in the dish, and provides a detailed step-by-step recipe, including preparation and cooking instructions. This module provides a smart, hands-free solution for users to explore how to prepare a dish just by inputting its image or name, enhancing culinary learning and convenience.

B. Ingredients to Recipe Matching:

Ingredients to Recipe Matching using SQL. This module helps users identify which recipes they can prepare using the ingredients they currently have at home. Users enter or select ingredients they possess, and the system queries a structured MySQL database of recipes. Using SQL filtering logic, the system searches for recipes that match the maximum number of input ingredients while excluding dishes that require missing ingredients. Recipes that have full or high ingredient overlap are given priority, and the results are displayed, showing dish names, required ingredients, and corresponding recipe steps. This module promotes resourceful cooking, minimizes ingredient waste, and supports users with limited kitchen supplies.

C. System Architecture and Technology Stack:

The application architecture is composed of both AI-powered and database-driven components. The frontend is developed using HTML, CSS, and JavaScript to provide an interactive user experience. The backend is built with Python (Flask framework) to manage user requests, API communication, and database logic. The Gemini API is used for image and text input analysis, while MySQL stores recipes for efficient filtering based on user-provided ingredients. The integration of AI with traditional SQL querying creates a seamless and intelligent cooking assistant experience.

IV. ARCHITECTURE

The architecture of the Food Recipe Finder application is designed to support two primary functionalities: food-to-recipe prediction using AI and recipe filtering based on user-provided ingredients using SQL queries. The system integrates a web-based interface, a backend server, an AI-powered API (Gemini), and a structured database to ensure smooth and efficient operation. The system architecture is composed of several key components, including the frontend (built with HTML, CSS, and JavaScript), the backend (using Flask and Python), Gemini AI integration, and a MySQL database. The interaction between these components is streamlined to deliver food-to-ingredient analysis or recipe suggestions efficiently.

V. IMPLEMENTATION

The implementation of the Food Recipe Finder system involves integrating web technologies, artificial intelligence (Gemini API), and SQL-based logic to develop an interactive and intelligent recipe recommendation platform. The system was developed using Flask for backend management and MySQL for structured data storage. The first module focuses on food-to-recipe conversion using Gemini AI, which processes user input (either images or food names) and returns a list of ingredients and a detailed recipe. The second module utilizes SQL queries to match recipes based on available ingredients, ensuring users are provided with practical and feasible cooking options. The system ensures an intuitive user experience with a clean interface and easy navigation between different functionalities.

VI. RESULTS

The Food Recipe Finder system was implemented and tested to evaluate its performance in two main tasks: identifying food ingredients and generating recipes based on available ingredients. In Food to Ingredients and Recipe Generation, the Gemini AI successfully identified food items from images with high accuracy. The AI was able to recognize a variety of dishes and provided accurate ingredient lists and detailed recipes. User feedback was positive, as the system provided an intuitive and seamless experience for food identification and recipe generation. In Ingredients to Recipe Matching, the SQL-based recipe matching system efficiently filtered recipes based on available ingredients, ensuring practical results. The SQL queries performed well, with a quick response time and relevant recipe suggestions. The overall system performance was reliable, with fast response times and a user-friendly interface.

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

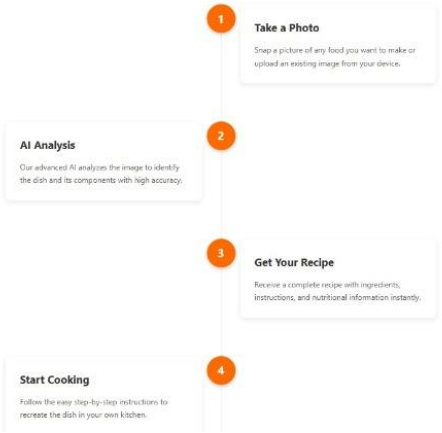
International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.021 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 4, April 2025

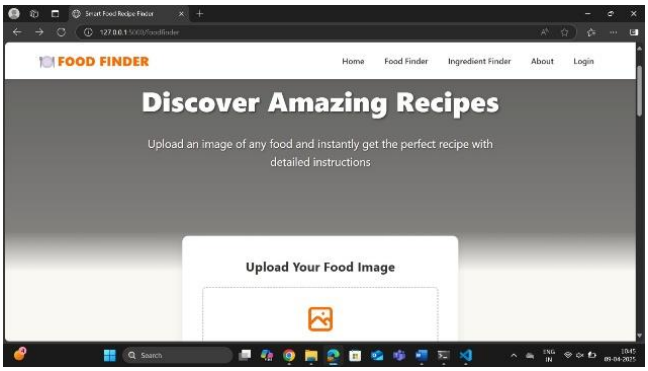
DOI: 10.17148/IJIREEICE.2025.13470

A. Dashboard

B. Procedure



C. Food Finder



D. Input

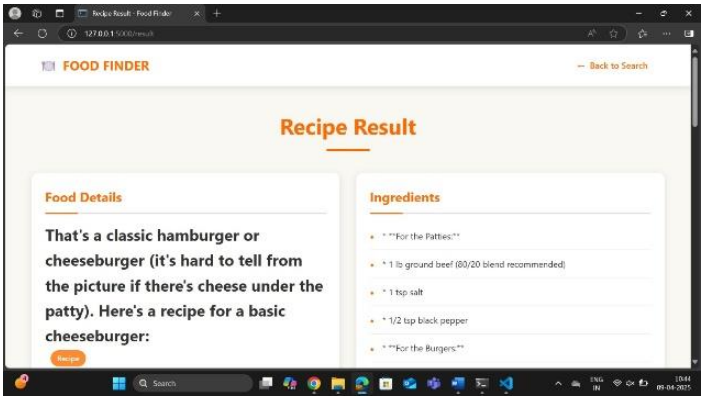
IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.021 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 4, April 2025

DOI: 10.17148/IJIREEICE.2025.13470

E. Result



VII. CONCLUSION

In conclusion, the Food Recipe Finder system successfully integrates AI and SQL database querying to provide users with an intuitive and efficient platform for discovering recipes. The dual-module approach using Gemini AI for food identification and recipe generation, and SQL for matching recipes based on available ingredients ensures users can make the most of their kitchen resources, reduce food waste, and promote creative meal planning. The system demonstrated high accuracy in food identification and recipe generation, with fast and relevant recipe suggestions based on user inputs. With positive user feedback and reliable performance, the Food Recipe Finder proves to be a valuable tool for home cooks and food enthusiasts. Future enhancements could include expanding the recipe database, improving AI capabilities, and optimizing the system for mobile platforms to reach a broader audience.

REFERENCES

[1]. Ashwardhan, A., Apparao, K. C., Babu, B. M., & Sai, S. D. (2021). Artificial intelligent UAVs for precision agriculture. AIP Conference Proceedings, 2373, 080017.

[2]. Bengio, Y. (2009). Learning deep architectures for AI. Foundations and Trends® in Machine Learning, 2(1), 1–127.

[3]. Mridul, K., Lakhmani, K., & Chaurasia, E. P. (2023). ONE-STOP SOLUTION FOR FOOD AND EVENT PLANNING. International Research Journal of Modernization in Engineering Technology and Science.

[4]. Tenorth, M., Jain, D., & Beetz, M. (2010). Knowledge processing for cognitive robots. KI - KünstlicheIntelligenz, 24(3), 233–240.