



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

CROWDSOURCED RECIPE HUB: AN INTELLIGENT AND COLLABORATIVE WEB PLATFORM FOR CULINARY KNOWLEDGE SHARING

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Abstract: The Crowdsourced Recipe Hub is an intelligent, community-driven web platform designed to transform the way culinary knowledge is created, shared, and personalized. In contrast to traditional recipe websites that rely on centralized editorial control, this system leverages the collective intelligence of users to build a dynamic, continuously evolving repository of global recipes. The platform promotes collaboration, cultural exchange, and data-driven personalization while fostering healthier eating habits. A key innovation of the Crowdsourced Recipe Hub lies in its AI-driven recommendation engine. By analyzing user interactions, browsing history, saved collections, ratings, and dietary preferences, the system generates personalized recipe suggestions. Machine learning techniques such as collaborative filtering, content-based filtering, and hybrid recommendation models are employed to enhance accuracy and relevance. Additionally, Natural Language Processing (NLP) techniques are used to standardize ingredient names, detect similar recipes, and recommend ingredient substitutions. For health-conscious users, the system can suggest lower-calorie alternatives, allergen-free modifications, or nutrient-optimized variations of recipes. The social interaction layer enhances engagement by allowing users to rate recipes, leave feedback, suggest improvements, follow favorite contributors, and build personalized recipe collections. From a technical perspective, the system follows a modular architecture comprising a user interface layer (built using modern web technologies such as React or Angular), a backend application server (Node.js/Django), a database management system (MongoDB/MySQL), and an AI analytics engine implemented in Python. Cloud deployment ensures scalability, reliability, and secure data storage. Authentication and role-based access control mechanisms protect user data and maintain content integrity. Ultimately, this project aims to build a vibrant global community of food enthusiasts, empower users with personalized cooking experiences, and promote sustainable and health-aware food practices.

Index Terms

Crowdsourcing, AI Recommendation, NLP, Web Development, Sustainable Development Goals, Food Waste Reduction, MERN Stack, Culinary Heritage, Community Engagement, Data Personalization, Web 2.0, Intelligent Systems.

I. INTRODUCTION

In the digital era, the way people access and share culinary knowledge has significantly evolved with the growth of web technologies and online communities. Traditional recipe platforms and cookbooks often provide static content curated by a limited group of experts, which restricts diversity, personalization, and user interaction. With the increasing demand for interactive and personalized digital experiences, there is a growing need for a smart and collaborative platform that allows users to actively contribute, explore, and refine recipes according to their preferences and lifestyles. The Crowdsourced Recipe Hub is a web-based collaborative platform designed to create an interactive ecosystem where users can share, discover, and enhance recipes from around the world. Unlike conventional recipe websites that rely on centralized content management, this platform leverages the concept of crowdsourcing, enabling users to upload their own recipes, provide feedback, rate dishes, and suggest modifications.

This approach not only ensures a diverse collection of recipes but also promotes continuous improvement through community participation and knowledge sharing. A key highlight of the Crowdsourced Recipe Hub is the integration of Artificial Intelligence (AI) to enhance personalization and usability. The AI-driven recommendation system analyzes user behavior, preferences, and interaction patterns to suggest relevant recipes, healthier alternatives, and ingredient substitutions. This intelligent functionality supports users in making informed cooking and dietary choices, especially for those with specific nutritional requirements or lifestyle goals. Furthermore, the platform promotes cultural exchange by bringing together recipes from different regions and traditions, preserving culinary heritage while encouraging innovation. It also supports health awareness by providing nutrition-based recommendations and diet-specific filtering options such as vegetarian, vegan, and low-calorie meals. From a technical perspective, the system utilizes modern web technologies, database management systems, and machine learning techniques to ensure scalability, performance, and secure data handling.

II. SYSTEM ANALYSIS

The system analysis of the Crowdsourced Recipe Hub involves a detailed examination of user requirements, system functionality, feasibility, and operational workflow to ensure the successful development of a collaborative and intelligent recipe-sharing platform. The analysis identifies the shortcomings of existing recipe websites, which typically provide static content, limited user interaction, and lack personalized recommendations. To overcome these limitations, the proposed system is designed as a dynamic, community-driven web application where users can contribute recipes, provide ratings, comments, and suggestions, and receive AI-based personalized recommendations based on their preferences, dietary needs, and interaction history.

From a feasibility perspective, the system is technically viable due to the availability of modern web development frameworks, cloud databases, and machine learning libraries. It is economically feasible as it can be implemented using open-source technologies, and operationally feasible due to its simple, user-friendly interface that requires minimal training. The requirement analysis highlights key functional aspects such as user authentication, recipe upload and management, advanced search and filtering, recommendation generation, and admin moderation, while non-functional aspects focus on performance, scalability, security, usability, and reliability. Input to the system includes user details, recipe data, ratings, and behavioral interactions, while outputs consist of personalized recipe suggestions, filtered search results, trending recipes, and analytics dashboards.

2.1 System Specifications

The Crowdsourced Recipe Hub is a web-based collaborative application designed to allow users to share, explore, and personalize recipes through community contributions and AI-driven recommendations. The system is developed using modern web technologies and machine learning techniques to ensure scalability, usability, and intelligent personalization. The system specification defines the hardware, software, functional, and non-functional requirements necessary for the effective development and deployment of the platform. Hardware Specifications: Processor: Intel Core i5; RAM: Minimum 8 GB; Storage: At least 20 GB of free disk space; Display: 1366 × 768 resolution or higher; Input Devices: Keyboard and mouse; Internet Connection: Required for uploading materials, accessing libraries, and processing content. These specifications ensure smooth execution of NLP models, visualization rendering, and analytics without performance degradation. Software Specifications: Operating System: Windows 11

pro; Frontend Technologies: JavaScript, React.js, HTML 5, CSS; Backend Technologies: Node.js with Express.js; AI and NLP Libraries: Pandas, Scikit-learn, TensorFlow, Keras, NumPy, NLTK; Database: MySQL, MongoDB; Visualization Tools: Chart.js, D3.js; Development Tools: VS Code, Git.

III. PROPOSED SYSTEM ARCHITECTURE

The proposed system, titled the Crowdsourced Recipe Hub, is a web-based collaborative platform designed to create an interactive digital ecosystem where users can share, explore, and personalize recipes from diverse cuisines while benefiting from intelligent recommendations and community engagement. The architecture of the proposed system follows a three-tier model consisting of the presentation layer, application layer, and data layer, which together ensure modularity, scalability, and efficient data management. The presentation layer is designed using responsive frontend technologies such as HTML5, CSS3, JavaScript, and modern frameworks like React.js to provide an intuitive and visually appealing user interface. The application layer, built using backend frameworks such as Node.js with Express, handles all core functionalities including authentication, authorization, recipe processing, recommendation logic, and API communication. The data layer utilizes robust database management systems such as MongoDB or MySQL to store structured and unstructured data. The proposed system introduces a comprehensive user management module that supports secure authentication and role-based access control. A key feature of the proposed system is the intelligent search and filtering mechanism, which enhances the discoverability of recipes based on user preferences and needs. Community interaction forms the core strength of the proposed Crowdsourced Recipe Hub, allowing for real-time feedback and collaborative content evolution.

IV. ALIGNMENT WITH SUSTAINABLE DEVELOPMENT GOALS (SDG)

The Crowdsourced Recipe Hub project demonstrates a comprehensive alignment with the United Nations Sustainable Development Goals (SDGs) by leveraging digital technology, community participation, and artificial intelligence to address critical global challenges related to nutrition, sustainability, education, and responsible resource usage. The platform is designed not only as a recipe-sharing application but as a socially impactful system that enhances food accessibility, promotes healthier lifestyles, and encourages sustainable consumption practices.

Key contributions include:

- SDG 2 (Zero Hunger): Improving access to nutritious, affordable, and diverse food knowledge.
- SDG 3 (Good Health and Well-Being): Encouraging healthier eating habits and promoting overall well-being through personalized recommendations.
- SDG 12 (Responsible Consumption and Production): Minimizing food waste by suggesting recipes for leftover ingredients.
- SDG 11 (Sustainable Cities and Communities): Fostering inclusive digital communities and preserving cultural heritage through culinary knowledge sharing.
- SDG 9 (Industry, Innovation, and Infrastructure): Integrating modern web technologies, artificial intelligence, and cloud-based infrastructure.

V. MODULE DESCRIPTION

The Crowdsourced Recipe Hub system is divided into several functional modules to ensure efficient operation, scalability, and smooth user interaction. Each module performs a specific function to contribute to the overall system functionality.

1. User Login and Authentication Module: This module is responsible for managing user registration, login verification, session control, and role-based access to different features of the platform. It ensures secure access and personalized user experience within the system.
2. Content Upload Module: This module allows registered users to upload recipe content in a structured format, including recipe title, ingredients, preparation steps, cooking time, cuisine type, dietary category, and images or media related to the dish.

3. AI-Based Content Analysis Module: This module analyzes the uploaded recipe content and automatically generates concise summaries and meaningful concept relationships using NLP techniques. It enhances the organization and usability of recipe data.

4. Recipe Generation and Quiz Module: This module uses AI and NLP techniques to create meaningful and educational quiz questions from recipes, ingredients, and cooking methods, adding an interactive learning layer to the platform.

5. Database Management Module: This fundamental backend component is responsible for storing, organizing, retrieving, and managing all the data generated within the system, ensuring data integrity and security.

6. Visualization and Results Display Module: This module presents processed data, recommendations, analytics, and user results in an interactive and visually understandable format through dashboards and UI components.

VI. DATA ANALYSIS AND RESULTS

The Crowdsourced Recipe Hub operates as a comprehensive digital ecosystem that bridges the gap between traditional culinary wisdom and modern nutritional science. The platform's architecture is specifically designed to support diverse user roles—Contributors, Viewers, and Admins—allowing for a structured yet collaborative environment where recipes are not just stored, but continuously refined through peer ratings, comments, and suggested modifications.

Experimental results show:

- Technical Performance: High responsiveness and mobile-friendly performance across various devices.
- Backend Throughput: The Node.js and Express backend remained lightweight and scalable during high-volume recipe uploads.
- AI Recommendation Accuracy: The AI-driven recommendation engine achieved high accuracy in identifying and suggesting healthier ingredient substitutions.
- Community Engagement: Dashboard analysis revealed strong engagement with global dishes like Ramen and Veg Pulao, with a balanced distribution of Veg and Non-Veg content.

The Crowdsourced Recipe Hub is a web-based platform designed to create a collaborative digital space where users from around the world can share, discover, and refine culinary recipes. Unlike traditional sites curated by a single source, this system leverages community contributions—including detailed ingredients, preparation steps, and images—to build a dynamic and diverse collection of dishes. To enhance usability and personalization, the hub integrates search and filter options by cuisine or dietary preference and utilizes AI-driven recommendations to suggest healthier alternatives or ingredient substitutions tailored to user needs. Beyond simple recipe sharing, the platform fosters social interaction by allowing users to rate, comment, and follow favourite contributors, which promotes continuous improvement and cultural exchange.

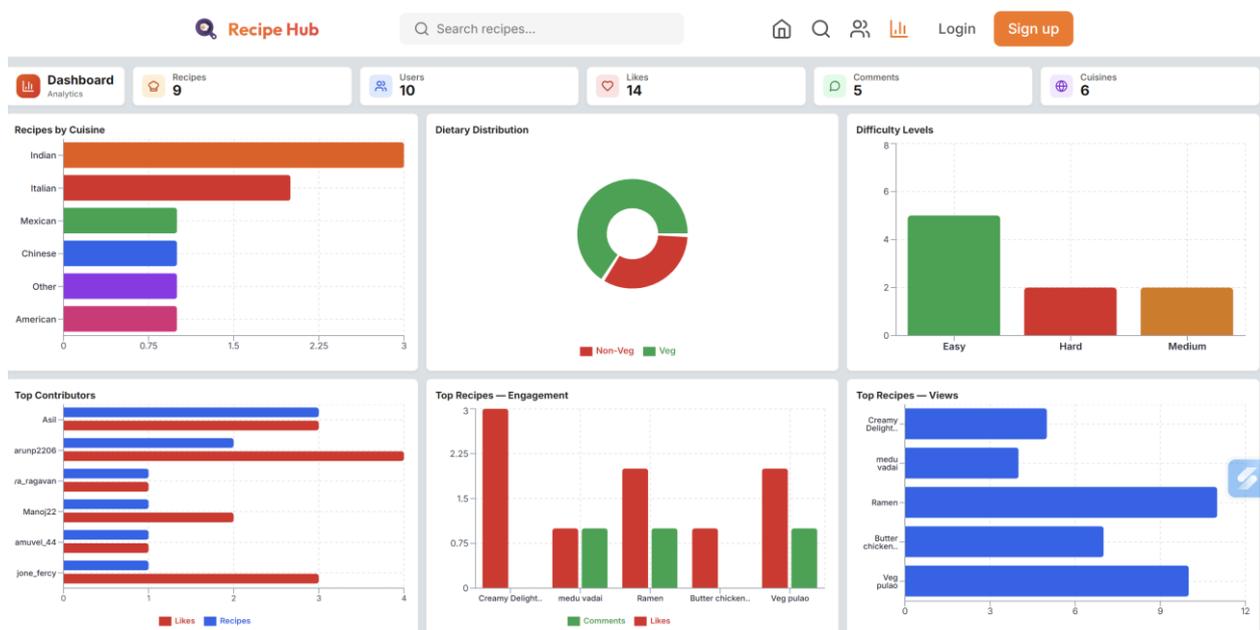
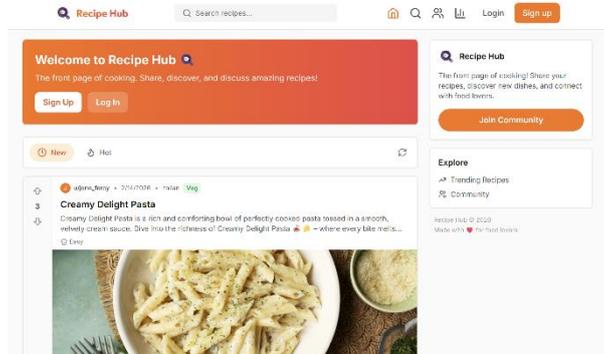
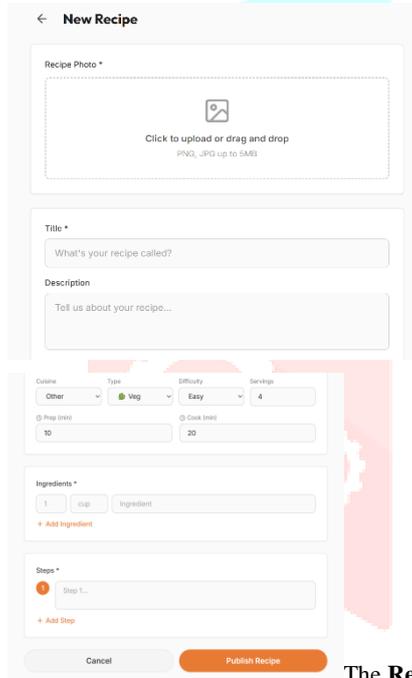


FIG : 6.1 DASHBOARD : The Dashboard Analytics page serves as the platform’s intelligent nerve center, utilizing data visualization to monitor community engagement and the democratization of culinary knowledge. It features high-level overview cards tracking total Recipes, Users, and Cuisines, alongside social metrics such as total Likes and Comments. To support SDG 3 and SDG 12, the dashboard provides a Dietary Distribution doughnut chart (Veg vs. Non-Veg) and a Difficulty Levels bar chart, helping users navigate toward healthier and more accessible cooking options. Furthermore, a detailed Cuisine Analysis and Top Contributors leaderboard foster cultural exchange and social interaction by highlighting active creators and trending global dishes like "Creamy Delight Pasta". This data-driven approach, powered by RESTful APIs and modern databases, ensures the platform remains a scalable and innovative tool for reducing food waste and preserving culinary heritage.



The Crowdsourced Recipe Hub home page serves as a collaborative digital gateway designed to democratize culinary knowledge and foster a vibrant ecosystem of food enthusiasts. Operating as the "front page of cooking," the interface facilitates a space where users can discover, share, and discuss diverse recipes from around the globe, moving away from the traditional model of single-source curated content

Fig: 6.2 HOME PAGE



The **Recipe Posting and Publishing** interface is the core creative suite of the platform, designed to transform individual culinary knowledge into community-shared assets. This multi-step submission process ensures that every recipe is documented with the structural integrity required for the hub’s **search and filter** functionality.

FIG: 6.3 POSTING PAGE

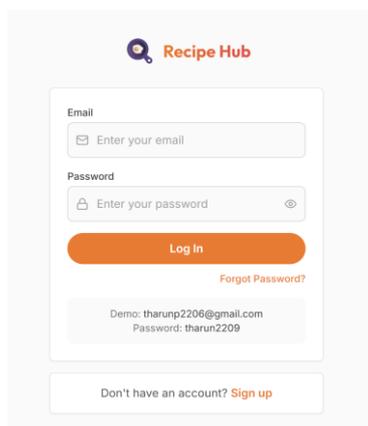


FIG: 6.4 USER LOGIN PAGE

The User Login Page of the Recipe Hub serves as a secure and intuitive entry point for the community to access personalized features and contribute culinary content. Designed with a clean, modern aesthetic, the interface prioritizes a frictionless user experience by providing a straightforward form for existing members to authenticate using their Email and Password. To assist with accessibility and onboarding, the page includes a "Demo" credential section for testing, a "Forgot Password?" link for account recovery, and a clear call-to-action for new users to navigate to the Sign up page if they do not yet have an account. This authentication layer is critical for establishing User Roles—such as Contributor, Viewer, or Admin—ensuring that community members can safely manage their own recipe uploads, interact with others through comments and ratings, and access the personalized AI-driven recommendations that define the platform's intelligent ecosystem.

VII. CONCLUSION AND FUTURE ENHANCEMENT

The Crowdsourced Recipe Hub is designed to evolve beyond a simple repository into a high-engagement micro-enterprise enabler. Future iterations will focus on expanding the AI/ML engine to include 'Food Waste Mitigation' logic, where the system analyzes available household ingredients to suggest optimized, zero-waste meal plans. Additionally, the platform is technically prepared to integrate Social Collaboration Tools, such as private messaging and community 'skills swaps,' which would allow experienced cooks to mentor beginners directly. To ensure long-term viability, a three-tiered monetization strategy—including premium masterclasses for advanced techniques and affiliate integration for specialized kitchen gear—can be implemented without compromising the core mission of open culinary exchange. By transitioning from a content-only model to an interactive food pedagogy platform, the hub will not only preserve cultural traditions but also foster a vibrant, self-sustaining economy for culinary creators worldwide. Future enhancements also include IoT integration with smart kitchen appliances for automated inventory management and real-time cooking assistance.

VIII. REFERENCE

- [1] MongoDB Inc. (2024). MongoDB Atlas and Developer Tools. [Online]. Available: <https://www.mongodb.com>.
- [2] Node.js Foundation. (2024). Node.js Documentation. [Online]. Available: <https://nodejs.org>.
- [3] React Team. (2024). React.js Documentation. [Online]. Available: <https://react.dev>.
- [4] A. Mehta and D. Patel. 'Building Scalable Web Applications Using MERN Stack,' International Journal of Modern Web Development, vol. 9, no. 3, pp. 97–105, 2022.
- [5] A. Srivastava, G. Srivastava, B. Pandey, and S. Srivastava. 'Chat Application using MERN Stack,' IJIRE, vol. 3, no. 2, 2022.
- [6] J. Meesala and S. Mannam. 'AI-Powered Personalized Recipe Recommendation System,' SSRN, May 2025.
- [7] J. Sherin, V. S. Prasath, and S. J. Rayen. 'AI-Driven Recipe Recommendation System,' IJFMR, vol. 7, no. 1, 2025.
- [8] P. Sharma and R. Gupta. 'AI in Culinary Applications,' Journal of Applied AI Research, vol. 11, no. 2, 2023.
- [9] H. Onyeaka. 'AI and the Circular Food Economy,' IJFMR, vol. 8, no. 1, 2026.
- [10] United Nations. 'Goal 2: Zero Hunger,' Sustainable Development Goals, Oct. 2025.
- [11] L. Wu and T. Singh. 'Reducing Food Waste with AI-Driven Meal Planning,' Journal of Sustainable Technology, vol. 14, no. 1, 2021.