SmartChef – A Smart Recipe Suggestion App

A PROJECT REPORT

Submitted by

ANISHA S	**22BCS008**
ASFIYA MEHRUNNISHA H	**22BCS013**
KRITTIKA V	**22BCS053**
NAFILA FATHIMA N	**22BCS069**

In partial fulfillment for the award of the degree

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BACHELOR OF

ENGINEERING IN

COMPUTER SCIENCE AND ENGINEERING

KUMARAGURU COLLEGE OF TECHNOLOGY

Saravanampatti, Chinnavedampatti (Post), Coimbatore- 641049, Tamil Nadu.

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Accredited by NBA and NAAC with 'A++' Grade | Approved by

AICTE

APRIL 2025

BONAFIDE CERTIFICATE

Certified that this project report titled **"SmartChef – A Smart Recipe Suggestion App"** is the bonafide work of **Anisha S, Asfiya Mehrunnisha H, Krittika V, and Nafila Fathima N**, who carried out the project work under my supervision. The project has been developed as part of their academic curriculum in the Department of Computer Science and Engineering at **Kumaraguru College of Technology, Coimbatore**.

The project focuses on utilizing web technologies like the MERN stack and Bootstrap to build a smart, user-friendly application that suggests recipes based on available ingredients. It also provides features such as pantry management, a weekly meal timetable generator, and user interaction modules, aiming to reduce food waste and simplify daily meal planning.

SIGNATURE
Mr. MANOJ K – SUPERVISOR
Assistant Professor,
Department of Computer Science and Engineering,
Kumaraguru College of Technology,
Coimbatore - 641049.

Certified that the candidates were examined by us in the Project presentation viva voce examination held on _____ at Kumaraguru College of Technology, Coimbatore - 641049.

INTERNAL EXAMINER

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SmartChef – A Smart Recipe Suggestion App

1. Introduction

In an era dominated by digital transformation and smart living, individuals are constantly seeking intuitive solutions to simplify their daily routines. Among these, food planning and meal preparation stand out as crucial yet time-consuming tasks. With the increasing reliance on technology, there is a rising demand for intelligent systems that can aid in efficient kitchen and grocery management. This demand becomes even more significant in households with busy schedules, where deciding what to cook can become a daily challenge.

The **Smart Recipe Suggestion App** is designed to revolutionize the way users approach cooking by making it easier, more efficient, and waste-free. Built using the MERN (MongoDB, Express.js, React.js, Node.js) stack and styled with Bootstrap for responsiveness and user-friendly design, the application allows users to input available ingredients and receive recipe suggestions, particularly focusing on Indian cuisine.

This app not only caters to individual taste preferences and dietary restrictions but also incorporates pantry management and meal scheduling. The **Pantry Tracker module** enables users to maintain a digital inventory of their kitchen supplies, while the Timetable Generator helps them plan their meals for the week based on their pantry stock, enhancing both time and resource management.

Moreover, the platform includes essential features such as secure login/signup authentication, a Contact page for support, and a Review section to collect user feedback—making the app robust, interactive, and scalable.

2. Purpose

The purpose of this project is to develop a smart, user-centric application that simplifies the cooking process by suggesting recipes based on available ingredients and managing pantry inventory.

Key motivations include:

- Reducing daily decision fatigue by helping users quickly find what to cook.
- Minimizing food waste by recommending recipes with existing ingredients.
- Improving organization in the kitchen through digital inventory tracking.
- Assisting users in maintaining consistent and healthy eating habits via meal planning.
- Offering a platform that is inclusive, efficient, and easy to navigate, even for non-tech-savvy users.

By addressing these common household pain points, the Smart Recipe Suggestion App serves as a virtual kitchen assistant aimed at promoting smarter living.

3. Objective

The primary objectives of the Smart Recipe Suggestion App are as follows:

- **Recipe Suggestion Engine:** To provide recipe suggestions dynamically based on user-inputted ingredients, ensuring the best utilization of available resources.
- **Pantry Management:** To allow users to maintain an up-to-date list of available items in their kitchen, stored securely in a cloud database.
- **Timetable Generation:** To generate customizable weekly meal plans using pantry data and user preferences.
- **User Authentication:** To offer secure login and signup functionality for maintaining personalized data.
- **User Experience:** To deliver a responsive and easy-to-use interface that enhances user engagement and reduces complexity in food planning.
- **Scalability and Flexibility:** To build a scalable architecture that can be easily extended to accommodate additional features such as voice input, shopping list creation, or dietary filters in future updates.

4. System Overview

- The Smart Recipe Suggestion App is a web-based solution developed using the MERN stack (MongoDB, Express.js, React.js, Node.js) and styled with Bootstrap. It helps users find Indian recipes based on available ingredients, manage pantry items, and generate weekly meal timetables.
- The system includes modules for ingredient-based recipe suggestions, pantry tracking, timetable creation, contact & review, and user authentication. All data is stored in a MongoDB database with separate collections for users, recipes, and pantry items.
- Designed with a clean, responsive interface and secure backend, the app offers a smart, convenient way to plan meals and reduce food waste.

5. Tech Stack Used

The development of the Smart Recipe Suggestion App utilizes a modern and efficient tech stack, ensuring smooth performance, scalability, and a seamless user experience. The major technologies used are:

- **Frontend:**
    - **React.js:** A JavaScript library for building dynamic and responsive user interfaces using reusable components.
    - **Bootstrap:** A CSS framework used for responsive design and user-friendly UI components.

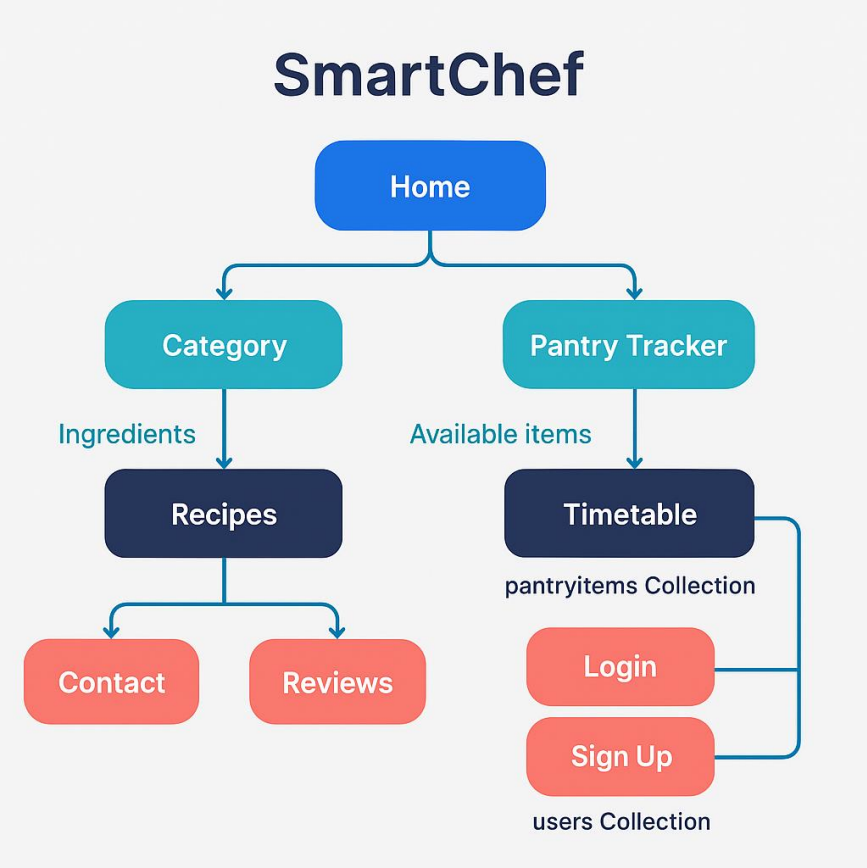
- **Backend:**
    - **Node.js:** A runtime environment that allows JavaScript to be run on the server side.
    - **Express.js:** A lightweight Node.js web application framework for building APIs and handling HTTP requests.
- **Database:**
    - **MongoDB:** A NoSQL database used to store user data, recipes, and pantry items in collections (users, indianrecipes, and pantryitems).
- **Authentication:**
    - JSON Web Tokens (JWT) or session-based methods used to handle secure login and signup processes.

This tech stack ensures that the app is scalable, maintainable, and responsive across various devices.

6. Product Functions

The Smart Recipe Suggestion App offers the following key functionalities:

- **User Authentication**: Enables secure login and signup for personalized access.
- **Ingredient-based Recipe Search**: Users can input available ingredients to receive matching Indian recipes.
- **Pantry Tracker**: Allows users to add and manage a list of available ingredients in their kitchen.
- **Timetable Generator**: Creates a weekly meal plan based on pantry items or user preferences.
- **Review System**: Users can share feedback and rate recipes for community insights.
- **Contact Form**: Facilitates communication with the admin for support or suggestions.
- **Responsive UI**: Clean and interactive interface designed with Bootstrap for seamless user experience across devices

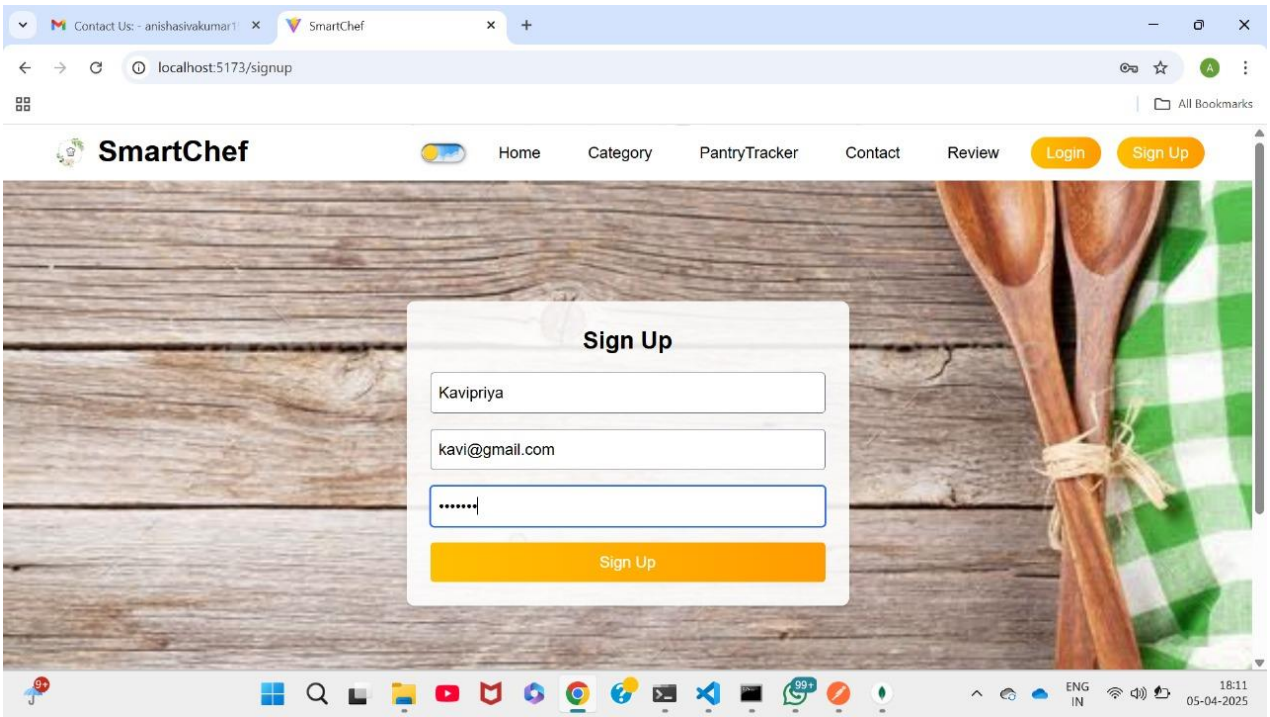


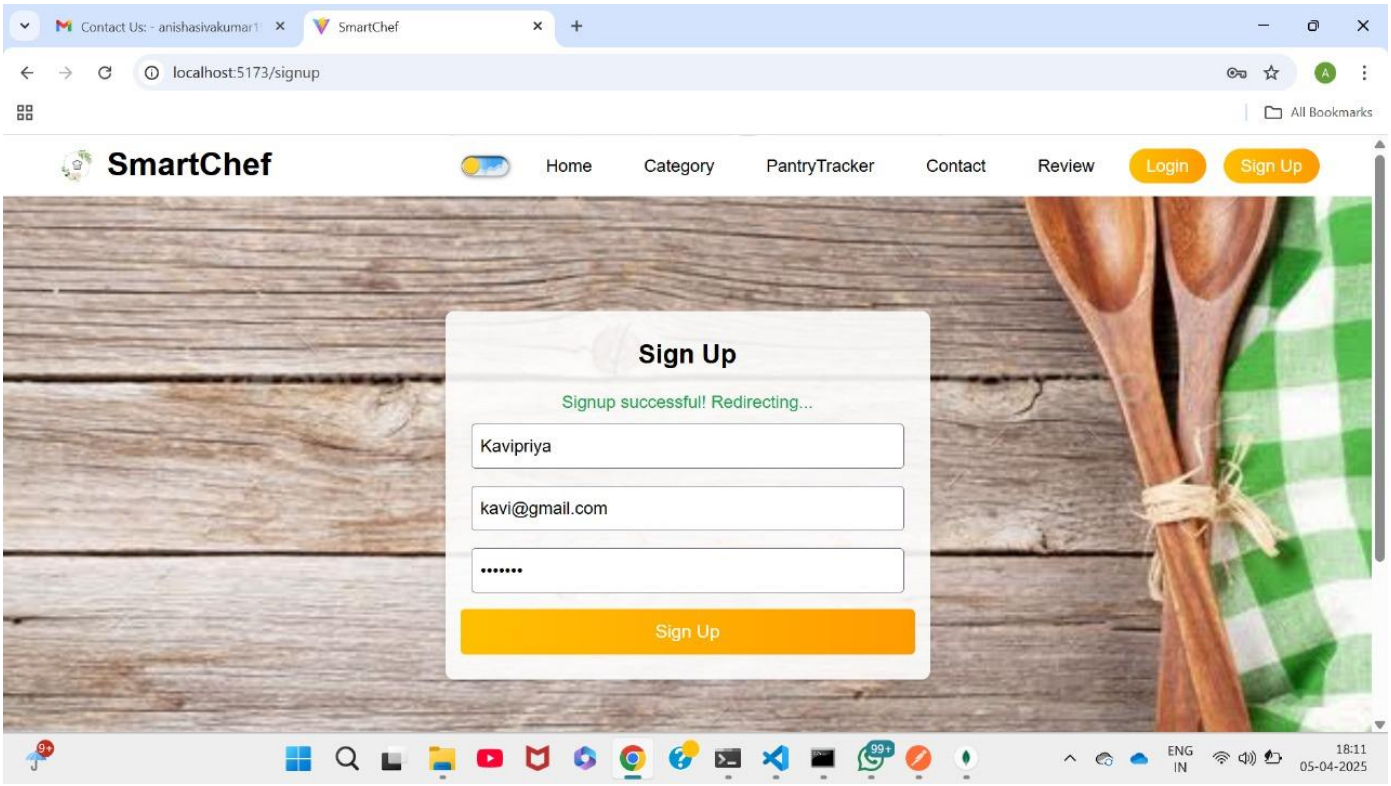
7. System Modules

The Smart Recipe Suggestion App consists of several interconnected modules that collectively provide a seamless and smart user experience.

7.1 Login & Sign Up Functionality

This module manages user authentication. New users can register through the Sign-Up form, while existing users can securely log in. Authentication ensures personalized experiences like saving pantry data and generated timetables.

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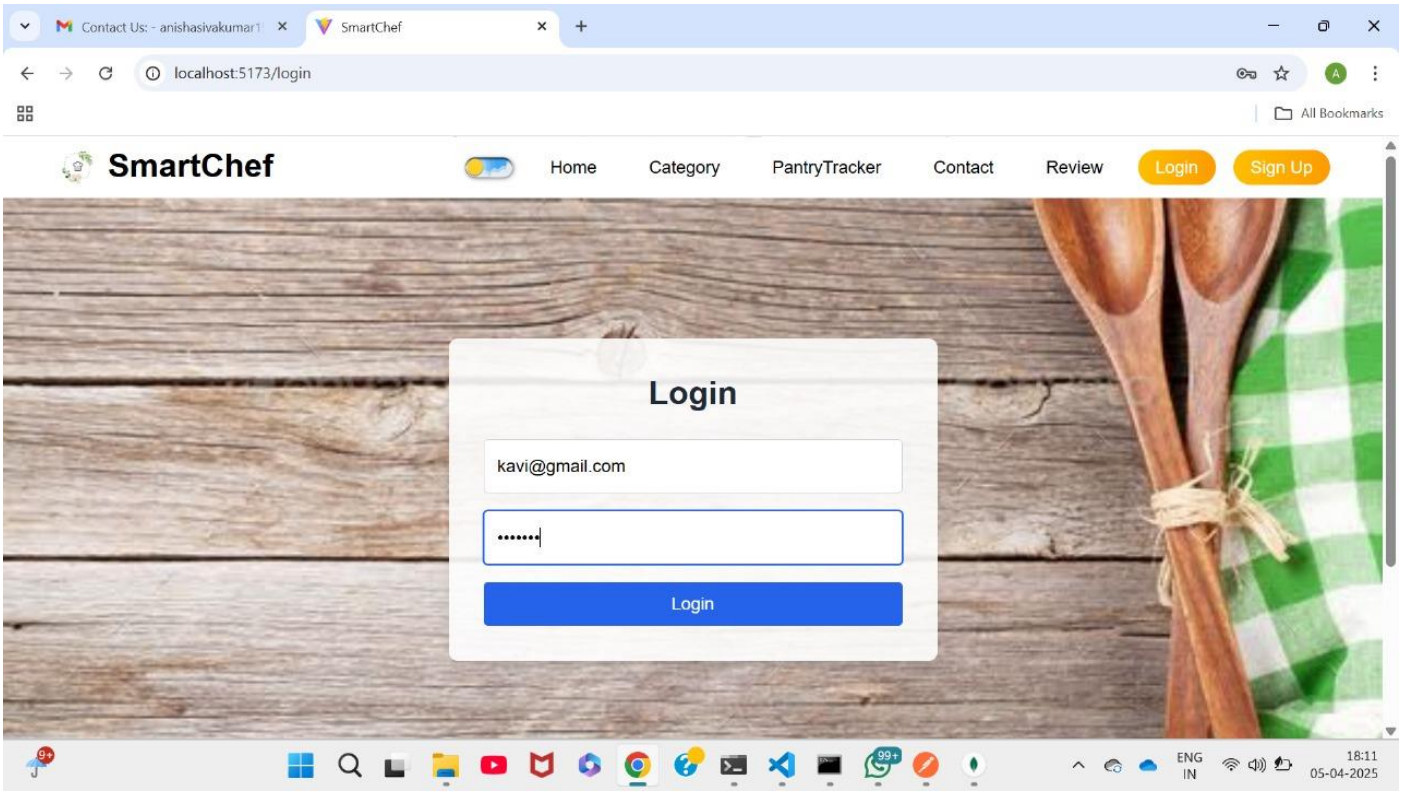
Contact Us: - anishasivakumar1
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kavi@gmail.com
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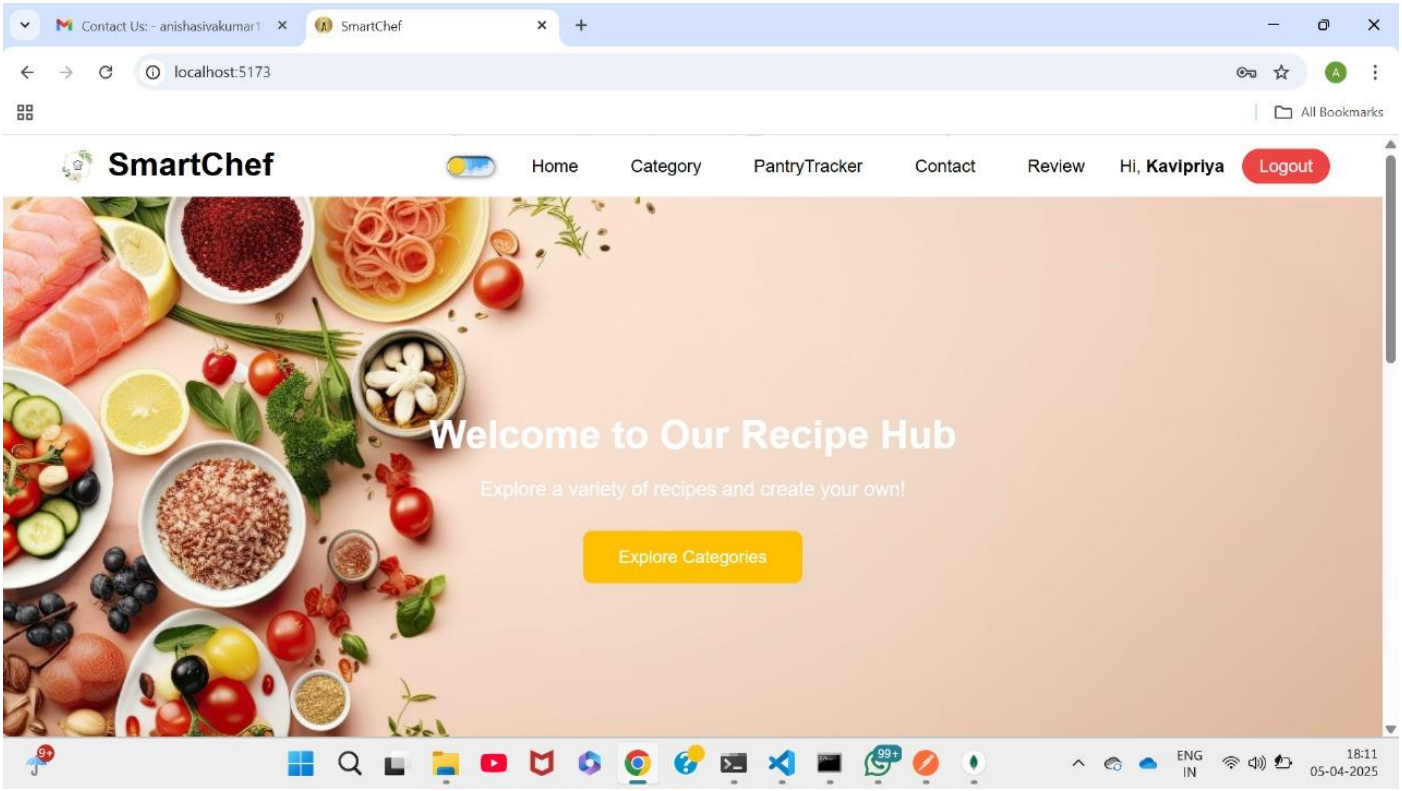
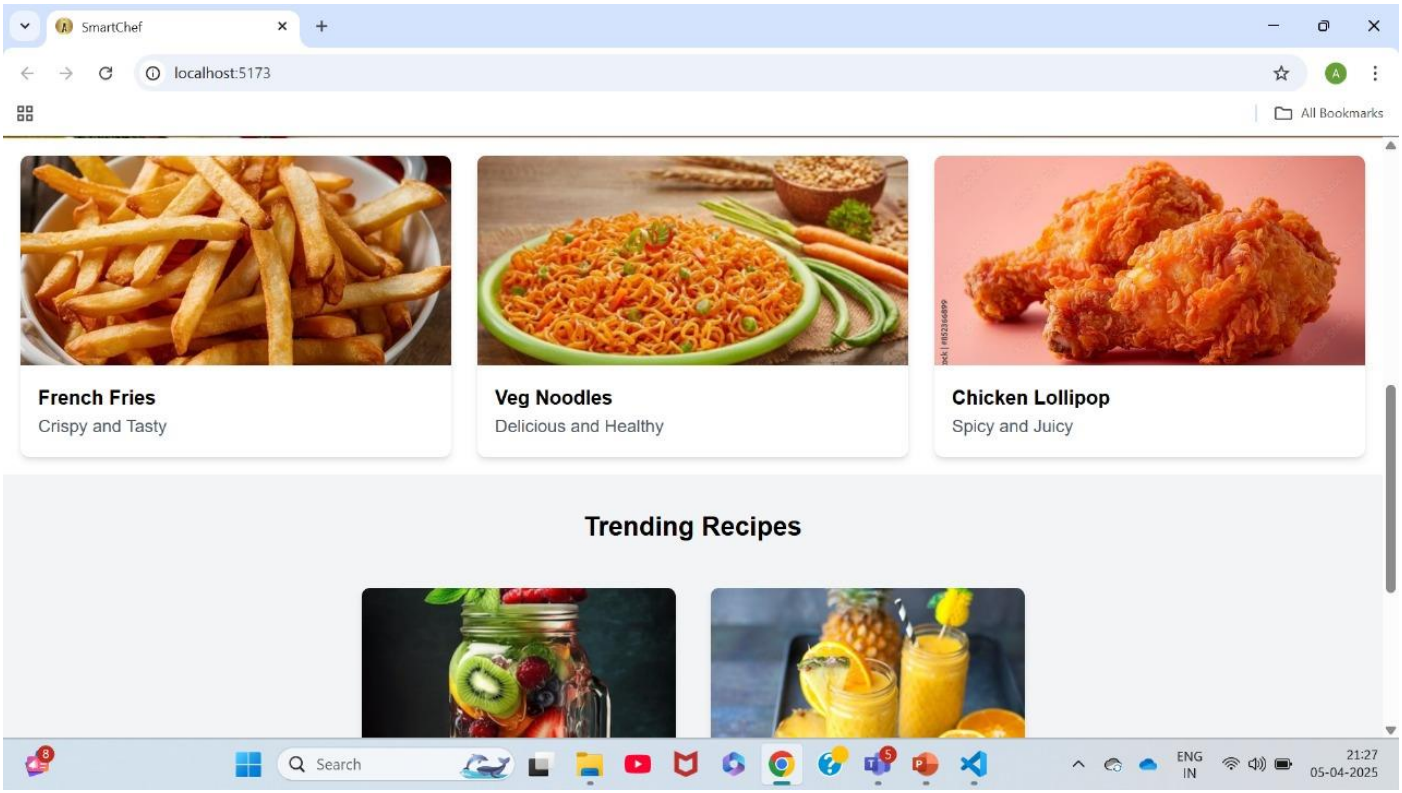
7.2 Home Page

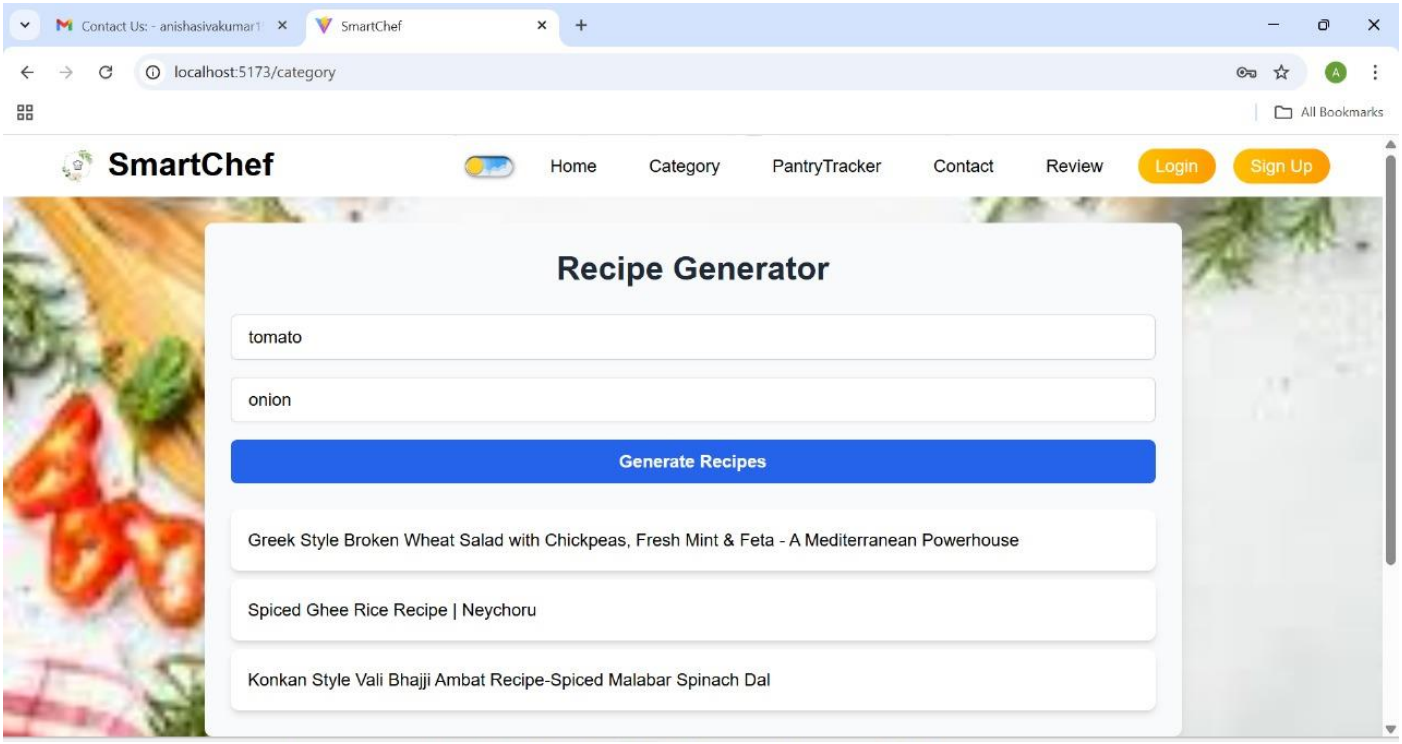
The Home Page serves as the landing page of the application. It provides a brief introduction to the app's purpose and features. With intuitive navigation, users can quickly explore various functionalities like recipe suggestions, pantry tracking, and timetable generation.

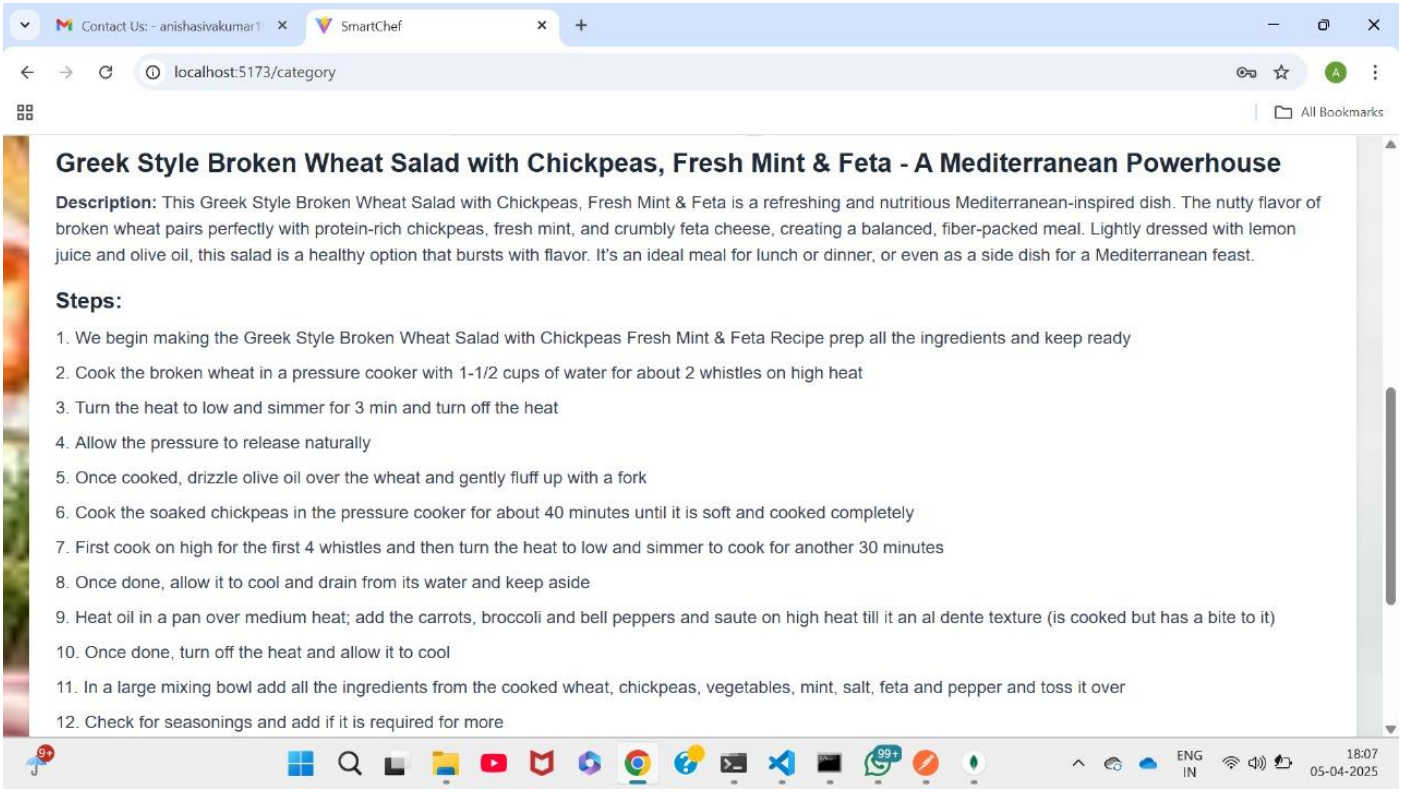


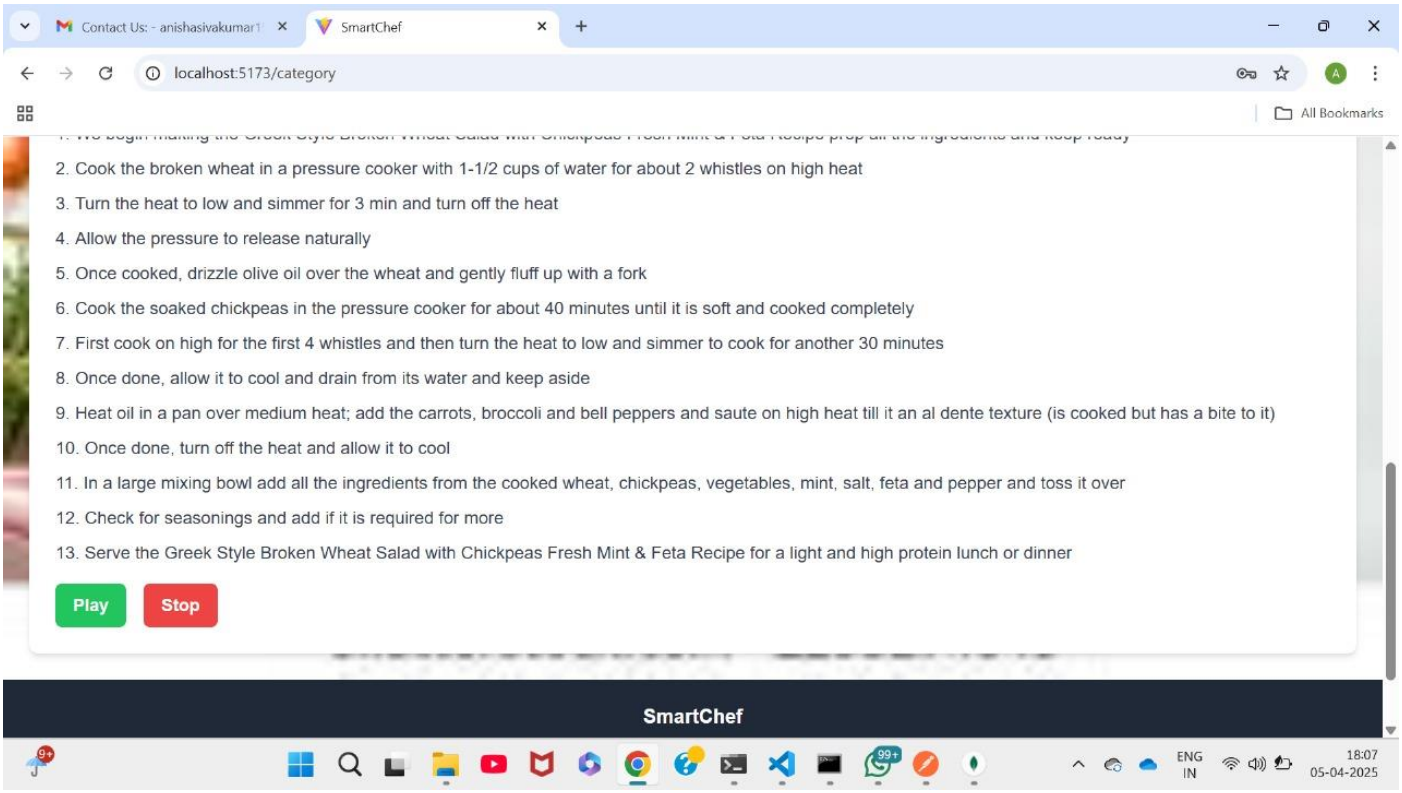


7.3 Category Page (Ingredient-based Recipes)

This module allows users to input the ingredients they currently have. Based on the input, the app filters and displays a list of Indian recipes that can be prepared using those ingredients. It helps users minimize food waste and make the best use of available resources.

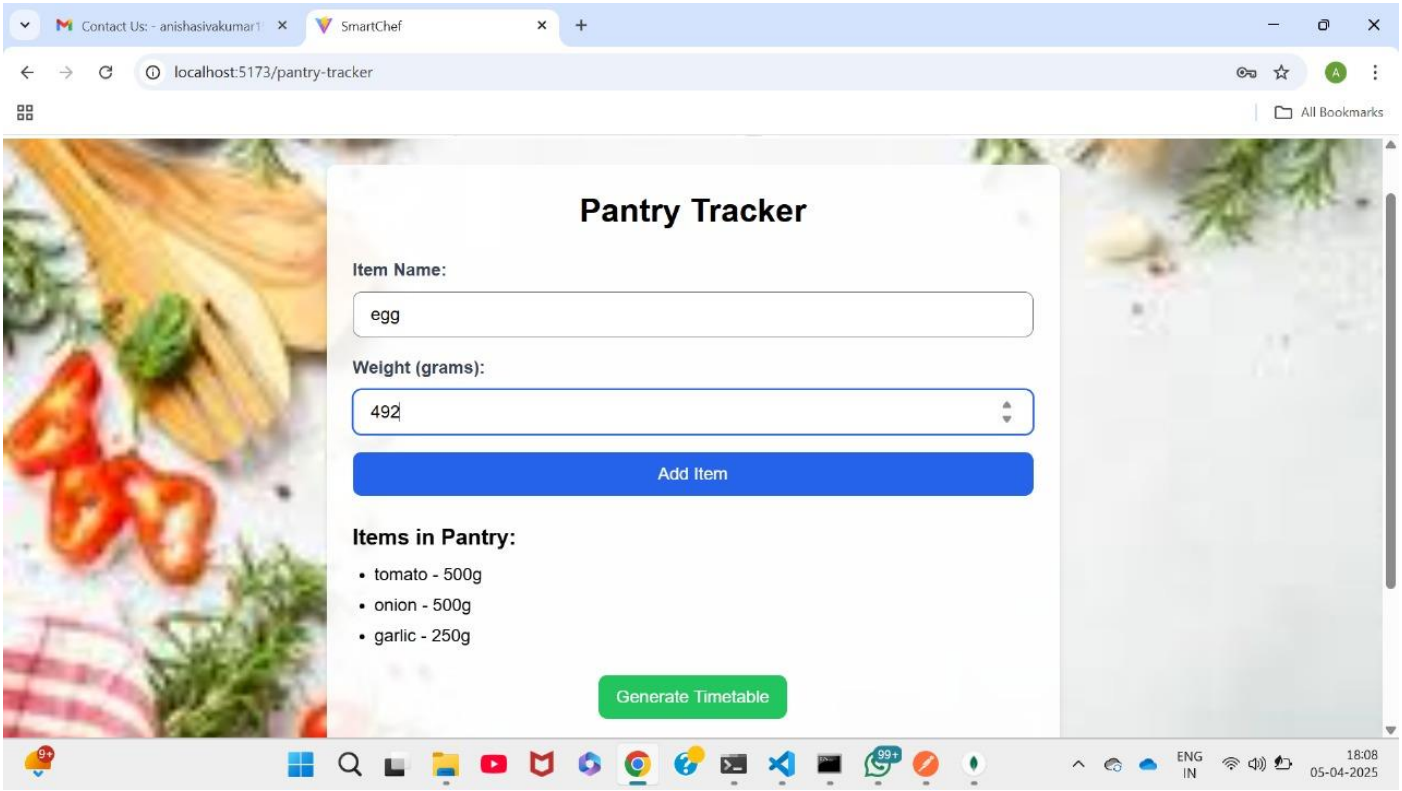






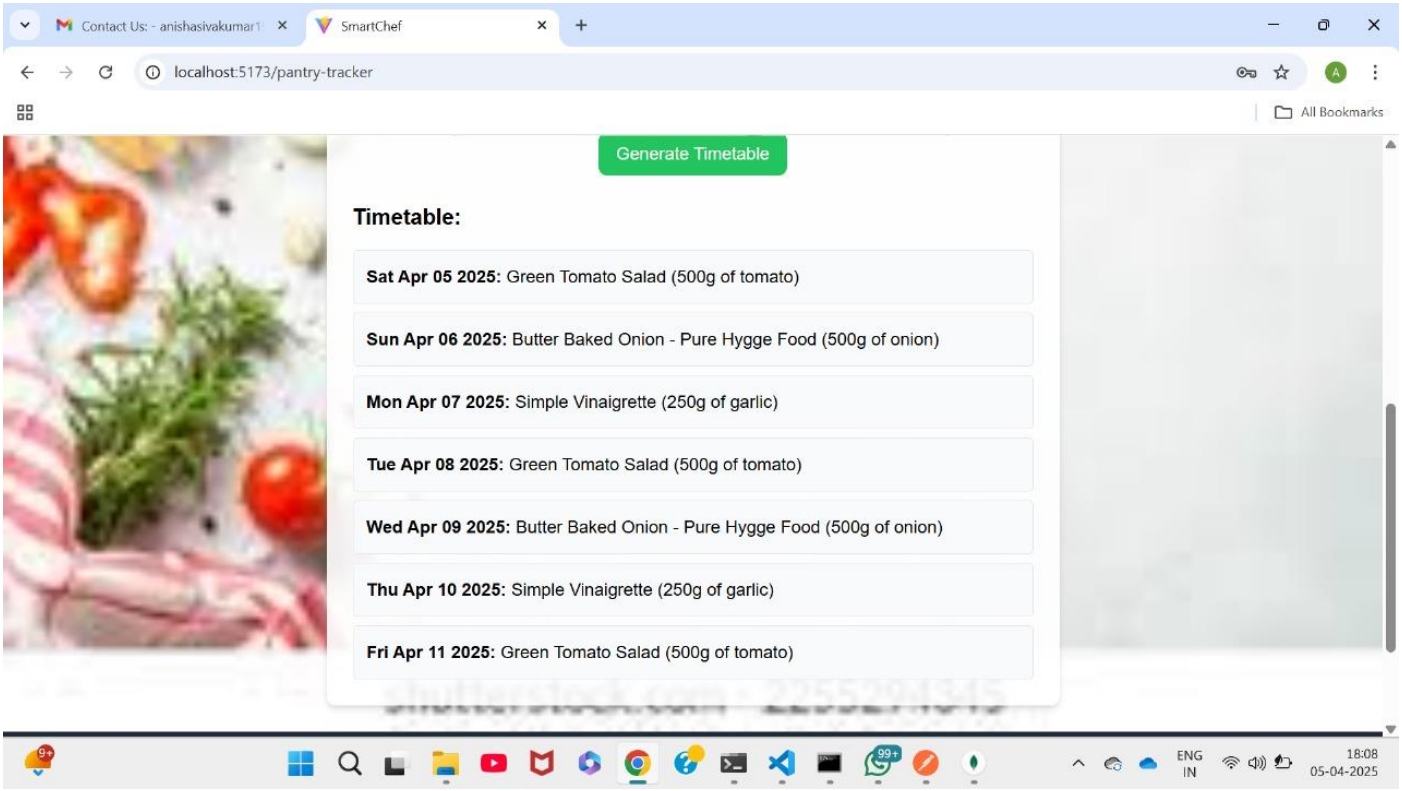
7.4 Pantry Tracker Page

The Pantry Tracker enables users to manage their kitchen inventory. They can add, update, or remove pantry items. This module keeps a real-time track of ingredients available at home, which also aids in accurate recipe suggestions.



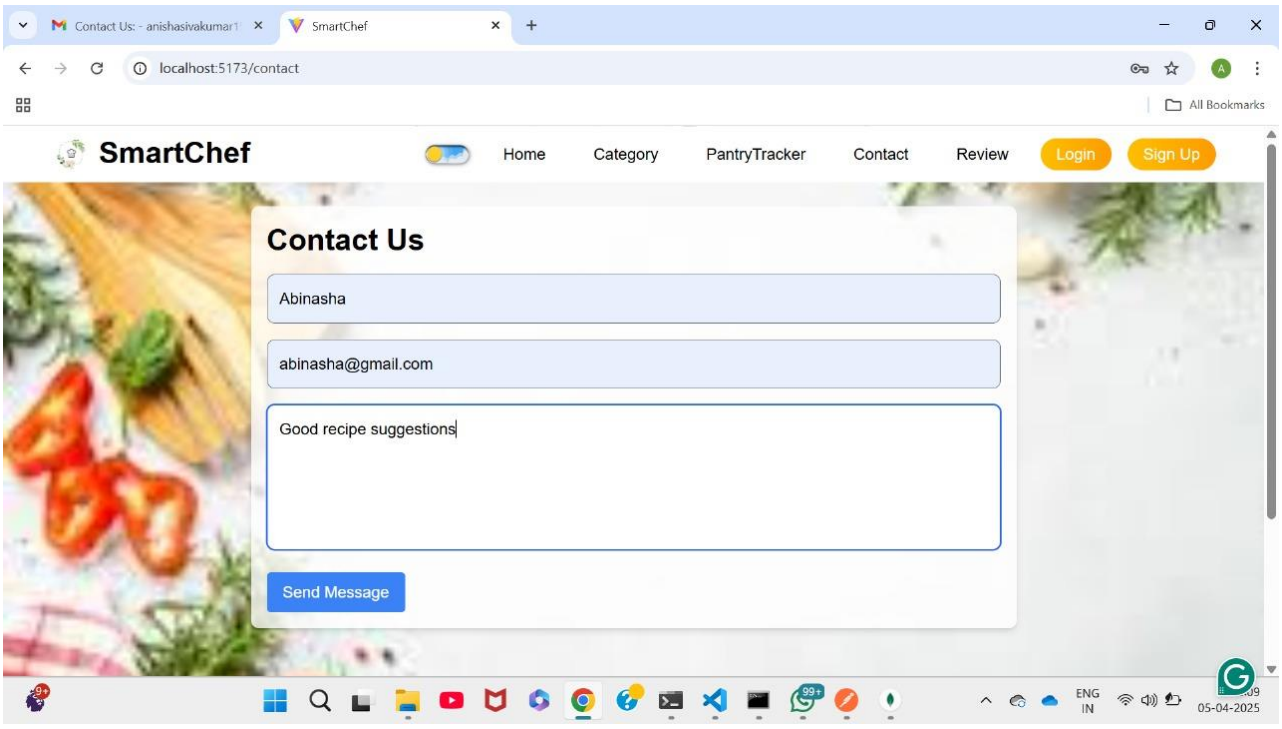
7.5 Timetable Generator

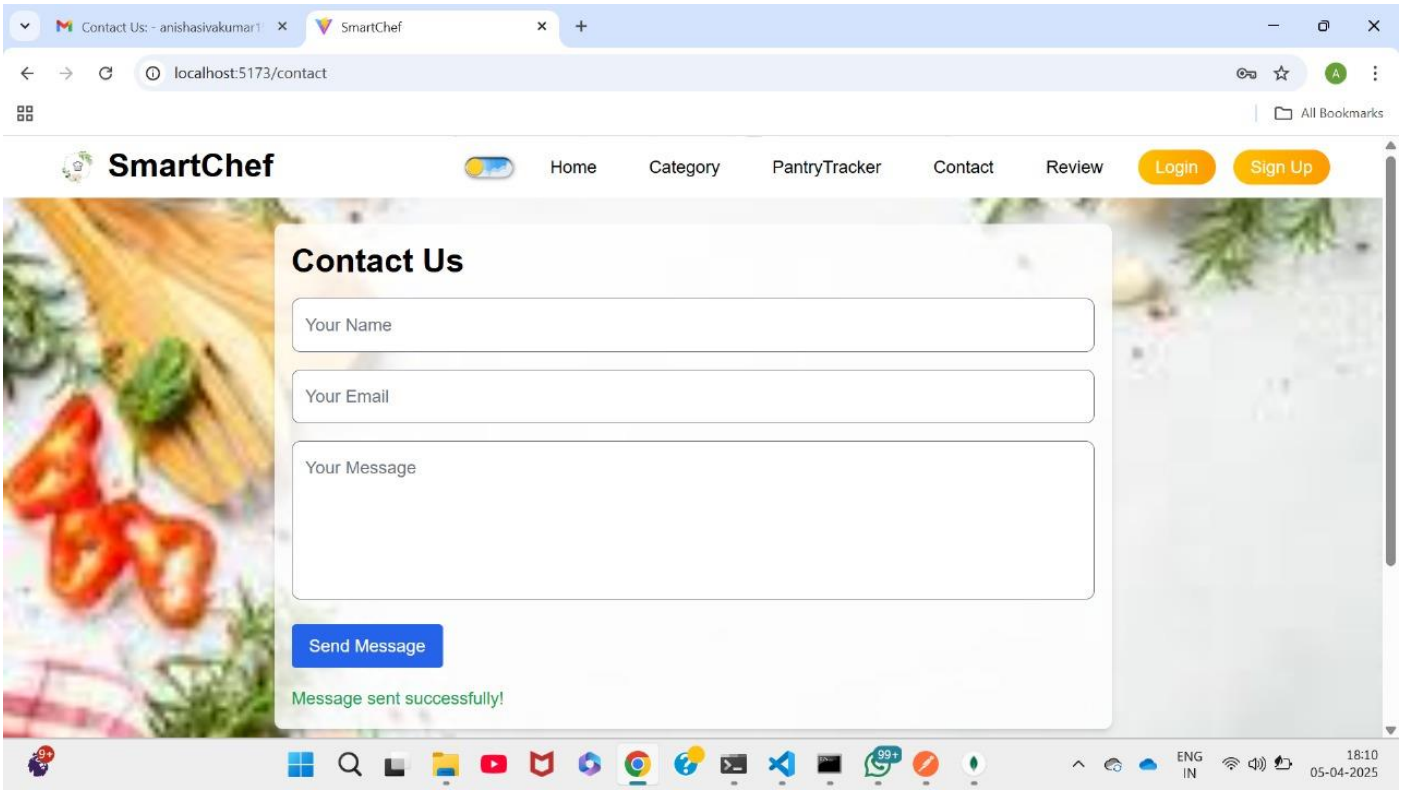
Based on pantry data and selected preferences, the Timetable Generator helps users plan a weekly meal schedule. This reduces decision fatigue and improves consistency in meal planning, contributing to a more organized cooking routine.



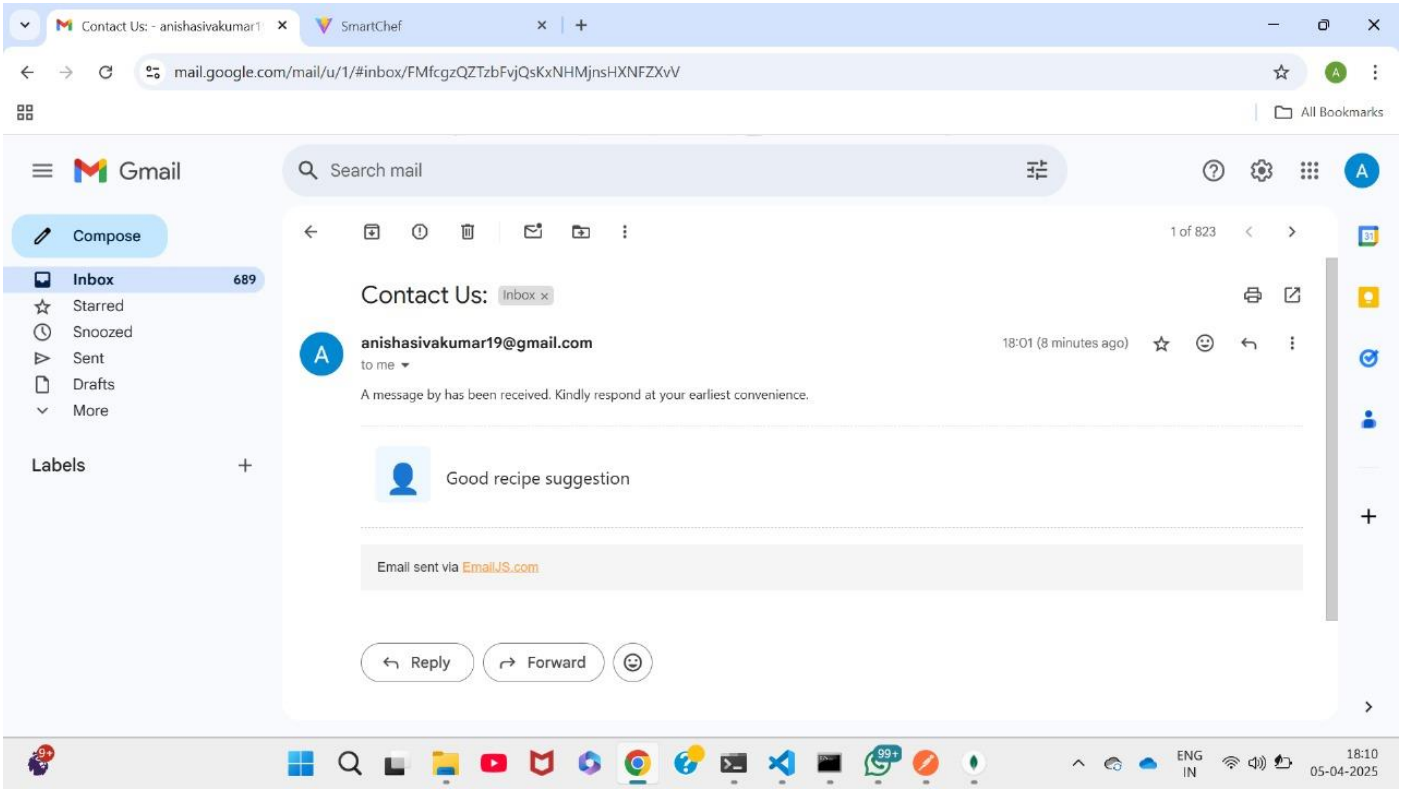
7.6 Contact Page

The Contact Page lets users send feedback, queries, or issues via a form with name, email, subject, and message fields. Submissions are sent directly to the admin's email for prompt support.



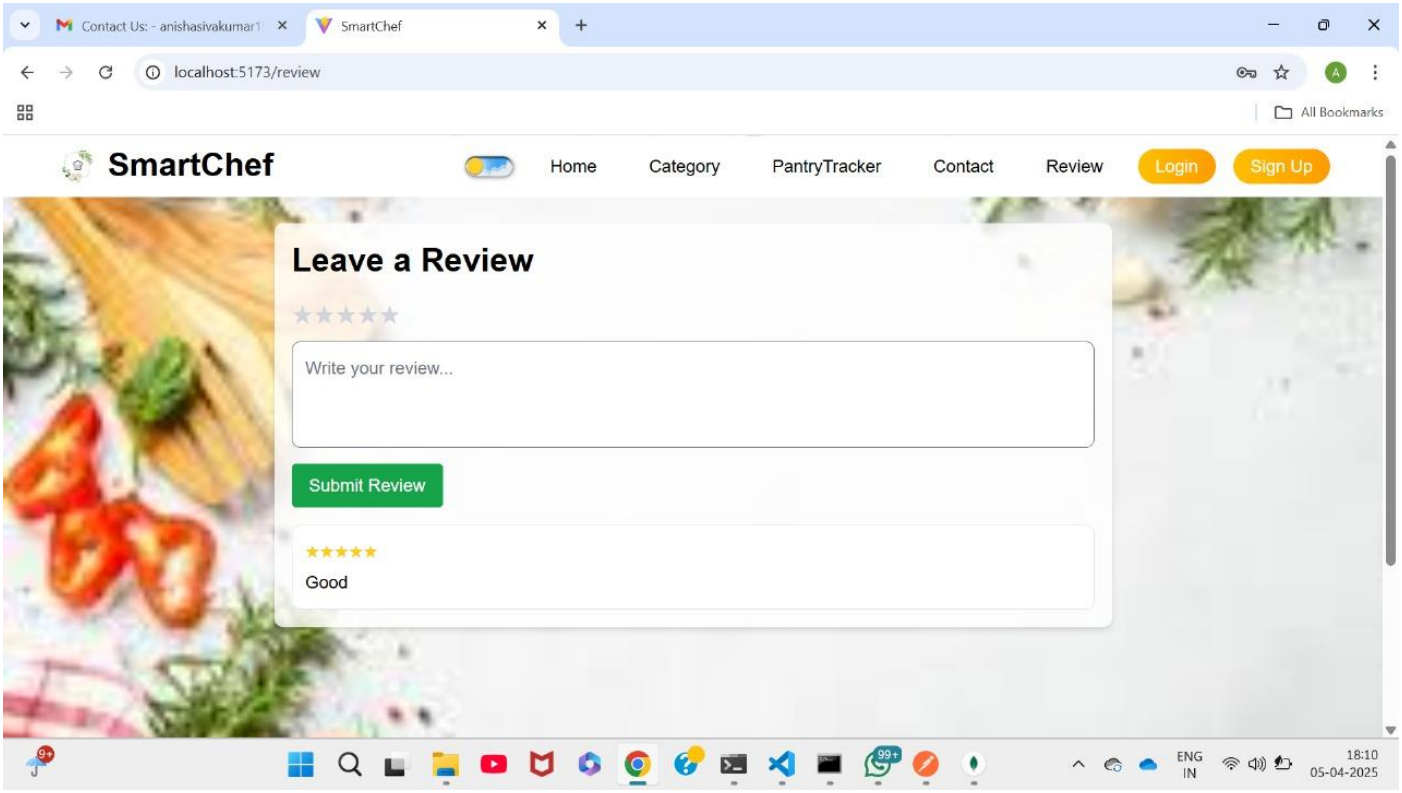


Message directly sent to admin's email



7.7 Review Page

The Review Page allows users to share their experience with the app or specific recipes. Users can leave ratings and comments to help improve quality and guide others. Reviews are stored in the database and may be displayed publicly.



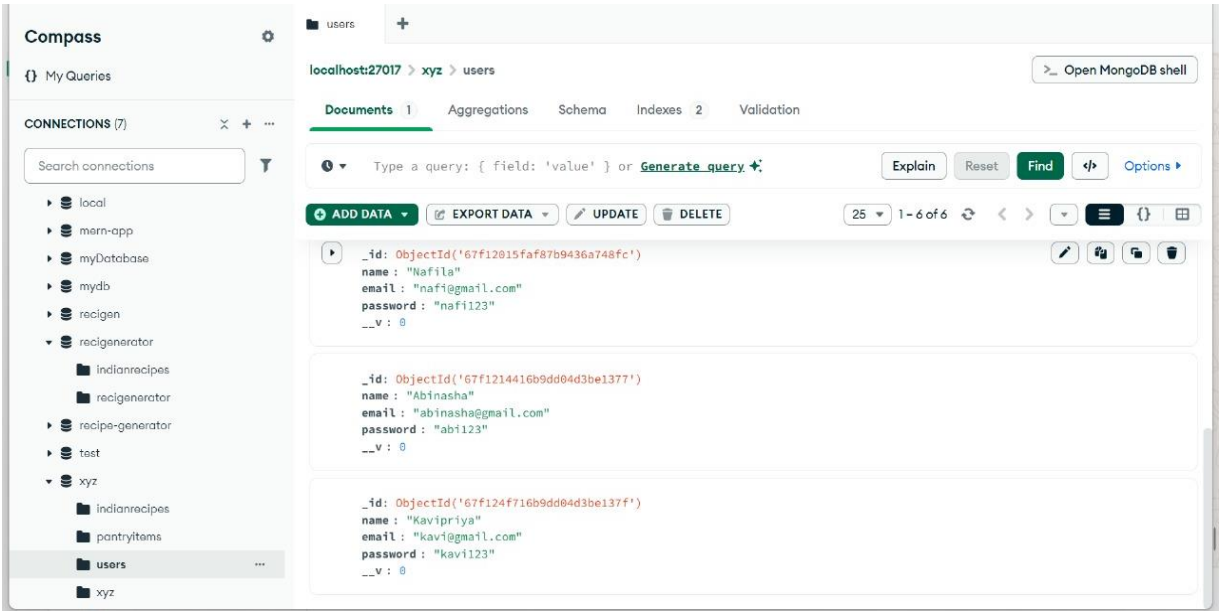
8. Database Collections

The app uses MongoDB as the database, which stores data in collections. Each collection is designed to store specific types of data relevant to the application.

8.1 users Collection

This collection stores all user-related data, such as:

- ID
- name
- Email
- Password

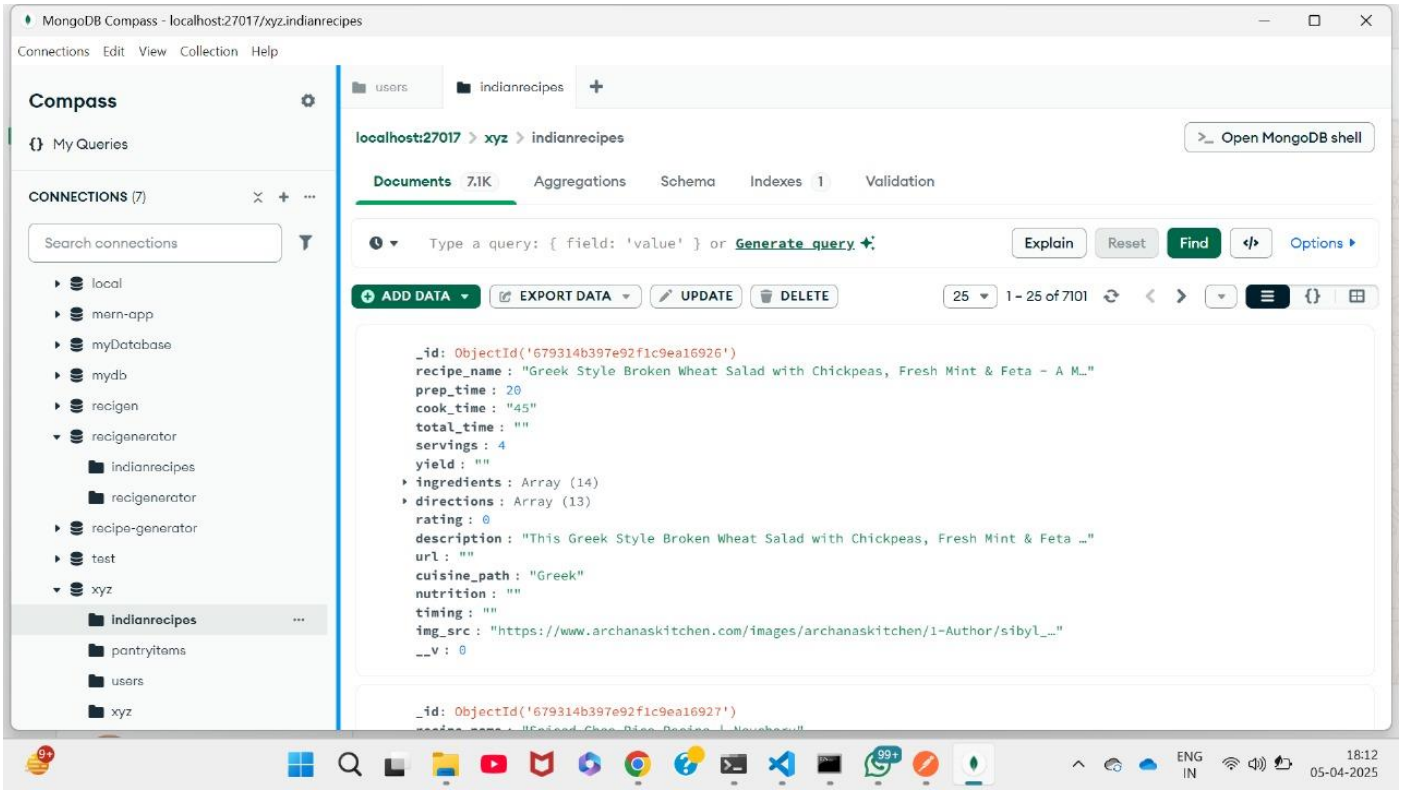


8.2 indianrecipes Collection

This collection stores recipe-related data such as:

- Recipe name
- Ingredients required
- Preparation steps
- Cooking time
- Directions

This collection is used to suggest recipes based on the user's selected ingredients.



8.3 pantryitems Collection

This collection stores pantry item data added by users, including:

- Item name
- Quantity
- Expiry date (optional)
- User ID (for item ownership)
  It supports the Pantry Tracker and Timetable Generator modules to function accurately.

9. Challenges Faced

- Designing accurate ingredient-to-recipe matching logic.
- Ensuring responsiveness across devices using Bootstrap.
- Managing secure login, signup, and data flow between components.
- Structuring MongoDB collections efficiently.
- Setting up admin email integration for the Contact form.

10. Future Scope

- **Add Voice Input**: Enable users to input ingredients via voice for ease of use.
- **AI-Based Suggestions**: Integrate machine learning to suggest recipes based on user preferences and past history.
- **Multilingual Support**: Include regional language options to reach a wider audience.
- **Nutritional Information**: Display calorie and nutrition data for each recipe.
- **Shopping List Generator**: Automatically create shopping lists based on missing ingredients.
- **Admin Dashboard**: Introduce a panel to manage recipes, reviews, and users more efficiently.

11. Conclusion

The Smart Recipe Suggestion App successfully bridges the gap between available kitchen ingredients and practical recipe choices. By offering features like ingredient-based search, pantry tracking, and meal timetable generation, it enhances user convenience and reduces food waste. Built using the MERN stack and Bootstrap, the app delivers a responsive, user-friendly interface with robust functionality. With room for future enhancements like voice input and AI-based recommendations, this project lays a strong foundation for smarter meal planning and kitchen management.

12. References

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