INTRODUCTION

Project Overview:

Flavor Fusion is an AI-powered smart recipe recommendation and food discovery web platform designed to assist users in finding suitable recipes based on their preferences, dietary requirements, and available ingredients. In today's fast-paced lifestyle, people often face difficulty in deciding what to cook or eat due to time constraints, lack of knowledge, and limited resources. This system uses intelligent recommendation techniques to provide personalized suggestions that improve user experience and promote healthy eating habits.

The platform integrates modern web technologies such as React for frontend, Node.js and Express for backend, and MongoDB as the database. The system also utilizes APIs and machine learning-based recommendation techniques to analyze user behavior and deliver accurate results.

Flavor Fusion aims to become a scalable and user-friendly solution that simplifies cooking decisions, reduces food waste, and supports a healthy lifestyle.

Purpose:

The main purpose of this project is:

- To develop a smart recipe recommendation system.
- To provide personalized food suggestions based on user preferences.
- To help users decide what to cook using available ingredients.
- To promote healthy eating by displaying nutrition information.
- To reduce food wastage by suggesting recipes using available ingredients.
- To enhance user engagement through AI-driven recommendations.

IDEATION PHASE

Problem Statement:

Many individuals face challenges in selecting suitable meals daily due to busy

schedules, lack of ingredients, and lack of personalized guidance. Existing food and recipe applications provide general recommendations but fail to consider user dietary preferences, health requirements, and available ingredients.
Therefore, there is a need for an intelligent system that can:
Understand user preferences.
Recommend recipes based on available resources.
Provide nutritional insights.
Offer personalized and dynamic suggestions.

Empathy Map Canvas:

Users:

Students
Working professionals
Homemakers
Health-conscious individuals

User Thoughts:

What should I cook today?
How to prepare healthy meals?
What can I cook with limited ingredients?

User Feelings:

Confusion and stress
Lack of time
Frustration with random recipe suggestions

User Actions:

Searching online
Using multiple food apps
Watching cooking videos

User Needs:

Personalized food recommendations
Easy and quick recipes
Nutrition and calorie information
Healthy diet support

Brainstorming:

Several innovative ideas were explored such as:

- Ingredient-based food recommendation.
- AI-based personalized meal planning.
- Diet tracking and nutrition monitoring.
- Food waste reduction.
- Smart grocery planning.
- After analyzing feasibility and impact, Flavor Fusion was selected as it addresses real-life problems and integrates artificial intelligence with web technologies.

REQUIREMENT ANALYSIS

Customer Journey Map:

- User visits the Flavor Fusion platform.
- Registers or logs into the system.
- Provides food preferences or available ingredients.
- System processes the data.
- Personalized recipe suggestions are generated.
- User views nutrition details.
- Recipes can be saved for future use.

Solution Requirements:

Functional Requirements:

- User registration and authentication.
- Ingredient-based recipe search.
- Personalized recommendation system.
- Nutrition and calorie display.
- Favorite recipe storage.
- Filtering based on cuisine, diet, and cooking time.

Non-functional Requirements:

- Fast response time.
- Secure user authentication.
- Scalability and flexibility.
- Responsive design.
- High system availability.

Data Flow Diagram:

Level 0 DFD:

User → Flavor Fusion System → Database → Results.

Level 1 DFD:

- User inputs ingredients and preferences.
- Backend processes input.
- MongoDB database retrieves recipes.
- AI algorithm filters and ranks results.
- System displays personalized recommendations.

Technology Stack:

Frontend: React.js
Backend: Node.js, Express.js
Database: MongoDB
Authentication: JWT
APIs: Recipe and nutrition APIs
AI Techniques: Recommendation algorithms
Version Control: Git and GitHub.

PROJECT DESIGN

Problem Solution Fit:

Flavor Fusion effectively addresses the problem of food decision-making by providing personalized and intelligent recommendations. It improves user

satisfaction by delivering relevant and healthy food options.

Proposed Solution:

The system is a web-based platform where users input their preferences and ingredients. The backend processes the information and uses AI techniques to generate suitable recommendations. The system also provides nutrition details and allows users to save their favorite recipes.

Solution Architecture:

The architecture follows a 3-tier structure:

1 Presentation Layer – React user interface.
2 Application Layer – Node.js and Express backend.
3 Data Layer – MongoDB database.

The system ensures scalability, flexibility, and security.

PROJECT PLANNING AND SCHEDULING

Project Planning:

Phase 1: Requirement analysis and research.
Phase 2: System design and architecture.
Phase 3: Frontend development.
Phase 4: Backend development and database integration.
Phase 5: Testing and debugging.
Phase 6: Deployment and documentation.

FUNCTIONAL AND PERFORMANCE TESTING

Functional Testing:

All modules were tested individually:

- User authentication.

- Recipe search.
- Ingredient-based recommendation.
- Nutrition display.
- Favorite storage.

The system performs accurately and provides correct outputs.

Performance Testing:

The system was tested for:

- Response time.
- Database performance.
- API efficiency.
- Load handling.

Results showed efficient performance for multiple users.

RESULTS

Output Screens:

The system successfully displays:

- Login and registration page.
- Personalized dashboard.
- Recipe recommendation page.
- Ingredient-based search.
- Nutrition and calorie details.

ADVANTAGES AND DISADVANTAGES

Advantages:

- Personalized recommendations.
- Time-saving.
- Healthy eating support.
- Reduces food waste.

Disadvantages:

- Requires internet connectivity.
- AI accuracy depends on data.
- Limited offline support.

CONCLUSION

Flavor Fusion is a smart and efficient solution for personalized food recommendation. It enhances user experience and promotes healthy eating. The system is scalable and can be expanded into a full commercial application.

FUTURE SCOPE

- Mobile application.
- Voice-based recipe search.
- Integration with IoT kitchen devices.
- Advanced AI and deep learning.
- Grocery shopping integration.
- Real-time health monitoring.