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MOODCHEF: MOOD-BASED SMART RECIPE RECOMMENDER WITH COOKING ASSISTANCE

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ABSTRACT

This paper presents a smart culinary assistant system that personalizes recipe recommendations based on the user's emotional state, dietary preference, and mood using facial expression recognition. Named MoodChef, the system integrates AI-driven face emotion detection, natural language processing, and speech synthesis module to provide real-time recipe guidance. Using face-api.js for expression detection and a responsive web interface with voice feedback, the system enhances the user's cooking experience by offering mood appropriate meal suggestions with step-by-step voice instructions. This solution aims to make meal preparation more interactive, personalized, and emotionally resonant.

What distinguishes MoodChef:Mood- Based Smart Recipe Recommender With Cooking Assistance is its voice-assisted cooking interface, implemented using the Web Speech API, which guides users through each recipe step audibly, reducing the need for screen interaction. The frontend is built with HTML, Tailwind CSS, and JavaScript for a responsive and interactive experience, while the system architecture is designed to support modular upgrades, including future integration with IoT-based kitchen appliances and real-time nutritional analysis.

Keywords: Mood detection, recipe recommender system, facial expression recognition, voice assistant, AI in cooking, human-computer interaction, dietary preferences.

1. INTRODUCTION

In recent years, the fusion of artificial intelligence (AI) with human-centric applications has given rise to innovative solutions that prioritize personalization, convenience, and emotional intelligence. One such domain where AI can significantly enhance user experience is culinary assistance and recipe recommendation. Cooking, while essential,

can often feel like a repetitive or overwhelming task, especially when users are unsure of what to prepare or lack motivation. Emotional state plays a critical role in influencing food choices, appetite, and even cooking engagement. Despite the growing number of recipe and meal- planning apps available, very few incorporate emotional context into their recommendation logic.

To address this gap, we present a mood- based smart recipe recommender with cooking assistance that dynamically responds to the user's emotional state to suggest personalized recipes. The application leverages facial expression recognition technology to analyze users' real-time emotions using their webcam. This input is then combined with user- provided dietary preferences (such as vegan, vegetarian, or non-vegetarian) to filter and recommend appropriate recipes that not only align with the user's nutritional needs but also resonate with their emotional well-being.

What sets MoodChef apart is its voice- enabled cooking assistant, which provides step-by-step spoken guidance to users during meal preparation. This hands-free functionality makes it especially useful in kitchen environments where visual or tactile interaction with devices may be impractical. The application is built using web technologies such as HTML, CSS (via Tailwind CSS), and JavaScript, with face- api.js used for facial expression detection and the Web Speech API for voice output.

2. LITERATURE REVIEW

Existing digital cooking platforms such as Tasty, Yummly, and AllRecipes primarily focus on ingredient-based or time-based recipe searches. While some offer voice or video instruction, none of them adapt content based on the user's emotional state, missing an opportunity to improve user engagement and emotional well-being.

The field of affective computing—which enables machines to detect and respond to human emotions—is gaining momentum in domains like education, therapy, and entertainment. However, its integration into the culinary domain remains underdeveloped. Research has shown that emotions significantly impact eating choices, suggesting that mood-aware systems could offer more relevant and satisfying food suggestions.

For mood detection, facial expression recognition using libraries like face-api.js, OpenCV, and MediaPipe provides a reliable and browser-compatible solution for real- time emotion classification. These tools support detection of emotions such as happiness, sadness, anger, and surprise through webcam input, and are suitable for lightweight, client-side applications.

Simultaneously, voice-based systems such as Amazon Alexa and Google Assistant have shown that hands-free, speech-guided experiences are not only possible but highly desirable in daily routines like cooking. The Web Speech API allows similar functionality to be embedded in browser- based applications, making voice interaction more accessible.

Comparable projects, such as AIR CANVAS DRAW, use hand gesture recognition with OpenCV and MediaPipe to allow users to draw in air. While they demonstrate creative use of computer vision, they do not consider user emotions or apply these interactions in practical domains like cooking.

In conclusion, there is a clear gap in the integration of emotion recognition, recipe recommendation, and voice-guided assistance. MoodChef:Mood-Based Smart Recipe Recommender With Cooking Assistance addresses this by combining real-time mood detection, personalized recipe selection based on dietary preferences, and voice-assisted cooking, making it a novel and emotionally intelligent cooking assistant.

3. PROPOSED SYSTEM

The proposed system MoodChef, is a web- based application that recommends personalized recipes based on a user's emotional state and dietary preference. It integrates real-time facial expression recognition, smart recipe filtering, and a voice-assisted cooking guide to enhance the cooking experience.

- Mood Detection: Utilizes face-api.js to detect user emotions (e.g., happy, sad, angry, surprised) through webcam input.
- Recipe Recommendation: Based on the detected mood and selected dietary choice (vegan, vegetarian, non-vegetarian), the system filters and displays relevant recipes from a pre-defined dataset.
- Voice Assistance: Uses the Web Speech API to read out each recipe step, enabling hands-free cooking support.
- User Interface: Built with HTML, Tailwind CSS, and JavaScript, providing a responsive and intuitive interface across pages like login, mood detection, and recipe interaction.

MoodChef offers a seamless blend of affective computing and cooking automation, making meal preparation more personalized and interactive.

4. SYSTEM ARCHITECHURE

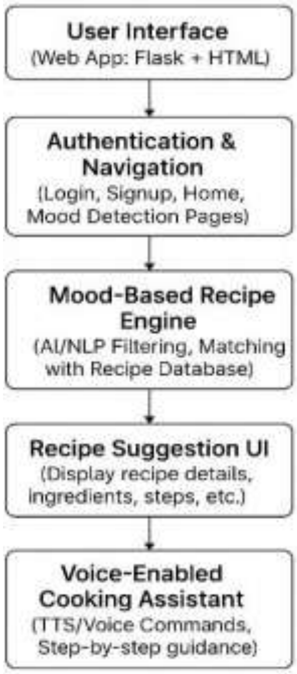

Figure 1: System Architecture Diagram

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5. IMPLEMENTATION

The MoodChef application is a browser- based system developed using HTML, Tailwind CSS, and JavaScript, integrating facial expression recognition and voice- guided cooking assistance. Facial emotions are detected using face-api.js through webcam input, classifying expressions like happy, sad, angry, and surprised.

Users can either select their mood manually or let the system detect it automatically. Based on the selected mood and dietary preference, recipes are fetched from a structured JSON dataset containing ingredients and cooking instructions.

The Web Speech API is used to read out each step, providing a hands-free, interactive cooking experience. The interface is designed to be modular and scalable, with future plans for Flask-based backend integration, nutrition tracking, and smart appliance connectivity.

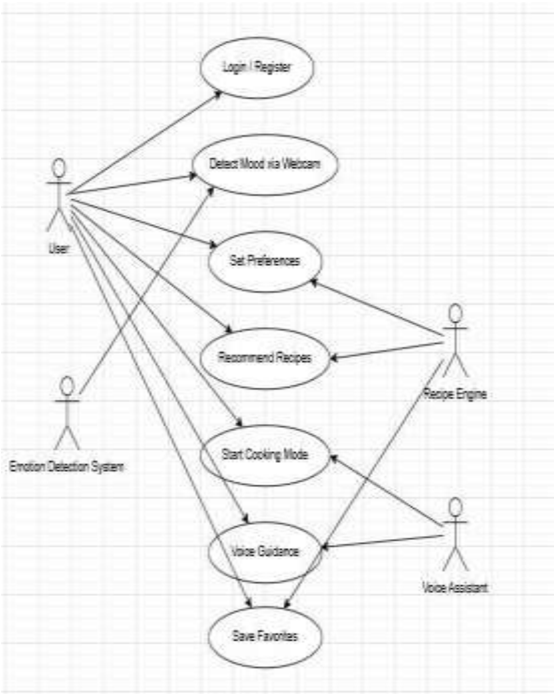

Figure 2: Use Case Diagram

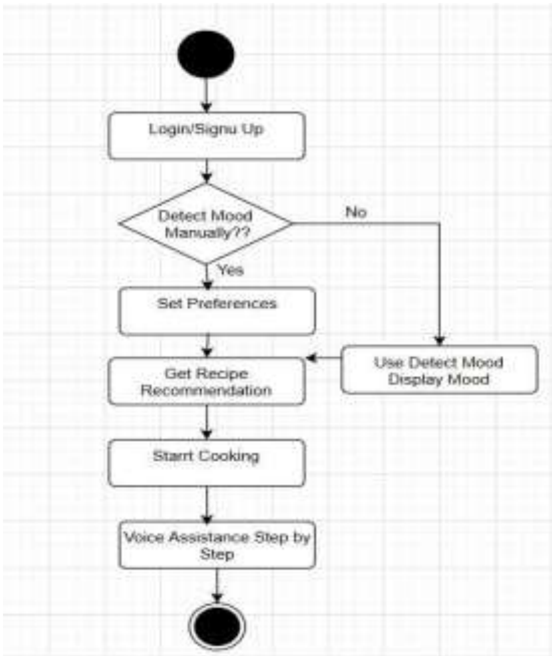

Figure 3: Activity Diagram V.RESULT

The MoodChef application has been successfully developed and tested as a working prototype in a browser environment. The system detects facial expressions with high accuracy using face- api.js models, capturing real-time emotions such as happy, sad, angry, and surprised. Based on this detected mood and the selected dietary preference, the system dynamically displays a relevant recipe with detailed ingredients and preparation steps. User interaction with the mood-based recipe suggestion and voice-assisted cooking interface has demonstrated a smooth and intuitive experience.

The voice assistant effectively narrates each recipe step using the Web Speech API, making the cooking process hands-free and more user-friendly, especially for novice users or those multitasking in the kitchen.The visual interface, developed with Tailwind CSS, provides a clean and responsive design across devices.The system also gracefully handles edge cases, such as no face detected, unsupported mood-diet combinations, and step-by-step audio playback control.

6. FUTURE WORK

- Integration with IoT kitchen appliances
- User nutrition tracking and history- based recommendations
- Cloud backend for storing recipes and personalization history
- Mobile app version with camera- based mood input.

7. CONCLUSION

This paper presents MoodChef, a novel web application that brings emotional intelligence to the culinary domain through mood- based recipe recommendation and voice-assisted cooking. By combining real-time facial emotion recognition, dietary filtering, and text-to-speech narration, Mood- Based Smart Recipe Recommender With Cooking Assistance personalizes and simplifies the cooking experience.

The results show that such an emotionally adaptive system can enhance user engagement, support hands-free interactions, and offer mood-aligned food choices. The application lays the groundwork for more emotionally aware and health- conscious digital assistants. With future enhancements, MoodChef can evolve into a powerful platform for smart, empathetic, and personalized cooking assistance, addressing both the emotional and nutritional needs of modern users.

8. REFERENCES

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