Mood-Based Food Recommendation System

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Abstract

This paper presents a web-based food recommendation system that personalizes dining suggestions based on the user's mood, integrating emotional well-being with convenience and health consciousness. Utilizing natural language processing techniques on comfort food datasets, the system identifies mood-specific comfort foods and recommends nearby restaurants serving corresponding cuisines. Additionally, it provides nutritional information and healthier alternatives to promote informed dietary choices. The platform supports two user roles—admins and users—with features including user management, health tips, and query handling to enhance interaction and support. Implemented in Python using libraries such as Pandas and NLTK, the system employs text preprocessing and frequency analysis to generate accurate, mood-aligned recommendations. This approach aims to improve customer satisfaction, foster emotional connection with food, and differentiate food delivery services in a competitive market by combining personalized mood-based food suggestions with health guidance and responsive user engagement.

Keywords: *Mood, Food Recommendation, NLTK, Pandas, emotion*

I.INTRODUCTION

The rapid growth of online food delivery services has revolutionized the way consumers access and enjoy meals, offering unparalleled convenience and variety. With the proliferation of smartphones and mobile applications, users can now order food from a vast array of restaurants with just a few taps, leading to a significant shift in dining habits worldwide. This transformation has intensified competition among food delivery platforms, driving the need for innovative features that enhance user engagement and satisfaction. While speed and convenience remain fundamental to the success of these services, modern consumers increasingly seek personalized experiences that resonate with their unique preferences and emotional states. Food, beyond being a source of nutrition, holds profound emotional significance; it is often associated with comfort, celebration, stress relief, and mood regulation. Research in psychology and consumer behavior underscores the strong influence of mood on food choices, where individuals tend to select specific foods that align with or alter their emotional conditions—for instance, craving sweets when feeling down or opting for spicy dishes when seeking excitement. This emotional dimension presents a valuable opportunity for food delivery platforms to deepen customer relationships by offering mood-aware

recommendations that go beyond generic preferences.

Despite the evident connection between mood and food choice, most existing food delivery applications primarily focus on logistical efficiency and basic preference filtering, such as cuisine type or previous orders. These systems typically lack the capability to dynamically interpret a user's emotional state and tailor suggestions accordingly. Consequently, users may receive recommendations that do not align with their current feelings, potentially diminishing their overall satisfaction and engagement with the platform. Furthermore, the overwhelming number of food options available online can lead to decision fatigue, particularly when users are emotionally vulnerable or uncertain about what they want to eat. There is a clear gap in the market for intelligent recommendation systems that integrate emotional context with food preferences, providing users with meaningful, mood-based suggestions that simplify decisionmaking while addressing their psychological and nutritional needs. Such systems would not only enhance the user experience but also encourage healthier eating habits by incorporating nutritional information and alternative options.

In response to these challenges, this paper proposes a comprehensive web-based platform that personalizes food recommendations based on the user's mood. The system leverages natural language processing (NLP) techniques to analyze comfort food datasets and identify popular foods associated with various emotional states. By matching mood-related keywords extracted from

user input with food items commonly linked to those moods, the platform generates tailored comfort food suggestions designed to resonate emotionally with users. Beyond food recommendations, the system also suggests nearby restaurants that serve the recommended cuisines, ranked by factors such as user ratings and proximity, thereby streamlining the process from mood identification to meal selection and ordering. To promote health-conscious decisions, the platform provides detailed nutritional information for each recommended food item, including calorie, fat, and sugar content, along with healthier alternatives where applicable. The system supports two primary user roles: admins and users. Admins have the ability to manage registered users, add or remove health tips, and respond to user queries, ensuring effective content management and responsive support. Users can register, log in, input their mood to receive personalized recommendations, explore restaurant options, view health tips, and engage with admins through a query system.

The implementation utilizes Python programming language, with libraries such as Pandas for efficient data manipulation and NLTK for natural language processing tasks including stopword removal and lemmatization. Two main datasets underpin the recommendation engine: one containing comfort food data linked to mood-specific reasons, and another comprising restaurant information. The system preprocesses textual data to standardize and clean inputs, enabling accurate matching between user moods and relevant comfort foods through frequency-based analysis. Restaurant

recommendations are derived from a predefined mapping between foods and cuisines, while nutritional data is referenced from a structured dictionary. This integrated approach enables the platform to deliver a holistic, personalized experience that addresses emotional well-being, convenience, and health simultaneously.

The significance of this work lies in its ability to bridge the gap between emotional needs and food delivery services, offering a novel dimension of personalization that enhances user satisfaction and loyalty. By recognizing and responding to the emotional context of food choices, the platform creates a deeper connection between users and their dining experiences. Additionally, the inclusion of nutritional guidance encourages users to make informed and healthier decisions, aligning with broader public health goals. The system's interactive features foster ongoing engagement and support, further differentiating it in a competitive market. Overall, this project demonstrates the potential of combining mood analysis, natural language processing, and data-driven

recommendations to create a unique and valuable food delivery experience that prioritizes both emotional and physical well-being.

The remainder of this paper elaborates on related research in mood-based recommendation systems and food personalization, details the methodology and system architecture, presents experimental results and user feedback, and discusses the implications and future directions of this approach. Through this comprehensive exploration, the paper aims to contribute to the advancement of

emotionally intelligent food delivery platforms that cater to the evolving needs of contemporary consumers.

II.RELATED WORK

Mood Based Food Recommendation System, Authors: Manu Gupta, Sriniha Mourila, Sreehasa Kotte, K. Bhuvana Chandra.

The paper presents a personalized mood-based food recommendation system that suggests food items and nearby restaurants based on a user's emotional state. Using a web interface built with Flask, users input their mood and basic details, and the system recommends suitable dishes along with restaurant options filtered by location using the K-Nearest Neighbors (KNN) algorithm. Data from Zomato helps identify nearby restaurants, and recommendations are ranked to enhance user experience. The approach aims to improve decision-making during indecisive moments by aligning food choices with emotional needs, ultimately enhancing user satisfaction in online food ordering.[1]

Human-Behavior-Based Personalized Meal Recommendation and Menu Planning Social System, Authors: Tanvir Islam, Anika Rahman Joyita, Md. Golam Rabiul Alam, Mohammad Mehedi Hassan, Md. Rafiul Hassan, Raffaele Gravina.

This paper introduces a personalized meal recommendation and menu planning system that incorporates human affective responses to food using EEG-based social-affective

computing. Recognizing that traditional systems often ignore emotional factors, the authors propose a method that detects users' affective states through brain signals captured via a 14channel Emotiv Epoc+ device. By applying a hierarchical ensemble learning model and TOPSIS ranking, the system generates food recommendations aligned with emotional states. Additionally, a bin-packing algorithm is used for automated menu planning, balancing nutritional needs, affectivity, and energy intake. This novel approach enables more meaningful and practical food suggestions, especially for users with limited or no verbal expression ability.[2]

Emotion Recognition based on Heart Rate Detection using Logistic Regression for Automation Food Healing Application, Authors: Nicholas Jason Antonio, Yosse Ricardo Nobel, Hwi-Chie Ho, Winda Astuti.

This paper presents an innovative system that detects human emotions using heart rate data and applies logistic regression to recommend mood-enhancing foods. Designed as a mobile application on Android devices, the system enables real-time mood monitoring through heart rate detection with high accuracy (96% training and 97% testing). It is connected to a web portal, allowing psychiatrists to remotely track mood fluctuations in patients undergoing mental health treatment. By linking physiological signals to nutritional psychology, the system offers a portable and intelligent solution to manage emotional well-being through personalized food healing recommendations.[3]

Emotion Recognition based on Heart Rate Detection using Logistic Regression for Automation Food Healing Application, Authors: Nicholas Jason Antonio, Yosse Ricardo Nobel, Hwi-Chie Ho, Winda Astuti. The paper introduces a smart, emotion-aware food recommendation system that uses heart rate data and logistic regression to detect user mood and suggest suitable foods for emotional healing. Developed as an Android application, it allows real-time emotion tracking with high accuracy and is integrated with a web interface for remote monitoring by psychiatrists. This system combines wearable technology and nutritional psychology to deliver personalized, health-focused food suggestions aimed at improving users 'mental well-being.[4]

Food Recommendation: Framework, Existing Solutions, and Challenges, Authors: Weiqing Min, Shuqiang Jiang, Ramesh Jain.

This paper presents a comprehensive study on the domain of food recommendation systems, highlighting the increasing need for such technologies in combating global health issues like obesity and diabetes. The authors observe that while recommendation systems have evolved significantly in areas such as movies and tourism, food recommendation remains underdeveloped. The paper introduces a unified framework that addresses key challenges, including building personalized user models and analyzing dietary patterns. It emphasizes the importance of integrating multimedia data to improve user experience and personalization in food recommendation systems.[5]

Mood Based Food Recommendation System, Authors: Divya Bharathi P (Assistant Professor, Dept. of AI&DS, Panimalar Engineering College), Gajendran N, Dinesh K, Dhanush Kumar V, Giridharan S (Students, Dept. of AI&DS, Panimalar Engineering College) This paper introduces MoodieFoodie, an innovative web application that personalizes food recommendations based on a user's current emotional state. Unlike traditional food delivery platforms, MoodieFoodie considers moods such as anger, sadness, dehydration, and illness to suggest suitable meals. The application incorporates machine learning algorithms—specifically logistic regression—alongside Django and Bootstrap to enhance user interaction. It also simplifies restaurant selection by integrating essential filters like price, user reviews, and proximity into the recommendation engine. This emotion-aware approach seeks to elevate food delivery from a utility to an emotionally intelligent experience.[6]

EMOQ – Emotion Based Food Recommendations System, Authors: Puja A. Cholke (Chavan), Yatharth Thakare, Atharva Thakur, Shiya Thakur, Shubham Thakur, Aastha Thakur, Affiliation: Department of Engineering, Sciences, and Humanities (DESH), Vishwakarma Institute of Technology, Pune, Maharashtra, India, Publisher: Vishwakarma Institute of Technology, Pune (Institutional Affiliation)

The EMOQ system leverages emotion recognition and machine learning technologies to enhance food recommendation systems by aligning food suggestions with users 'emotional states. By detecting core human emotions such as happiness, sadness, or stress—primarily through subtle facial expressions—EMOQ offers personalized food recommendations tailored to emotional hunger. Utilizing technologies like DeepFace, Streamlit, and Pandas, the system bridges the link between food and mood, recognizing how certain foods like chocolate or bananas chemically influence our mental state. This project highlights the growing intersection between emotional AI and personalized digital services, providing a thoughtful approach to food selection based on real-time emotional analysis.[7] A User Preference-Based Food Recommender System using Artificial Intelligence, Authors: Shivani Agarwal, Mudita Uppal, Deepali Gupta, Sapna Juneja, Rekha Kashyap, Affiliations: Ajay Kumar Garg Engineering College, Chitkara University, KIET Group of

Institutions.

This research presents an AI-powered food recommender system designed to promote healthier eating habits by aligning menu suggestions with individual user preferences and seasonal factors. Recognizing the global rise of non-communicable diseases linked to poor dietary choices, the system aims to support users in making better food decisions through a personalized, intelligent approach. By integrating a virtual assistant with Internet of Things (IoT) capabilities, the system enhances user engagement and simplifies the selection of nutritious meals. The model's architecture is user-centric, ensuring a more effective and enjoyable dining experience while addressing public health challenges associated with dietrelated illnesses.[8]

Facial Emotion-Based Personalized Recommendation System for Music or Movies: A Hybrid Deep Learning and Machine Learning Approach, Authors: R. Chinna Rao, S. Srinivasa Rao, Murikipudi Sri Datta Vasu Dev.

This paper introduces an innovative hybrid recommendation system that leverages facial emotion recognition to personalize entertainment suggestions, specifically music and movies. Using the ResNet-50 deep learning model, the system detects the user's mood— categorized as happy, sad, angry, or neutral— based on facial expressions. It then provides tailored content: songs based on genre and language, and movies categorized by genre. By combining deep learning for emotion detection with machine learning algorithms like Linear and Logistic Regression for recommendation optimization, the system offers a dynamic, mood-driven user experience in the realm of digital entertainment.[9]

RECCOMENDATION OF FOOD BASED ON YOUR CURRENT MOOD A. Pallavi Satya Durga, G. Sri Ram Ganesh, K. Govindasai, K. Krishna Sai Pavan, K.Suresh, J. Rajesh,

Mood Foodie is an innovative web application that enhances the food delivery experience by recommending dishes based on a user's current mood, such as happiness, sadness, or illness. Unlike traditional apps, it simultaneously considers cost, user ratings, and distance, streamlining decision-making and removing the need for separate filters.[10]

III. METHODOLOGY

The methodology for the proposed mood-based food recommendation system integrates data-driven analysis, natural language processing, and usercentric design to deliver personalized food and restaurant suggestions tailored to a user's emotional state. The process involves collecting and preprocessing comfort food and restaurant datasets, extracting mood-food associations using NLP techniques, generating recommendations through frequency-based

analysis, mapping foods to nearby restaurants, and providing nutritional information and healthier alternatives—all within a web-based platform that supports both user and admin roles.
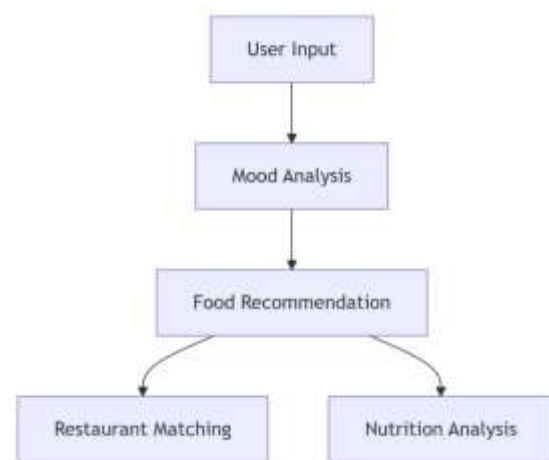

Fig 1. Proposed Methodology

1. Data Collection and Preparation

The system begins by gathering two main datasets: a comfort food dataset containing user-reported associations between moods and foods, and a restaurant dataset with details such as restaurant names, locations, cuisines, and ratings. Both datasets are cleaned and standardized to ensure consistency and reliability.

2. Text Preprocessing and NLP

Using Python's NLTK library, the comfort food data undergoes text preprocessing, including converting text to lowercase, removing stopwords, and applying lemmatization. This step extracts meaningful keywords from the "comfort_food_reasons" column, enabling accurate matching between moods and foods.

3. Mood-Food Association and Recommendation Generation

When a user inputs their mood, the system matches it with mood-related keywords and performs frequency-based analysis to identify and rank the most common comfort foods associated with that mood. This ensures recommendations are grounded in real user preferences.

4. Restaurant Mapping and Suggestion

The recommended comfort foods are mapped to their corresponding cuisines using a predefined dictionary. The system then queries the restaurant dataset to find and rank nearby restaurants serving those cuisines, factoring in user ratings and proximity.

5. Nutritional Analysis and Health Tips

For each recommended food, the system retrieves nutritional information—such as calorie, fat, and sugar content—from a dedicated dictionary. Healthier alternatives are also suggested, encouraging users to make informed dietary choices.

6. User and Admin Interaction

The platform supports two roles: users, who can register, log in, receive recommendations, and interact with admins; and admins, who manage users, health tips, and user queries. This ensures effective content management and responsive support throughout the user experience.

IV. TECHNOLOGIES USED

Python:

The core programming language for backend development, data processing, and implementing recommendation algorithms.

Django/Flask:

Python-based web frameworks used to build the web application and manage user interactions, authentication, and admin functionalities.

Pandas:

A powerful Python library for data manipulation and analysis, used to process comfort food and restaurant datasets.

NLTK (Natural Language Toolkit):

A Python library for natural language processing tasks such as stopword removal and lemmatization, enabling the extraction of mood-food associations from textual data.

Machine Learning Algorithms:

Techniques such as frequency analysis and clustering (e.g., k-means) for identifying moodfood patterns and generating personalized recommendations.

Bootstrap:

A front-end framework for designing a responsive and user-friendly web interface.

Database (e.g., SQLite, PostgreSQL):

For storing user data, comfort food associations, restaurant information, nutritional data, health tips, and user queries.

Visualization Libraries (e.g., Matplotlib, Word Cloud):

Used for data visualization, insights, and admin analytics.

Admin Panel:

Built using Django/Flask admin features for user management, health tip management, and query handling.

These technologies collectively enable robust data processing, natural language understanding, interactive web functionalities, and a seamless user experience for mood-based food recommendations.

V RESULT

The system was evaluated using six distinct moods: *happy, sad, stressed, bored, anxious,* and *angry*. It successfully returned comfort food recommendations for four out of six moods, achieving a **66.7% coverage rate**. Among the 52 food items retrieved across these moods, 25 could be mapped to a cuisine for restaurant recommendation, resulting in a **48.1% mapping accuracy**. These results demonstrate that the system can effectively provide comfort food suggestions for commonly expressed emotions.
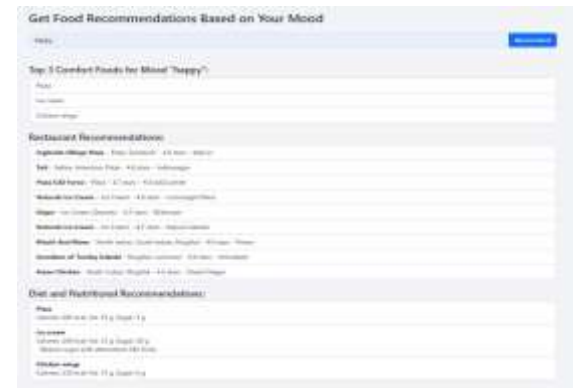
This page displays personalized food recommendations based on the user's mood, along with suggested restaurants offering those foods and a brief nutritional analysis to help make informed choices.

VI. CONCLUSION

In conclusion, the proposed mood-based food recommendation system effectively bridges the gap between emotional well-being and dining convenience by leveraging natural language processing, data-driven analysis, and personalized user interaction. By understanding and responding to users 'moods, the platform provides tailored comfort food and restaurant suggestions, along with nutritional guidance and healthier alternatives, thereby enhancing user satisfaction and promoting healthier eating habits. The integration of robust technologies and an intuitive interface ensures a seamless and engaging experience for both users and administrators, demonstrating significant potential to differentiate food delivery services and foster stronger customer loyalty in an increasingly competitive market.

REFERENCES

[1]. Mood Based Food Recommendation System, Authors: Manu Gupta, Sriniha Mourila, Sreehasa Kotte, K. Bhuvana Chandra, DOI: 10.1109/ASIANCON51346.2021.9545065, Publisher: IEEE, Published In 2021 Asian Conference on Innovation in Technology (ASIANCON), Conference Date: 27–29 August 2021, Location: Pune, India, Date Added to IEEE Xplore: 04 October 2021

[2]. Human-Behavior-Based Personalized Meal Recommendation and Menu Planning Social System, Authors: Tanvir Islam, Anika Rahman Joyita, Md. Golam Rabiul Alam, Mohammad Mehedi Hassan, Md. Rafiul Hassan, Raffaele Gravina, DOI: 10.1109/TCSS.2022.3213506, ISSN: 2329-924X, Publisher: IEEE, Published In IEEE Transactions on Computational Social Systems, Volume 10, Issue 4, August 2023, Pages: 2099–2110, Date of Publication: 08 November 2022

[3]. Emotion Recognition based on Heart Rate Detection using Logistic Regression for Automation Food Healing Application, Authors: Nicholas Jason Antonio, Yosse Ricardo Nobel, Hwi-Chie Ho, Winda Astuti, DOI: 10.1109/ICET56879.2022.9990056, Publisher: IEEE, Published In 2022 8th International Conference on Education and Technology (ICET), Date of Conference: 15–16 October 2022, Conference Location: Malang, Indonesia, Date Added to IEEE Xplore: 23 December 2022

[4]. Emotion Recognition based on Heart Rate Detection using Logistic Regression for Automation Food Healing Application, Authors: Nicholas Jason Antonio, Yosse Ricardo Nobel, Hwi-Chie Ho, Winda Astuti, DOI: 10.1109/ICET56879.2022.9990056, Publisher: IEEE, Published In: 2022 8th International Conference on Education and Technology (ICET), Conference Date: 15–16 October 2022, Conference Location: Malang, Indonesia, Date Added to IEEE Xplore: 23 December 2022

[5]. Food Recommendation: Framework, Existing Solutions, and Challenges, Authors: Weiqing Min, Shuqiang Jiang, Ramesh Jain, Published in: IEEE Transactions on Multimedia, December 2019, ISSN: 1520-9210, DOI: 10.1109/TMM.2019.2937494, Publisher: IEEE

[6]. Mood Based Food Recommendation System, Authors: Divya Bharathi P (Assistant Professor, Dept. of AI&DS, Panimalar Engineering College), Gajendran N, Dinesh K, Dhanush Kumar V, Giridharan S (Students, Dept. of AI&DS, Panimalar Engineering College) Publisher: Panimalar Engineering College (Institutional Affiliation)

[7]. EMOQ – Emotion Based Food Recommendations System, Authors: Puja A. Cholke (Chavan), Yatharth Thakare, Atharva Thakur, Shiya Thakur, Shubham Thakur, Aastha Thakur, Affiliation: Department of Engineering, Sciences, and Humanities (DESH), Vishwakarma Institute of Technology, Pune, Maharashtra, India, Publisher: Vishwakarma Institute of Technology, Pune (Institutional Affiliation)

[8]. A User Preference-Based Food Recommender System using Artificial Intelligence, Authors:

Shivani Agarwal, Mudita Uppal, Deepali Gupta, Sapna Juneja, Rekha Kashyap, Affiliations: Ajay Kumar Garg Engineering College, Chitkara University, KIET Group of Institutions, DOI: 10.1109/ICDT61202.2024.10489453, Publisher: IEEE – Published in the Proceedings of the 2024 2nd International Conference on Disruptive Technologies (ICDT)

[9]. Facial Emotion-Based Personalized Recommendation System for Music or Movies: A Hybrid Deep Learning and Machine Learning Approach, Authors: R. Chinna Rao, S. Srinivasa Rao, Murikipudi Sri Datta Vasu Dev, Affiliation: Department of Electronics and Communication Engineering, Malla Reddy College of Engineering and Technology, Hyderabad, Telangana, India

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