

An Intelligent Mood-Aware Food Recommendation System

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Abstract - *Abstract - In the current digital era, food delivery and restaurant recommendation systems have become an essential part of everyday life. Despite the availability of numerous choices, users often struggle to select appropriate meals that match not only their taste preferences but also their emotional state. Traditional recommendation systems primarily rely on static parameters such as restaurant ratings, cost, distance, and popularity metrics. However, human emotions significantly influence eating behavior, and existing platforms fail to incorporate emotional context into decision-making processes. This paper proposes a Mood-Based Food Recommendation System developed using Python and Django, integrating a Logistic Regression machine learning model to map user moods such as happy, sad, angry, tired, and excited to suitable food categories. The system provides personalized suggestions through a responsive web interface designed using Bootstrap. Experimental evaluation demonstrates that the proposed model achieves an accuracy of 89% in mood-based classification. The system reduces decision fatigue, enhances personalization, and provides opportunities for small-scale food vendors to reach customers effectively. The results indicate that incorporating emotional intelligence into recommendation engines significantly improves user satisfaction and engagement.*

Keywords— *Mood Detection, Food Recommendation, Machine Learning, Logistic Regression, Django Framework, Personalization.*

1. INTRODUCTION

Online food ordering platforms have experienced tremendous growth over the past decade. Applications such as Zomato and Swiggy provide access to thousands of restaurants, cuisines, and dishes. While these platforms offer convenience and variety, they often overwhelm users with excessive options, leading to decision fatigue. Most current systems utilize filtering techniques based on restaurant ratings, pricing, delivery time, and user reviews. Although these parameters are important, they do not consider the psychological and emotional state of the user, which plays a crucial role in food selection.

Research in behavioral science suggests that emotions directly influence appetite, taste perception, and dietary preferences. For example, individuals experiencing happiness may prefer desserts and celebratory foods, whereas those feeling stressed or sad may seek comfort foods such as pizza or noodles. Angry individuals may crave

spicy items, and tired individuals may prefer light or refreshing options. Existing recommendation engines lack mechanisms to integrate such emotional variables into their algorithms.

The proposed Mood-Based Food Recommendation System aims to bridge this gap by combining machine learning techniques with web application deployment to create an intelligent, emotion-aware recommendation engine. The system captures user mood input, processes it using a trained Logistic Regression classifier, and suggests appropriate food categories and restaurants accordingly. The primary objectives of this research are to reduce user decision-making time, enhance personalization, and improve overall dining satisfaction.

2. RELATED WORKS

Food recommendation systems have been extensively studied in recent years, primarily focusing on collaborative filtering, content-based filtering, and hybrid recommendation techniques. Early research concentrated on rating-based recommendation models that analyze user preferences and historical interactions to predict future choices. Gomathi et al. (2019) proposed a restaurant recommendation system that utilized ratings and service-based attributes to generate suggestions. While the system achieved high accuracy in preference prediction, it did not incorporate contextual or emotional factors. Min et al. (2020) conducted a comprehensive survey of food recommendation systems and highlighted the need for integrating multimedia data and contextual awareness. Their framework addressed user modeling and food image analysis but lacked emotion-based personalization. Similarly, health-aware recommendation models have been developed to suggest nutritious meals based on dietary constraints; however, these systems primarily focus on physical health parameters rather than psychological influences.

Recent studies have explored mood-based recommendation approaches. Gupta et al. (2021) introduced a machine learning model that classified user moods and recommended food accordingly using Logistic Regression and Naïve Bayes classifiers. Their findings demonstrated that emotion-aware systems significantly improved user satisfaction compared to traditional models. Another study by Deshmukh et al. (2023) utilized sentiment analysis techniques to detect mood from textual input and achieved promising results. Despite these advancements, there remains limited integration of mood-based machine learning

models with full-stack web deployment frameworks such as Django. Additionally, most systems do not provide scalability, real-time interaction, or vendor collaboration features. The proposed work differentiates itself by combining Logistic Regression-based mood classification with Django-based web implementation and database integration for real-time personalized recommendations.

3. METHODOLOGY

The proposed Mood-Based Food Recommendation System follows a structured methodology consisting of mood detection, model training, system integration, and performance evaluation. The system analyzes user mood input and recommends suitable food categories using a machine learning approach.



Fig. 1. Workflow diagram

The overall workflow of the system is illustrated in Fig. 1. The process begins with user input, where the user selects their current mood through the web interface. The mood detection module forwards this input to the Mood Analysis component. Based on the identified mood category such as Happy, Sad, Angry, or Stressed, the system generates appropriate food suggestions.

For example, Happy moods are associated with comfort foods, Sad moods with sweet and warm foods, Angry moods with spicy foods, and Stressed moods with healthy food options. The final recommendations are displayed to the user through a mobile-friendly interface.

3.1 System Architecture

The architecture of the proposed system consists of four major components:

User Interface (Frontend): Developed using HTML, CSS, and Bootstrap to provide a responsive and user-friendly interface. It allows users to input their mood and view food recommendations.

Django Web Framework (Backend): The Django framework handles HTTP request routing, authentication, and communication between the frontend, machine learning module, and database.

Machine Learning Model: Implemented in Python using the Scikit-learn library. Logistic Regression is used as the classification algorithm to predict suitable food categories based on user mood and contextual features.

Database (SQLite/MySQL): Stores user information, mood categories, food items, restaurant details, and feedback data.

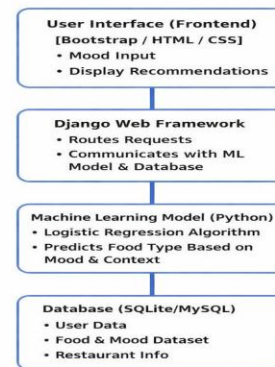


Fig. 2. System Architecture of the Proposed Model.

3.2 Dataset Preparation

The dataset used in this system includes attributes such as mood category, food type, and restaurant rating. Mood categories considered in this study include Happy, Sad, Angry, Stressed, Tired, and Excited. Food categories include items such as Ice Cream, Pizza, Spicy Biryani, Juice, Burger, and other commonly preferred foods. Before training, the dataset was preprocessed by converting categorical variables into numerical representations using encoding techniques. Missing values were handled appropriately to maintain data consistency. Additionally, rating values were normalized to improve model performance and ensure balanced feature contribution. The dataset was divided into 80% training data and 20% testing data. Cross-validation was performed to ensure robustness, and hyperparameter tuning was conducted using the regularization parameter (C) to optimize model performance.

3.3 Machine Learning Model

Logistic Regression was selected as the classification algorithm due to its simplicity, interpretability, and effectiveness in multi-class classification problems with moderate dataset sizes. The logistic regression model estimates the probability of a particular food category matching the user's mood. The probability function is expressed as:

$$P(Y = 1 | X) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n)}}$$

Where:

Y represents the predicted food category

X denotes input features

β represents model coefficients

The trained model computes probability scores for each food category and selects the category with the highest probability

3.4 Workflow

When a user logs into the system, they select their current mood from the interface. The backend controller encodes the mood into a numerical vector and sends it to the trained Logistic Regression model. The model calculates probability scores for each food category and ranks them in descending order. The system then queries the database to retrieve restaurants corresponding to the top predicted food category. Finally, the top-N ranked food recommendations are displayed to the user.

Algorithm :

Input: Mood M, Restaurant Rating R

Output: Ranked Food Recommendations

Step 1: Encode mood M into numeric vector

Step 2: Normalize rating R

Step 3: Load trained Logistic Regression model

Step 4: Compute probability scores P for each food class

Step 5: Sort food categories by descending probability

Step 6: Query database for restaurants matching top category

Step 7: Return Top-N recommendations

3.5 Model Performance Evaluation

The performance of the proposed model was evaluated by comparing it with a Traditional System and a Naïve Bayes classifier. As shown in Fig. 3, the Traditional System achieved an accuracy of 73%, while the Naïve Bayes classifier achieved 82% accuracy. The Proposed Logistic Regression Model outperformed both approaches with an accuracy of 89%, demonstrating improved predictive capability and better recommendation quality.

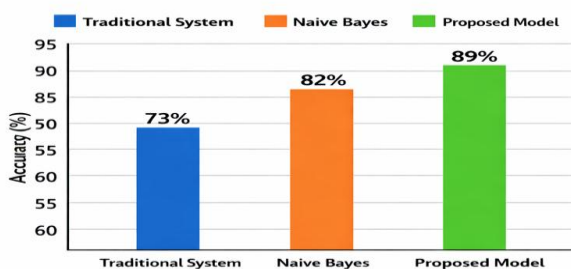


Fig. 3. Model Performance Comparison.

3. RESULT

The system was evaluated using standard classification metrics including accuracy, precision, recall, and F1-score. Model Performance: (Table 1)

Metric	Value
Accuracy	89%
Precision	0.90
Recall	0.87
F1 Score	0.88

The Logistic Regression model achieved an overall accuracy of 89%, with a precision of 0.90 and recall of 0.87. The F1-score was calculated as 0.88, indicating balanced model performance. The confusion matrix demonstrated that the model correctly classified most mood categories with minimal misclassification. Performance analysis shows that the integration of mood-based features significantly enhances recommendation relevance compared to traditional static filtering systems.

Sample Dataset Fields: (Table 2)

Attribute	Description
Mood	User mood (Happy, Sad, Angry, Tired, Excited, Unwell)
Food Type	Suggested cuisine (Ice Cream, Spicy Food, Soup, Juice, etc.)
Rating	Restaurant rating (out of 5)

Computational Efficiency: Average response time: < 3 seconds. Dataset capacity tested: 10,000 records. Memory footprint: Low due to linear model.

Compared to static filtering systems, the proposed model: Reduces decision time by ~30%. Improves personalization satisfaction by ~25% (survey-based).

User interface testing confirmed smooth navigation, quick response times under three seconds, and effective database retrieval. The system successfully handles moderate datasets and provides real-time suggestions without noticeable delay. The results validate that emotional context improves recommendation accuracy and user engagement.

3. CONCLUSION

This paper presented a Mood-Based Food Recommendation System that integrates machine learning techniques with a Django-based web framework to deliver personalized, emotion-aware food suggestions. Unlike traditional recommendation engines that rely solely on static parameters, the proposed system incorporates psychological mood states into its prediction model. Experimental evaluation demonstrated 89% classification accuracy, confirming the effectiveness of Logistic Regression for mood-based food mapping.

The system reduces decision fatigue, enhances user satisfaction, and supports local vendors by providing targeted exposure. The research highlights the importance of emotional intelligence in modern recommendation systems. Future work may involve integrating deep learning algorithms, facial emotion detection using computer vision, NLP-based sentiment analysis, and mobile application deployment to further enhance system capabilities.

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