

**D.Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY,
KASABA BAWADA, KOLHAPUR**

A

Project Report On

“CRAVINGS:- A FOOD RECOMMADATION SYSTEM”

Submitted by:

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DEPARTMENT OF COMPUTER SCIENCE (DATA SCIENCE)

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**D. Y. PATIL COLLEGE OF ENGINEERING AND TECHNOLOGY,
KOLHAPUR**
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(DATA SCIENCE)



CERTIFICATE

This is to certify that the project group consisting of following members have satisfactorily completed the project-I work entitled “**CRAVINGS :- A food recommendation system**” at BTech (CSE DS) semester – IV as prescribed in the syllabus of D.Y Patil college of engineering and technology ,Kolhapur for the academic year 2022-2023.

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Last, but not least, we are also thankful to all the authors whose work has been consulted, utilized, and cited in this report.

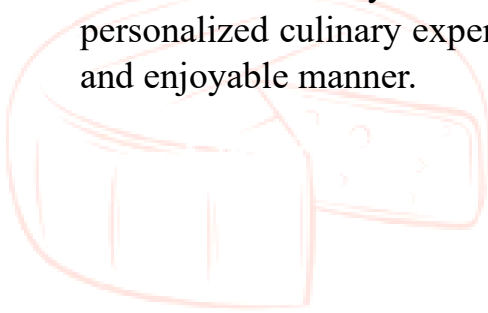
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ABSTRACT :-

The food recommendation system is an intelligent application designed to provide personalized food recommendations to users based on their taste preferences, dietary restrictions, and ingredient availability. This system utilizes machine learning algorithms and data processing techniques to analyse a vast collection of food-related data, including recipes, user reviews, and nutritional information. Through the extraction of relevant features and the training of a recommendation model, the system aims to offer tailored suggestions that match the user's unique culinary preferences. Additionally, gamification elements are incorporated to enhance user engagement and motivation. The system's user-friendly interface allows users to input their preferences and receive a list of recommended recipes that align with their requirements. The effectiveness of the system is evaluated through metrics and user feedback, with ongoing improvements and enhancements planned for future iterations. The food recommendation system serves as a valuable tool for individuals seeking personalized culinary experiences and exploration of new recipes in an intuitive and enjoyable manner.



CRAVINGS

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INTRODUCTION: -

The Food Recommendation System is a computer-based software that aims to provide users with personalized food recommendations based on their preferences. The system uses a variety of data, including the user's dietary requirements, past food choices and other relevant factors, to generate food recommendations that are tailored to the user's needs and tastes.

The project is designed to make it easier for users to discover new foods, explore different cuisines, and make informed decisions about what they eat. The system is particularly useful for people who have specific dietary requirements, such as vegetarians, vegans, or people with food allergies or intolerances.

The Food Recommendation System is based on machine learning algorithms that analyse data from various sources to make accurate and relevant food recommendations. The system is designed to continuously learn and improve over time, based on the user's feedback and new data.

The project aims to provide a user-friendly interface that is easy to navigate and understand, with features that allow users to filter and sort their food recommendations based on various criteria, such as cuisine, dietary requirements, price range, and location.

Overall, the Food Recommendation System is a useful tool for anyone who loves food and wants to discover new culinary experiences. It provides a personalized and convenient way for users to explore new cuisines and find the perfect meal for their taste buds.

LITERATURE REVIEW: -

The Food Recommendation System is a computer-based software that aims to provide users with personalized food recommendations based on their preferences. The system uses a variety of data, including the user's dietary requirements, past food choices and other relevant factors, to generate food recommendations that are tailored to the user's needs and tastes.

Collaborative filtering algorithms recommend items based on the preferences of similar users or items. User-based collaborative filtering compares a user's preferences with other similar users to make recommendations. Item-based collaborative filtering compares the similarity between items to recommend similar items to users.

Content-based filtering algorithms recommend items based on their content attributes. In a food recommendation system, content-based filtering considers attributes such as ingredients, cuisine, cooking techniques, and nutritional information to suggest similar recipes.

Hybrid filtering algorithms combine collaborative filtering and content-based filtering to provide more accurate and diverse recommendations. These algorithms leverage the strengths of both approaches to overcome their limitations and improve recommendation quality.

PROBLEM STATEMENT: -

To design and develop a food recommendation system that suggests personalized food options to users based on their preferences, past interactions, and dietary restrictions.

The goal is to enhance the user experience by suggesting dishes that they are most likely to enjoy and cater to their dietary needs



EXISTING SYSTEMS: -

There are many existing food recommendation systems available, both online and offline. These systems often use collaborative filtering, content-based filtering, or hybrid approaches to recommend food items to users based on their preferences, history, and other factors.

Here are some examples of existing food recommendation systems:

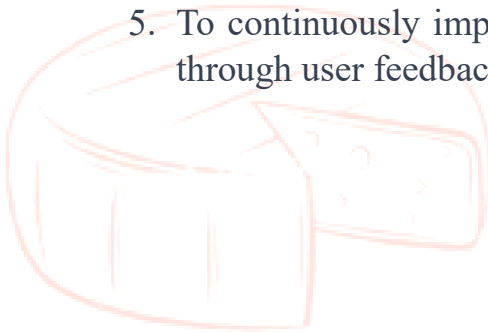
1. Yelp: This is a popular platform that not only allows users to rate and review restaurants but also provides personalized recommendations based on their past searches and reviews.
2. OpenTable: This is a restaurant reservation and review website that also provides recommendations for nearby restaurants based on a user's location and cuisine preferences.
3. Zomato: This is a restaurant discovery and review platform that provides personalized recommendations based on a user's search history and rating patterns.
4. Allrecipes: This is a recipe discovery and sharing website that provides personalized recipe recommendations based on a user's search history and saved recipes.
5. HelloFresh: This is a meal kit delivery service that provides personalized recipe recommendations based on a user's taste preferences and dietary restrictions.

The proposed project aims to develop a food recommendation system that utilizes natural language processing techniques to better understand users' food preferences and recommend food items based on those preferences. It will also incorporate a user interface to enhance the user experience.

Compared to existing systems, the proposed system aims to provide more personalized and accurate food recommendations and a more user-friendly interface. It will also incorporate additional features such as dietary restriction filtering and recipe suggestions based on recommended food items.

OBJECTIVES: -

1. To provide personalized food recommendations to users based on their preferences & dietary restrictions
2. To make the process of finding new and interesting food options easier for users.
3. To promote lesser-known or underappreciated dishes and cuisines.
4. To provide an engaging user experience through a GUI.
5. To continuously improve the accuracy of the recommendation algorithm through user feedback and machine learning techniques.

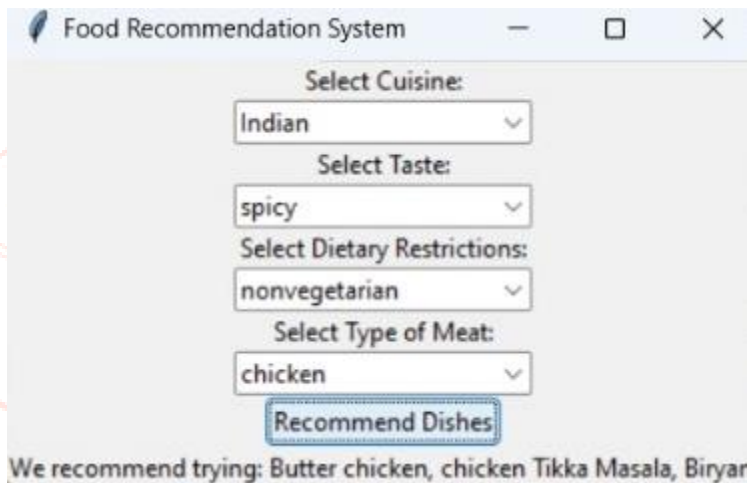


CRAVINGS

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PROPOSED WORK: -

The proposed work for the food recommendation system involves collecting a comprehensive dataset of recipes and user preferences. User profiles will be created to capture dietary restrictions and taste preferences. Relevant features will be extracted from the data, and machine learning algorithms like collaborative filtering and content-based filtering will be trained to generate personalized recipe recommendations. An intuitive user interface will be designed for easy interaction, and the system will be evaluated, optimized, and tested for accuracy and performance.



The screenshot shows a web application window titled "Food Recommendation System". It contains four dropdown menus for user selection: "Select Cuisine:" with "Indian" selected, "Select Taste:" with "spicy" selected, "Select Dietary Restrictions:" with "nonvegetarian" selected, and "Select Type of Meat:" with "chicken" selected. Below these menus is a blue button labeled "Recommend Dishes". At the bottom of the window, a text message reads: "We recommend trying: Butter chicken, chicken Tikka Masala, Biryani". A large, semi-transparent "CRAVINGS" watermark is visible in the background of the image.

METHODOLOGIES: -

The methodology for developing a food recommendation system involves problem definition, data collection, pre-processing, and feature extraction.

The appropriate machine learning algorithms are selected, and models are trained using a dataset split into training and testing sets.

The recommendation engine is developed to generate personalized recipe recommendations based on user inputs.

The user interface is designed for easy interaction and exploration of recommended recipes.

The system's performance is evaluated using metrics and user feedback, leading to iterative improvements.

The final system is deployed, monitored, and maintained, ensuring scalability, security, and data privacy.

Regular testing, validation, and adherence to ethical guidelines are integral throughout the methodology.

TECHNOLOGIES: -

Programming Language: Python is a popular choice due to its extensive libraries and frameworks for machine learning and data processing.

Machine Learning Libraries: Python libraries such as scikit-learn, TensorFlow, and PyTorch are used for training and implementing machine learning algorithms.

Data Processing and Analysis: Pandas and NumPy libraries are employed for data preprocessing, manipulation, and analysis tasks.

GUI Development: Tkinter library is used in Python for creating graphical user interfaces (GUIs). It provides a set of tools and widgets that can be used to design interactive interfaces for the application.

Database Management: CSV files for database management is a lightweight option, especially for smaller-scale projects. CSV files allow you to store structured data in a tabular format, making it easy to read, write, and manipulate data using Python's built-in CSV module.

Canva:- Popular designing tool for making GUIs and other graphical work

MODULES IMPLEMENTED: -

Pandas: Pandas is a powerful library for data manipulation and analysis. It can be used to read and process data from CSV files, perform data filtering and transformations, and handle missing values.

NumPy: NumPy provides support for efficient numerical operations and array manipulation. It is often used in conjunction with Pandas for handling numerical data and performing mathematical calculations.

Scikit-learn: Scikit-learn is a popular machine learning library that offers a wide range of algorithms and tools for classification, regression, clustering, and preprocessing. It can be used for training and evaluating recommendation models.

Tkinter: Tkinter is a standard GUI toolkit for Python. It enables the creation of windows, buttons, labels, and other graphical elements required for developing a user-friendly interface for the food recommendation system.

CSV: The CSV module is part of Python's standard library and provides functionality for reading from and writing to CSV files. It can be used to store and retrieve recipe data, user profiles, and feedback in a tabular format.

SYSTEM ARCHITECTURE: -

1)User Interface (GUI):

The GUI allows users to input their preferences, such as cuisine, taste, dietary restrictions, and meat type.

The GUI collects user inputs and sends them to the admin panel.

2)Admin Panel:

The admin panel receives user inputs from the GUI.

It performs any necessary pre-processing or validation on the user inputs.

The admin panel then sends the pre-processed inputs to the database.

3)Database:

The database stores the cuisine, taste, dietary restrictions, and meat type data

The pre-processed user inputs received from the admin panel are stored in the database for further processing.

4)Recommendation Engine:

The recommendation engine retrieves the relevant user inputs from the database.

It utilizes machine learning algorithms to generate personalized recipe recommendations based on the user's preferences.

5)Admin Panel (continued):

The recommendation engine generates a list of recommended recipes based on the user inputs.

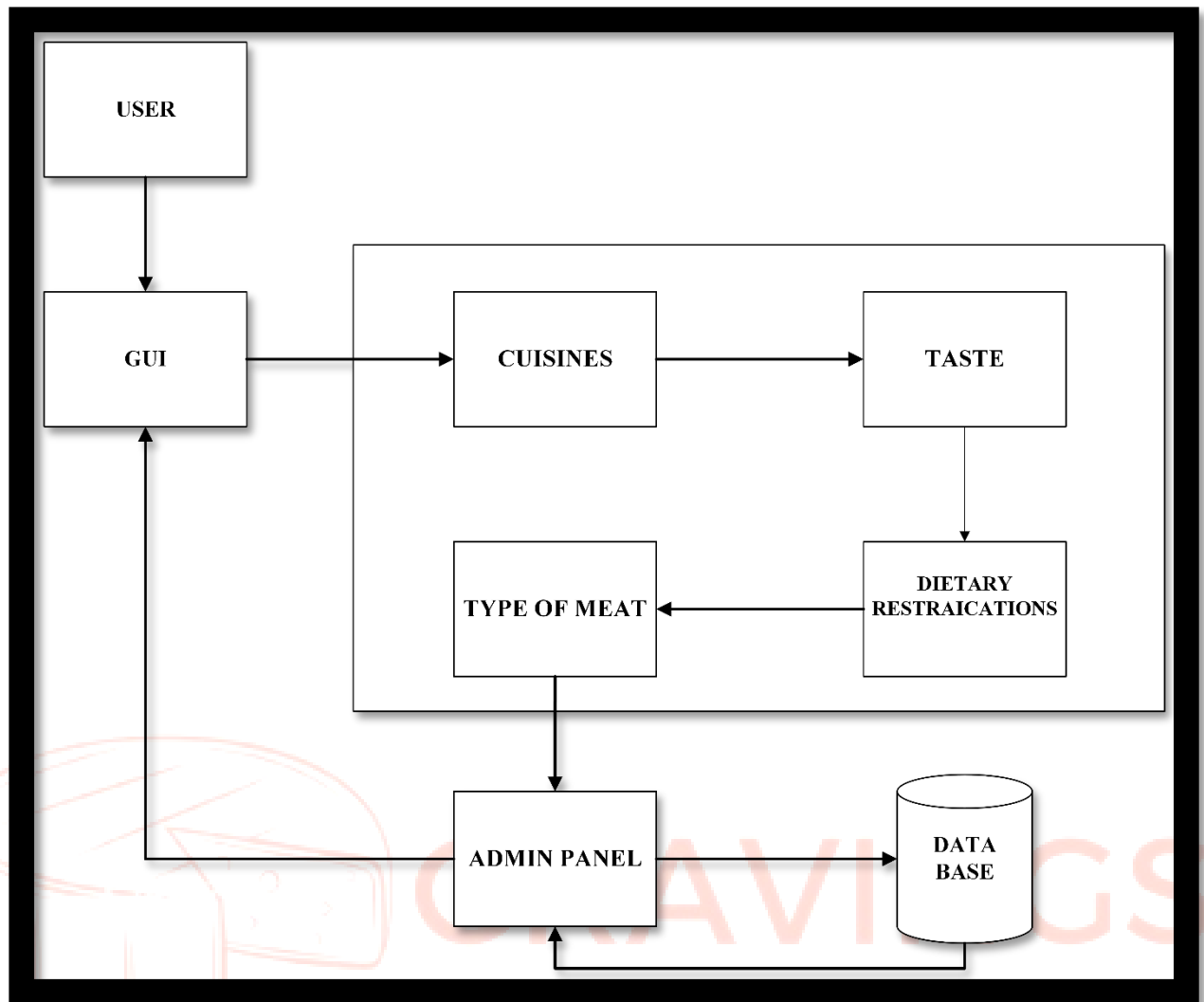
The admin panel retrieves the recommended recipes from the recommendation engine.

6)GUI (continued):

The admin panel sends the list of recommended recipes back to the GUI.

The GUI displays the recommended recipe list to the user.

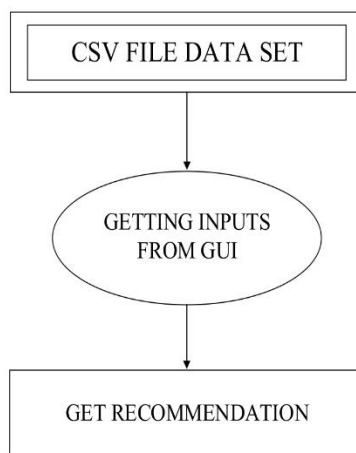
The user can view recipe details, ratings, and other relevant information.



DATA FLOW DIAGRAM: -

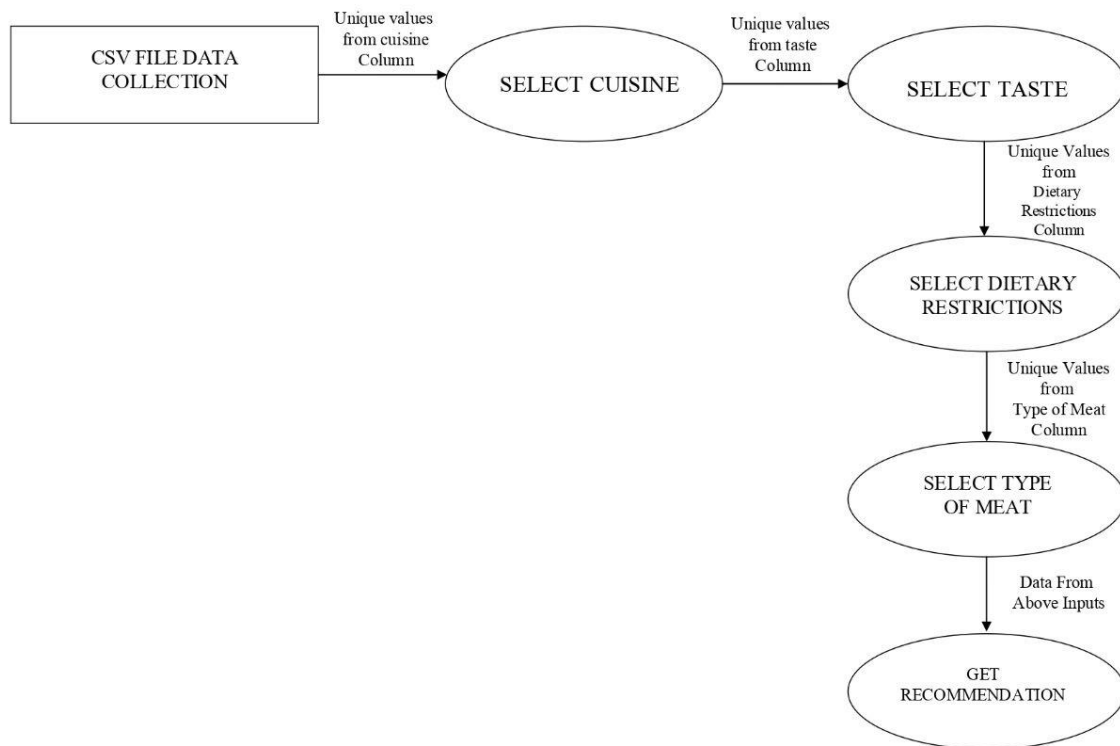
LEVEL 0: -

The CSV (Comma Separated Values) file dataset will be used as input by the GUI (Graphical User Interface), which will then present appropriate recommendations.



LEVEL 1

In level 1 of DFD from the CSV file data collection unique values from cuisine column will be selected, followed by unique values from the taste column after that unique values from dietary restrictions column will be chosen then same with the values of meat column and now we will get appropriate recommendations from the above inputs of data. This is how the data flows



HARDWARE REQUIRED: -

- Processor: Intel Pentium or higher
- RAM: 4 GB or more
- Storage: 256 GB or more
- Internet connection: Broadband connection with good speed
- GPU: Not mandatory but can be helpful for faster training of machine learning models.

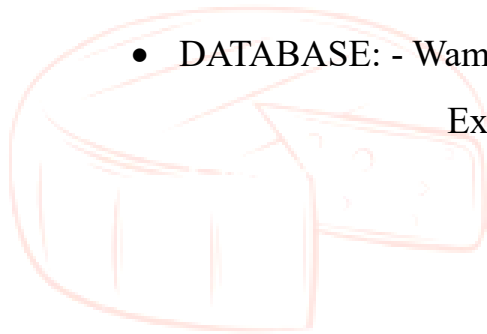
SOFTWARE REQUIRED: -

- PROGRAMMING LANGUAGE: - PYTHON

Anaconda Jupiter notebook

- DATABASE: - WampServer

Excel



CRAVINGS

IMPLEMENTATION AND RESULTS: -

1) OVERALL GUI



A screenshot of a software window titled "CRAVINGS" with a standard Windows-style title bar (minimize, maximize, close buttons). The window contains a vertical stack of five dropdown menus, each with a label and a downward arrow: "Select Cuisine:", "Select Taste:", "Select Dietary Restrictions:", "Select Type of Meat:", and "Recommend Dishes:". Below these menus is a button labeled "Recommend Dishes".

2) SELECTION OF CUISINE



A screenshot of the "Select Cuisine:" dropdown menu. The menu is open, showing a list of cuisines: Indian, Chinese, Italian, Mexcian, American, French, Thai, Korean, Greek, and Japanese. "Indian" is currently selected and highlighted in blue. The window title bar shows "CRAVINGS" and standard Windows controls.

3)SELECTION OF TASTE



A screenshot of a web application window titled 'CRAVINGS'. It shows a 'Select Cuisine:' dropdown menu with 'Indian' selected. Below it is a 'Select Taste:' dropdown menu with a list of options: 'spicy', 'savory', 'sweet', 'sour', 'tangy', and 'salty'. The 'spicy' option is currently selected and highlighted in blue.

4)SELECTION OF DIETARY RESTRICTIONS



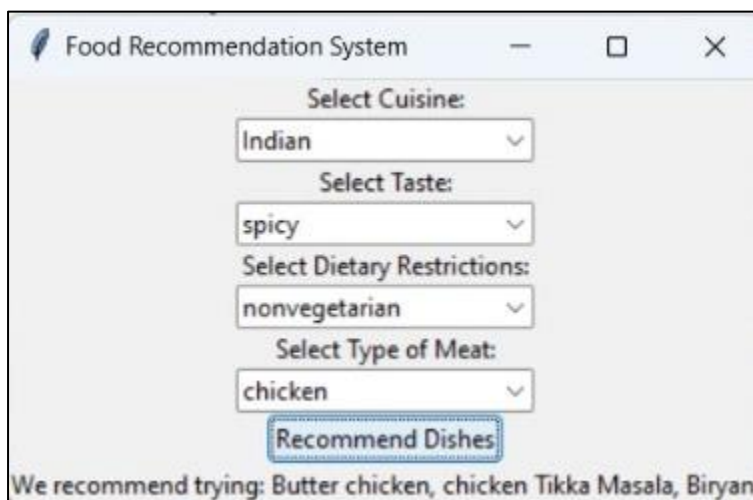
A screenshot of the same web application window, now showing the 'Select Dietary Restrictions:' dropdown menu. The 'spicy' option is still selected in the 'Select Taste:' menu. The 'Select Dietary Restrictions:' menu has a list of options: 'nonvegetarian', 'vegetarian', 'eggetarian', 'pascatarian', and 'vegan'. The 'nonvegetarian' option is currently selected and highlighted in blue.

5)SELECTION OF TYPE OF MEAT



A screenshot of a dropdown menu titled "Select Type of Meat:". The menu is open, showing a list of options: "chicken", "no_meat", "egg", "beef", "seafood", and "pork". The "chicken" option is currently selected and highlighted in blue.

6)GET RECOMMENDED



A screenshot of the "Food Recommendation System" window. It displays the same selection process as the previous image, but now with the "Recommend Dishes" button highlighted. Below the button, the text reads: "We recommend trying: Butter chicken, chicken Tikka Masala, Biryani".

FUTURE ENHANCEMENT:-

Some possible future enhancements for a food recommendation system could include:

- **Integration of social media:** Incorporating user-generated content from social media platforms such as Instagram, Twitter, and Facebook to personalize recommendations based on individual food preferences.
- **Integration of health data:** Incorporating users' health data, such as body mass index (BMI) or blood sugar levels, to recommend food items that align with their health goals.
- **Personalized meal planning:** Offering users the ability to plan their meals for a week, with recipe suggestions based on their preferences and dietary restrictions.
- **Integration of restaurant reviews:** Incorporating user reviews of restaurants and food items to provide more comprehensive recommendations.
- **Integration of food delivery services:** Integrating with food delivery services to allow users to order recommended food items directly from the app.
- **Enhanced data analytics:** Using machine learning algorithms to better understand user preferences and behavior, and to continuously improve the accuracy of recommendations.
- **Gamification:** Adding game-like elements to the app, such as challenges, rewards, and badges, to increase user engagement and retention.
- **Multi-language support:** Adding support for multiple languages to expand the user base and reach a wider audience.
- **Integration of augmented reality (AR):** Using AR technology to allow users to visualize food items in a virtual environment and enhance the overall user experience.

CONCLUSION: -

In conclusion, the food recommendation system is a valuable tool for individuals who are looking to discover new and exciting recipes. With the help of machine learning algorithms, the system can suggest recipes that match the user's preferences and dietary requirements. The system also has the potential to help individuals make healthier and more sustainable food choices.

Overall, this project can be a great learning experience for beginners interested in data science and machine learning. By working on this project, we gained experience in data cleaning & preprocessing, exploratory data analysis, and building machine learning models.



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