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RESTAURANT RECOMMENDATION SYSTEM

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ABSTRACT

Recommender systems, sometimes referred to as recommendation systems, are highly developed algorithms that filter data from a database to present users with relevant things. Predictive models are used by these systems to foresee user interests and make appropriate item suggestions. Recommendation engines provide results that are in line with the requirements and interests of users by helping them navigate the massive volumes of information available on the internet. They do this by analyzing data patterns within datasets to determine consumer preferences. Our goal is to create a machine learning model that can make restaurant recommendations depending on the tastes of the user. We built a model using user evaluations and ratings since we understood that people have different dietary constraints, interests, and preferences when it comes to food. In order to do this, we used cosine similarity matrices in our machine learning algorithm and gathered data from a reliable source. Helping consumers choose the best restaurants where they may savor their meals to the fullest is the main objective of this project.

Keywords: Recommendation System, Restaurant, Cosine similarity, Machine learning, Count Vectorization

1. INTRODUCTION

A recommendation system is a model that forecasts user interest and presents the pertinent products the user would like to see. Using their choices as a guide, the system assists users in navigating the internet for information. As you are aware, when we use Swiggy or Zomato, you can see which restaurants are suggested to you. This is an example of recommendation in action. Certain applications for music and tourism can suggest songs and destinations based on your preferences.

How recommendation systems work, For example, There are two users A and B wants to order food in same restaurant in a e-commerce website(Zomato). When this happens the similar index of these two users are going to be computed. After this the recommend food to the user is depending on the system. Because it detects that the two users are similar in terms of the food they want to order. Our main primary purpose is to provide the restaurant which the user is looking for. It facilitate the user with restaurant according to their preferences such as location, cuisine type, price range, rating. The model which we made work in two ways. Firstly, when the user fill the preferences, the model will search or calculate those restaurants that are stored in our database after that it gives top rating restaurants as users wanted. Secondly, When the user select a restaurant the model starts working and it will pick up all the restaurants which user have choose and using machine learning algorithm cosine similarity to find the restaurant same as the user choosen by using content-based filtering.

2. LITERATURE SURVEY

1. Ling Li*, Ya Zhou, Han Xiong, Cailin Hu, Xiafei Wei. "Collaborative Filtering based on User Attributes and User Ratings for Restaurant Recommendation." (2017)[1]

In this paper they first explored the approach of CF and examined the relationship between users and restaurants by analyzing ratings and users attributes to design a restaurant recommendation algorithm. This paper done in two ways, It presents the concept of traditional collaboration filtering, and describes the procedure of this algorithm[1]. Proposed collaborative filtering based on user attributes and store grading[2].

2. Aji Achmad Mustofa1 and Indra Budi2. "Recommendation System Based on Item and User Similarity on Restaurants Directory Online." (2018)[2]

This paper aims to evaluate recommendation system based on item and user similarity which combine features of collaborative filtering and content-based filtering. They done project in two stages, First model is to built to find the value of similarity between one item with another.

Second model is a model built to find the value of similarity between one user with another. These two models built using nearest neighbor algorithm.

3. K.V.P Sushma Sai, T. Siva Pavani, K. Indira. "Restaurant Recommended Web Application Using Machine Learning." (2021)[3]

In this research They used streamlit to develop a web app. Their aim to build a restaurant recommendation system that provides personalized restaurant recommendations to users. The application which they made is used to find the restaurants based on **user's taste. And it can be accessed by anyone from anyplace if they have network.**

4. Taufiq Ahmed, Fazle Rabby Talukder, Hasibur Rahman. "Restaurant Recommendation System in Dhaka City Based on Machine Learning." (2022)[4]

In this research, a new model is proposed where the model deals with two different approaches and merges the best result. Firstly, it takes user input like location, price range, rating, cuisine type. Secondly, it calculates the score based on weight where 90 percent consist of user ratings and 10 percent consists of the price range. After getting the score the model will sort the restaurants based on the score in non-decreasing order and suggest the user top 10 restaurants. Lastly, by taking users chosen restaurants the model uses another machine learning approach content-based filtering, and suggests similar restaurants that users have chosen.

3. IMPLEMENTATION STUDY

Before the advent of group recommender systems, most systems were targeted to individuals. In the last decade, group recommender systems have become increasingly popular, with a number of early systems developed in a variety of domains. GroupMinder, for example, was developed to recommend web pages for a group to consider collectively (Lieberman et al. 1999). While the web page recommendation problem may be admittedly oversimplified, our approach to tackling the inherent complexities by combining two distinct methods for preference aggregation is novel. In the tourism domain, a recommender system was developed to generate tour packages for a group of tourists (Ardissono et al. 2003). Another recommender engine was developed to suggest congruent tracks to a group of listeners (Crossen et al. 2002). The group recommendation problem is most prevalent in the food domain, where a group of individuals such as family, friends, or colleagues, wish to hold a party or have a meal together. However, the problem is more complicated in the case of food recommendation systems, which not only have to consider the preferences of several different users with different taste buds, but also need to decide amongst themselves on a strategy for reaching a consensus among group members.

.3.1 PROPOSED METHODOLOGY

We proposed a system which uses streamlit to develop a web app to recommend restaurants that user wants. In this proposed system we used machine learning algorithms like Count vectorization, Bag of words, Rating-based recommendation and main model in this system is Cosine similarity matrix. By using these methods we can maintain more accuracy rate and recommend personalized items to users. Our main goal to build restaurant recommendation system is because it gives personalized recommendations to users based on their ambience, food, rating, price.

4. METHODOLOGY

I. DATA COLLECTION

We collected our dataset from Kaggle. The following is the link for the dataset

https://www.kaggle.com/datasets/arnabchaki/indian-restaurants-2023

The dataset consists of more than 8000 restaurants with rating ranging from (4-10).

The dataset is "reads.csv" file. The size of the file is less than 2MB.

II. DATA PRE-PROCESSING

After obtaining the raw data from the data collection action we had to refine the entire dataset coupled with to make it best for our version to educate. First off we need to remove duplicate data. Second of all, we erased the missing out on coupled with replicate data, to do so we needed to utilize different python devices like pandas, Matplotlib and so on. After cleansing the dataset we obtained virtually 1600 dining establishments information to deal with our design.

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III. FEATURE SELECTION

Choosing the features is crucial when developing a machine learning model especially when it comes to recommending restaurants. The key focus is, on determining the restaurants name as our target variable, which requires a selection of input features. These input features include the restaurants location, cuisine type, price range, ratings and the number of ratings received. Additionally we regard the quantity of ratings as a factor since a restaurant may have ratings but if only a few people have rated it assessing its quality becomes challenging. This is why we treat the number of ratings as an input variable, in our model.

5. RESULTS AND SCREEN SHOTS

OUTPUT SCREENSHOTS

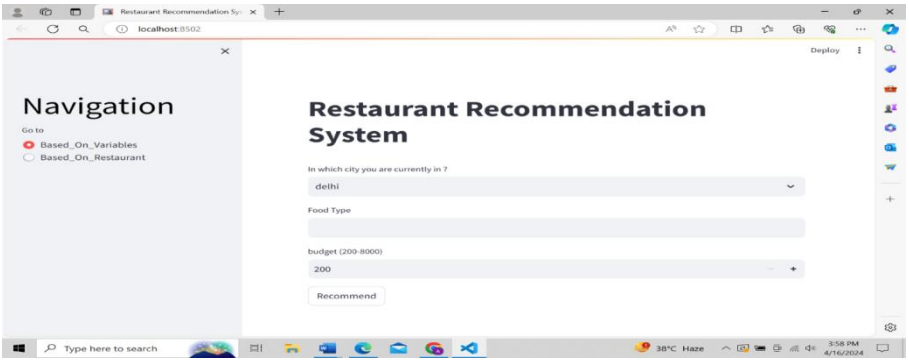

Figure 1: Home Page

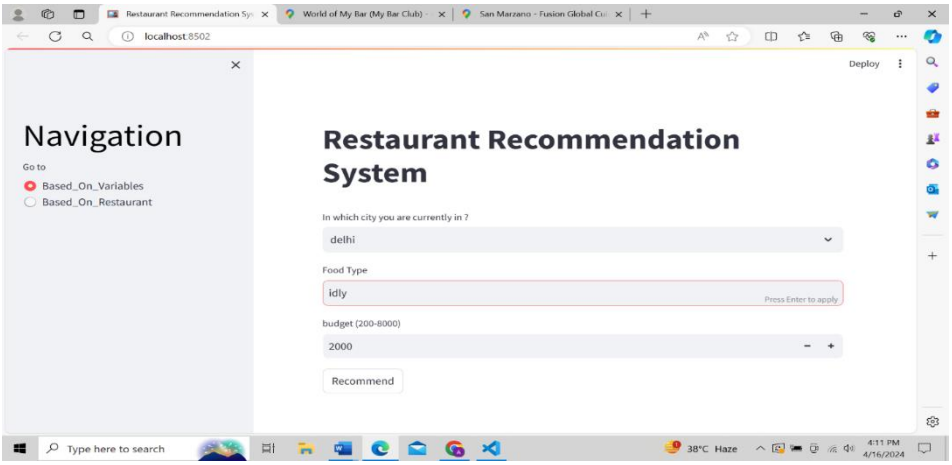

Figure 2: Image Is Based On Variables

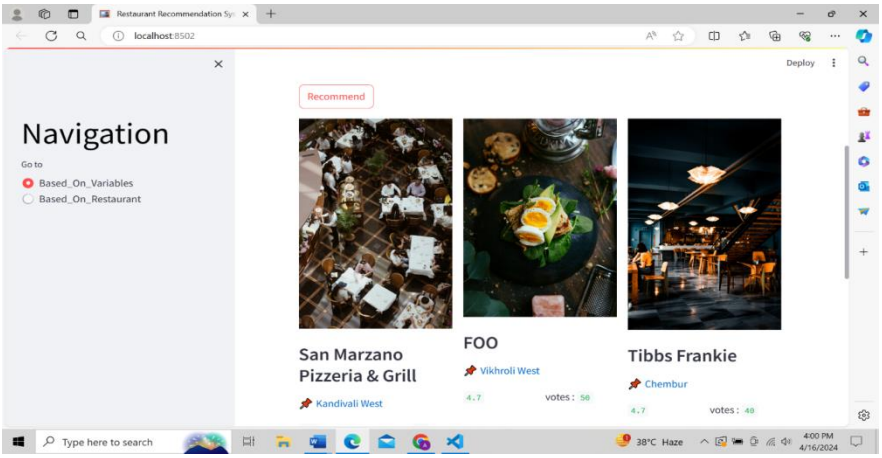

Figure 3: Recommended Restaurants

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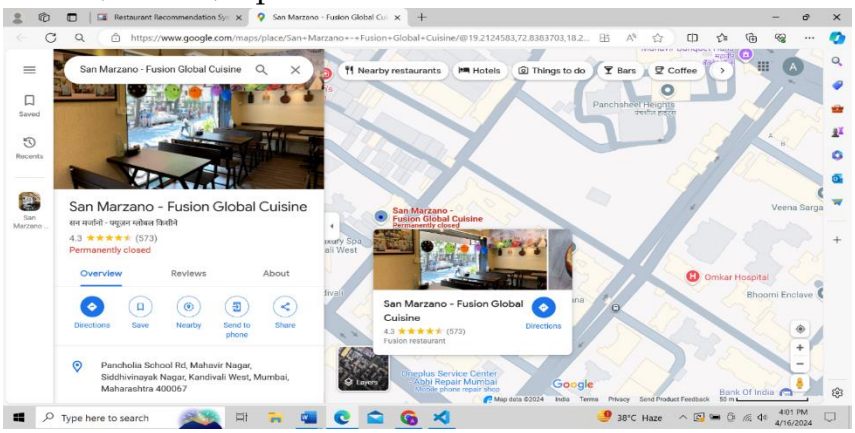

Figure 4: Map Of Recommended Restaurant

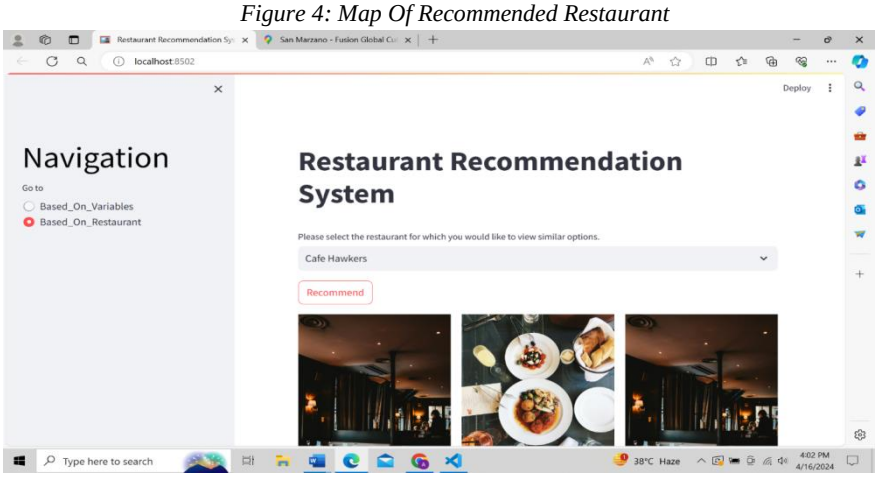

Figure 5: Image Is Based on Restaurant

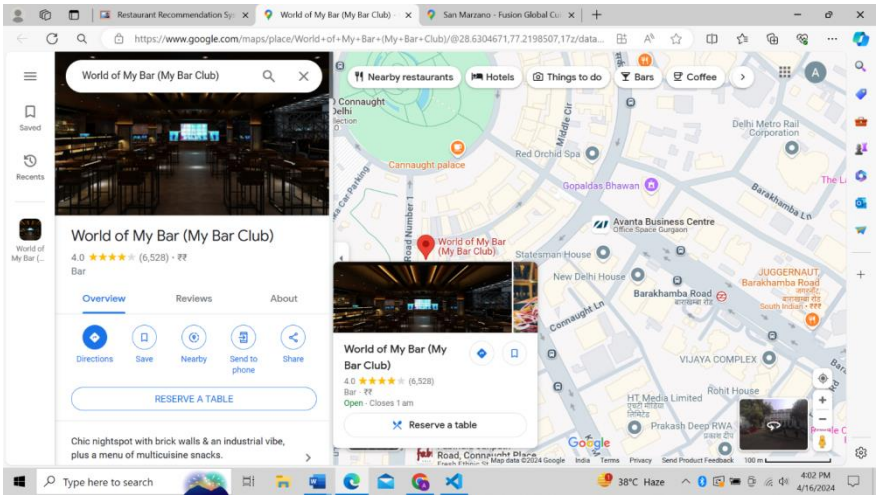

Figure 6: Map Of Recommended Restaurant

6. CONCLUSION AND FUTURE SCOPE

6.1 CONCLUSION

In this project, we have created a web application that offers restaurant recommendations tailored to individual preferences. Users can predict the most suitable and optimal dining options based on their tastes. Our recommendation engine utilizes both content-based filtering and collaborative filtering techniques to enhance efficiency, ensuring that each user benefits from accurate and personalized suggestions. The Restaurant Recommendation System project was executed successfully by implementing Cosine Similarity and Count Vectorization. Through this approach, we developed a robust model capable of providing restaurant recommendations based on user preferences and

interests. This system significantly streamlines the process of selecting restaurants, offering users a convenient and intuitive tool for decision-making.

6.2 FUTURE ACOPE

In the near future, we plan to further expand this project by integrating it into a web application using the Streamlit. This initiative aims to make the recommendation system accessible to a wider audience, allowing individuals to utilize it across various devices seamlessly. Additionally, we intend to enhance the system's capabilities by incorporating content-based filtering techniques.

Our goal is to gather user review data from individuals who have utilized the system, enabling us to classify users based on demographic factors and behavioral patterns. By implementing collaborative filtering, we seek to leverage this user data to refine the recommendation process. While our current dataset primarily comprises information about restaurants, the addition of user information will enable us to apply collaborative filtering effectively.

Through this approach, we aim to provide more personalized and relevant restaurant recommendations based on similarities in user preferences. By combining content-based and count vectorization, NLP methodologies, we aspire to offer a comprehensive and intuitive recommendation system that caters to the diverse needs and preferences of our users.

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