UE20CS302 – Machine Intelligence

Mini Project

Restaurant Recommendation System

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Problem Statement

- In terms of restaurants, there are too many options available for people to choose from based on their preferences.
- It's always difficult for new visitors, even locals, to find the ideal restaurants that are exciting and novelty.
- We aim to build a personalized prototype of restaurant recommendation system, which not only considers the interaction between customers and restaurants, but also contains metadata representing customers' personal taste and restaurant functions.

Application and Uses

Applications :

- Spotify’s personalized mood and genre categories.
- YouTube’s personalized playlist recommendations.
- Song identifiers like shazam takes mood classification in consideration.
- Multiple food delivery apps like Zomato, Swiggy, Amazon foods…. provide recommendations to their users based on reviews and past history of the users to recommend restaurants.
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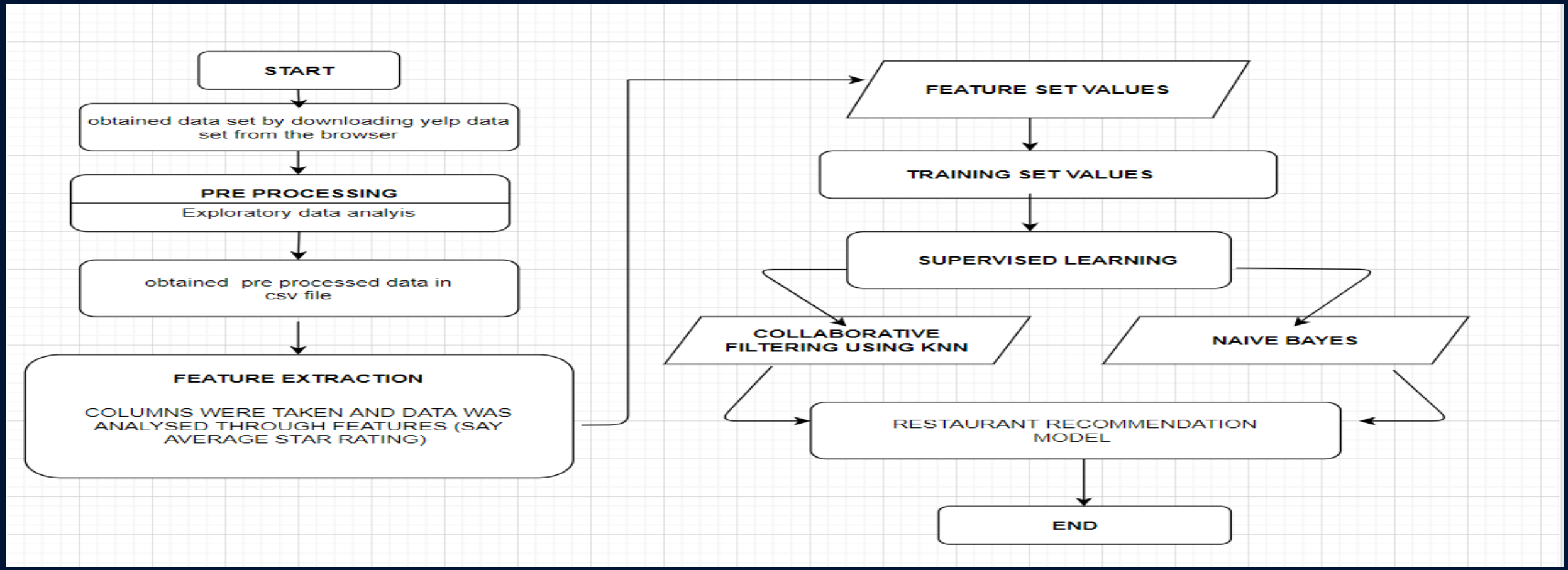
Uses :

- Widely used by the above applications, to recommend more personalized restaurants for foodies to enjoy the next restaurant they visit.

High level Architecture



Literature Survey

Title of the paper	Year of Publication	Journal/Conference Name	Advantages	Limitations
Restaurant Recommendation System in Dhaka City using Machine Learning Approach	2020	IEEE	The user gets to give preference such as location, price range, food type, ratings then the model will filter the dataset based on score and give the user the best recommendation when the user chooses one restaurant among them the model will work again and apply content-based filtering to find out similar restaurants and recommend it other users.. .	lack of similar type of user's data to build a recommendation system that suggests restaurants based on user behaviour the system built here suggests restaurants based on user's review and restaurant similarities.
Comparing Filtering Techniques in Restaurant Recommendation System	2018	IEEE	hybrid recommendation is model which is a combination of regression and collaborative filtering is the best model to predict the restaurant as it leverages information from the user.	These techniques are difficult to implement due to a lack of comprehensive dataset, insufficient meaningful attributes
Restaurant Recommendation System	2017	IEEE	comparable were achieved results from the different algorithms that were used although linear SVM was least susceptible to over-fitting and performed marginally better. We achieved a testing accuracy of 69.89% with linear SVM feature set 3 and using 1 month of reviews as training data.	More models should be tested on the given dataset to improve accuracy of the restaurant prediction as the current accuracy given by the SVM is about 70%

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Mood Based Food Recommendation System	2021	Asian Conference on Innovation in Technology (ASIANCON)	The aim of this system is to suggest food based on user's current mood from top-rated restaurants using K-means algorithm.	The weakness of proposed model is that the mood has to be entered by user manually, which too can be automated by incorporating face identification model in the system for mood detection.
Restaurant Recommendation System for User Preference and Services Based on Rating and Amenities	2019	International Conference on Computational Intelligence in Data Science (ICCIDS)	The strategy of Natural language Processing (NLP) machine learning algorithm is used which provides effective results with enhanced functionality thereby offering precise output and greater accuracy of 92%.	The total development time taken to develop an NLP system is higher and hence requires powerful computing resources.
A Chinese Restaurant Recommendation System Based on Mobile Context-Aware Services	2013	IEEE 14th International Conference on Mobile Data Management	A restaurant recommendation system for mobile devices, so that the system can provide more accurate services based on personal locations and the user preferences.	The interface of mobile devices is limited to screen size, resulting in difficulty of presenting a variety of information on such small screen sizes.

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Location based personalized restaurant recommendation system for mobile environments	2013	International Conference on Advances in Computing, Communications and Informatics (ICACCI)	Tracks the Location (google api) of the user and recommends nearby restaurants using foursquare (social network) by naïve bayes classifiers.	Does not take into account the reviews of other people
Location, time, and preference aware restaurant recommendation method	2016	19th International Conference on Computer and Information Technology (ICCIT)	Users' historical data is analyzed using logistic function to identify preference trend, and recommendation is given by considering time, location of the user and user preference	Customer reviews were not taken into account.
Worth eat: An intelligent application for restaurant recommendation based on customer preference	2017	5th International Conference on Information and Communication Technology (ICoIC7)	Restaurant is being recommended on the basis of distance rating and interest using fuzzy logic and bubble sort	Economical aspect such as budget or food price was not considered also some additional aspects like the eating time behavior (lunch breakfast dinner) was not considered

Proposed Approach

We downloaded the yelp dataset and then pre processed it to convert it into a small dataset (restaurants only from Illinois) Then we performed feature extraction and extracted the columns user id, review id, business id, stars and text. Then we performed splitting of data in train and test for Naïve bayes – (70-30 split) and in collaborative filtering we used Kfold technique to split the data.

Then we used two different supervised learning algorithms Naïve bayes and collaborative filtering to train our restaurant recommendation model

Thank You