

GEOGRAPHICAL LOCATION RECOMMENDATION SYSTEM FOR RESTAURANTS IN BENGALURU

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Abstract : The basic idea of analyzing the Zomato dataset is to get a fair idea about the factors affecting the establishment of different types of restaurant at different places in Bengaluru, aggregate rating of each restaurant, Bengaluru being one such city has more than 12,000 restaurants with restaurants serving dishes from all over the world. With each day new restaurants opening the industry hasn't been saturated yet and the demand is increasing day by day. In spite of increasing demand it however has become difficult for new restaurants to compete with established restaurants, most of them serving the same food. Bengaluru being the IT capital of India, most people here are dependent mainly on the restaurant food as they don't have time to cook for themselves. With such an overwhelming demand of restaurants it has therefore become important to study the demography of a location.

IndexTerms – Linear Regression, Random Forest Tree, Latent Factor Model, Decision Tree, Support Vector Machine.

I. INTRODUCTION

Bengaluru is a city which has in excess of 12,000 cafés with every eatery serving various cooking styles from everywhere throughout the world. With new cafés coming up every day, the business has not been immersed at this point and the interest is expanding step by step. In spite of the expanding request, it anyway has gotten hard for new eateries to contend with built up cafés, the greater part of them serving a similar food. Bengaluru being the IT capital of India, here the greater part of the individuals here are needy essentially on the café food as they don't have time to cook for themselves. With such a mind-boggling request of cafés it has along these lines gotten imperative to examine the demography of an area.

II. DATA AND SOURCE OF DATA

This system aims to predict the rating of a restaurant by taking into consideration of previous review. Three machine learning algorithms have been studied and they are linear regression, random forest tree and latent factor model which is combined with sentimental analysis. The Zomato database is used to obtain the dataset of restaurants in Bengaluru [5].

III. THEORETICAL FRAMEWORK

Ibne Farabi Shihab (2013), "A Machine learning approach to suggest ideal geographical location for new restaurant establishment": This paper suggests a proper location or city for opening a restaurant business in USA. Entrepreneurs can know the mindset of customers in a particular city and open their restaurants accordingly. The main problem is that the customers from different parts of the country like different cuisines and thus the rating may vary for each restaurant [1].

Jun Zeng, Feng Li. (2016) "A Restaurant Recommender System Based on User Preference and Location in Mobile Environment": It is a recommendation system that helps users to obtain the personalized and useful information of restaurant in mobile environment [2]. Cloud services are used to implement the proposed recommendation system. The traditional recommender systems are based on user-item matrix which often need the user rating which in turn may require user's extra effort.

Anant Gupta (2013) "Location based Personalized Restaurant Recommendation for mobile Environments": It is a personalized restaurant recommendation system integrated in mobile technology which studies the user's behavioral pattern of visiting restaurants using a machine learning algorithm[3]. Recommender systems take into account the reviews and experiences of community to produce for the user a mapping of scores to items, ranking of items and a set of recommended items.

Mengqi Yu(2017) "Restaurants Review Star Prediction for Yelp Dataset": This paper aims to predict the rating of a restaurant by taking into consideration of previous review[5]. Three machine learning algorithms has been studied and they are linear regression, random forest tree and latent factor model which is combined with sentimental analysis. The best model was random forest tree. Yelp dataset helps in exploring correlation.

Thienne Johnson.(2017) "A Mobile food recommendation System based on The traffic Light Diet": The purpose of this paper is to develop a food recommendation system[4]. There are significant number of mobile applications available for smart phones targeting diets. The contributions of this paper include new insights of mobile computing application for health behavioral change.

IV. SYSTEM ARCHITECTURE

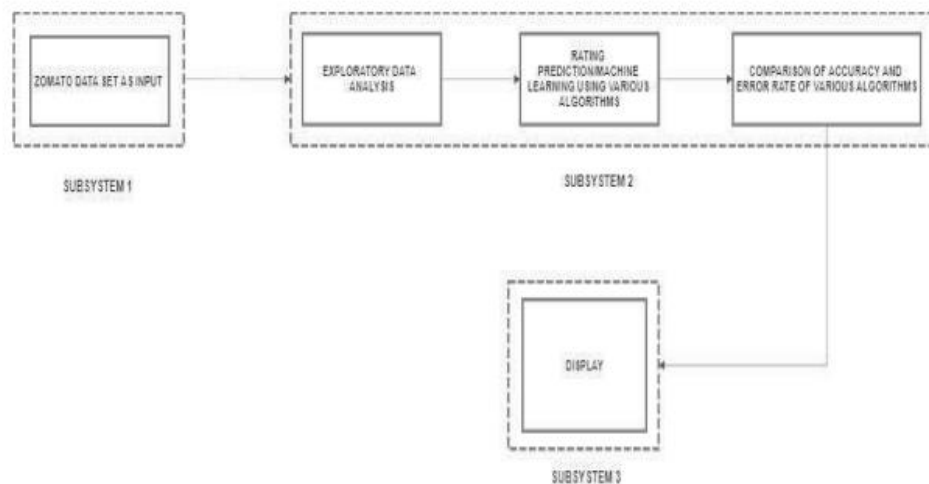


Fig: System Architecture

The Zomato Datasets is fed to Execution Environment from database, then it undergoes EDA where the suitable attributes are selected based on Data that has been collected. Then it performs Regression to extract Useful Data. Algorithms like Decision Tree, Random Forest Support Vector Classifier are to be implemented.

V. IMPLEMENTATION

Implementation is the process of converting a new system design into an operational one. It is the key stage in achieving a successful new system. It must therefore be carefully planned and controlled. The implementation of a system is done after the development effort is completed.

a) IMPLEMENTATION STEPS:

Step 1: Data preprocessing has to be done to the obtained datasets.

Step 2: Feature Selection is the process of reducing the number of input variables when developing a predictive model.

Step 3: Train Test Split is a process of dividing the data where training data is used to developing model and testing data is used after development.

Step 4: Applying the algorithm is a step where we run different algorithms on the data set to find the accuracy.

Step 5: Analyze Accuracy is where all different algorithms would have different accuracy. Comparing them and selecting the best is done here.

Step 6: Displaying the results of how attributes are related through graphs, charts and plots.

b) ALGORITHMS USED:

i. Support Vector Machine :

Support Vector Machine, abbreviated as SVM can be used for both regression and classification tasks. The objective of the support vector machine algorithm is to find a hyperplane in an N-dimensional space (N — the number of features) that distinctly classifies the data points.

ii. Decision Tree :

Decision Tree is one of the easiest and popular classification algorithms to understand and interpret. Decision Tree algorithm belongs to the family of supervised learning algorithms.

iii. Random Forest :

Random Forest algorithm is a supervised classification algorithm. We can see it from its name, which is to create a forest by some way and make it random. There is a direct relationship between the number of trees in the forest and the results it can get: the larger the number of trees, the more accurate the result.

c)IMPLEMENTATION DETAILS:

i. Module 1: PDFS (Preprocessing of Data and Feature Selection)

Data Preprocessing has to be done to the obtained dataset. Pre-processing refers to the transformations applied to our data before feeding it to the algorithm. Feature Selection is the process of reducing the number of input variables when developing a predictive model.

ii. Module 2: AMLT (Application of Machine Learning Techniques)

Train Test Split is a process of dividing the data where training part is used to developing model and testing part is used after development to test the model. Applying the algorithm is a step where we run different algorithm on the data set to find the accuracy.

iii. Module 3: AAD (Analysis of Accuracy and Display)

Analyzing Accuracy is where all the different algorithms having different accuracy are compared and the one with the best accuracy is selected here. Displaying the results of how attributes are related through graphs, charts and plots. Different attributes influence the location, rating and the relative cuisine of any restaurant.

VI. RESULTS AND CONCLUSION

This project concentrates on recommending the best location in Bengaluru for a new restaurant that the user wants to set up based on its cuisine or the best cuisine that the user can choose for his restaurant based on its location. Efforts have been made to make sure that a reasonably good recommendation is done. Different data analytical strategies and Machine learning calculations have been actualized and tried to ensure that the best outcome is gotten. The entire client range is investigated for their preferences, for their decision of cooking, for their rating and different variables that impact the rating and furthermore dependent on the area of the current eateries

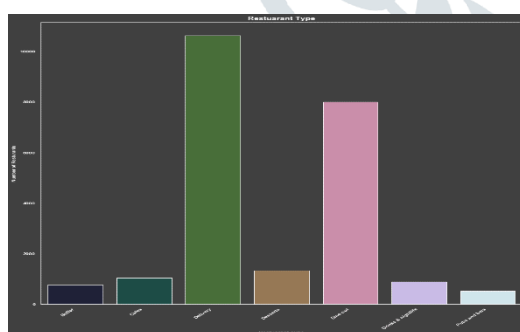


Fig: Restaurants based on Location

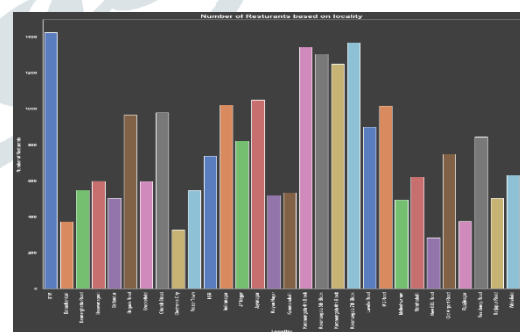


Fig: Restaurant Types

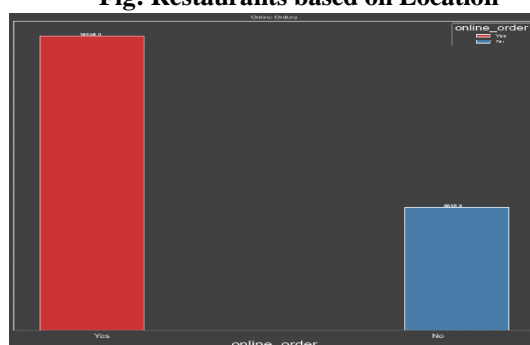


Fig : Online Orders

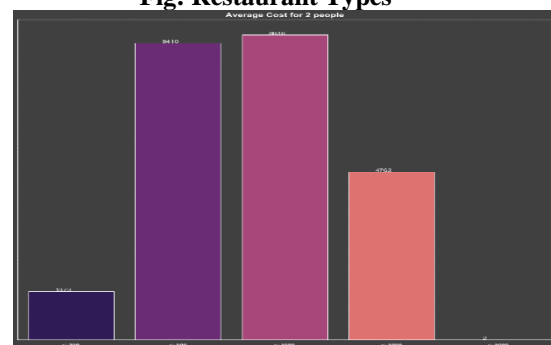


Fig : Average Cost for Two People

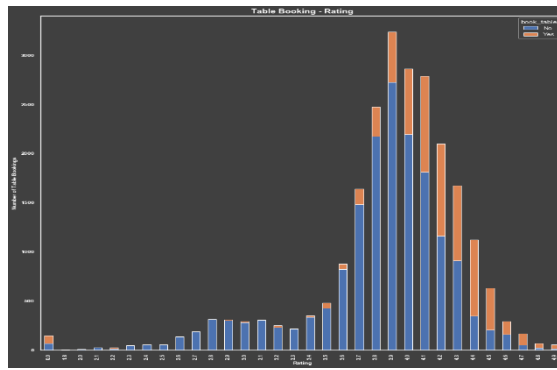


Fig: Table Booking

VII. REFERENCES

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