Capstone Project
Opening "Peaceful Restaurant" in New Delhi, India

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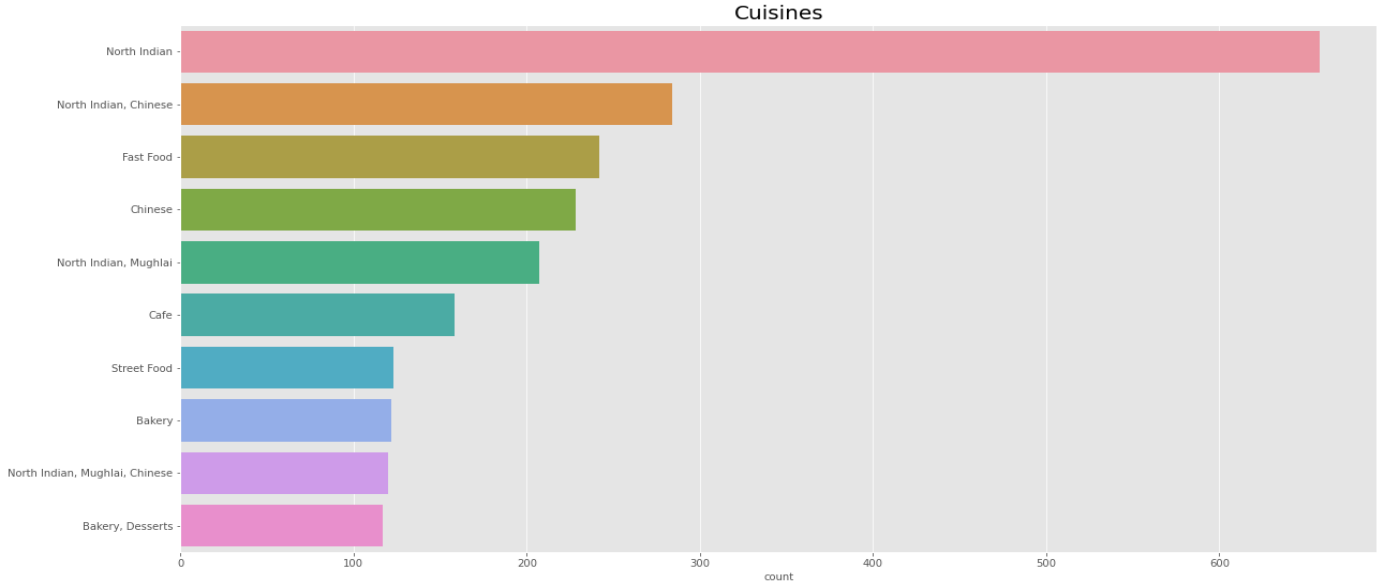
For this Capstone project, I am writing an analytical report for the restaurateur who wants to explore opening an authentic Chinese restaurant in New Delhi, India. The name of the restaurant is a Vancouver-based Chinese restaurant chain called “Peaceful Restaurant”. This businessman does not know anything about India, and particularly New Delhi restaurants businesses, and my job is to provide a full analysis of restaurants in New Delhi and come up with suggestions and recommendations about the whole idea of coming to the New Delhi market, and about potential factors of success for "Peaceful" restaurants in New Delhi. With this purpose in mind, I am designing this project to find out if it is a good idea at all to extend the "Peaceful" chain to New Delhi, and if it is, what factors would be the most important for the restaurant to succeed.

Business Problem: The objective of this capstone project is to predict if a Chinese restaurant business will succeed in New Delhi, India, and what factors would lead to success.

Target Audience: 'Peaceful Restaurant' business team.

Data: The Zomato data set available on Kaggle.

In this analytical report, I have analyzed the Zomato data set from the Kaggle website. I have extracted New Delhi information and built several plots and maps to visualize different data set features. I established that Chinese food is popular in New Delhi, and also no major food chains are serving Chinese cuisine.



However, many restaurants serving Chinese food, have combined cuisines (i.e., Chinese, and Indian, Chinese, and Thai, etc.). The Indian/Chinese combined kitchen is in second place in popularity in New Delhi.

I showed that most restaurants do not have online delivery options and do not accept table reservations.

After EDA, I could not say what neighborhood would be the best to open "Peaceful Restaurant" as restaurants are evenly distributed among all neighborhoods. I found data types for all columns and was able to convert non-numerical data to numerical data types.

Then I performed different Unsupervised Machine Learning methods of clustering to find out what factors if any contributed to the higher rating or higher business success.

I performed k-means clustering with 2 and 4 clusters, and agglomerative clustering with 2 and 3 clusters.

Out of them all, the best choice was k-means clustering with 2 clusters.
Clusters were perfectly separated by rating, and class 1 had the rating of 1 which was defined as a successful rating.

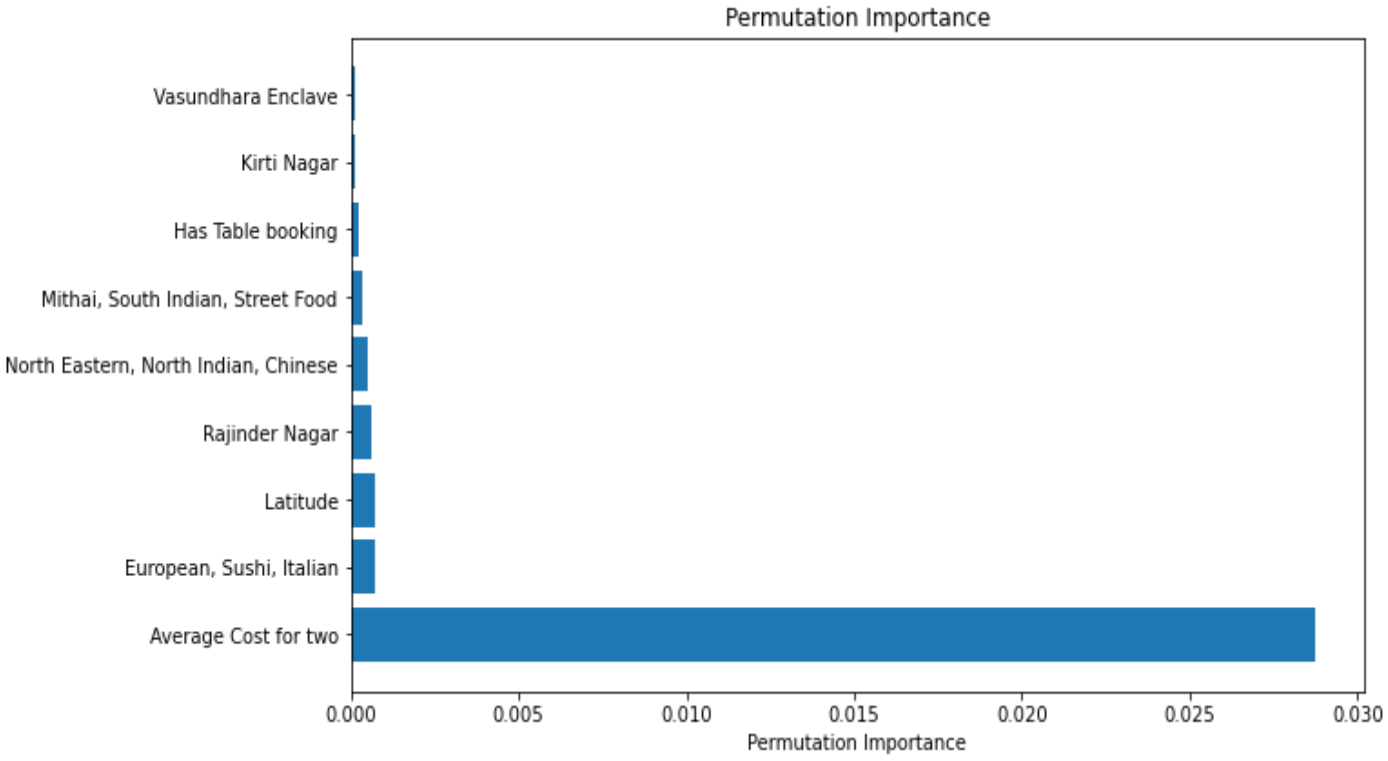
Attributes belonging to class 1 were:
has table booking, has online delivery, more votes, higher food prices.
Also, most well-rated restaurants are located at major shopping malls and major business areas.

After finding successful classes, I moved to the supervised machine learning methods and built a pipeline searching for the best classifier model and its hyperparameters.

Models included in the grid search were k-nearest neighbors, Random Forest, and Logistic Regression models.

The best model turned out to be Random Forest Classifier with an accuracy score of 83%.

By definition, Random Forest models are black-box models, and it is very difficult to say how the decisions were made. However, there is a permutation_importance feature built-in the sklearn module that allows determining what factors were the most influential for the model. It turned out that the most important feature in the prediction was the "The average cost for two" attribute, followed by "European, Sushi, Italian", "Latitude", and other features.



As the purpose of this analytical report was to make suggestions to a business team whether it is a good idea to expand "Peaceful" Restaurants to New Delhi, here are my suggestions:

1. Yes, I do recommend New Delhi as a good option for expanding business.
2. I recommend not only opening a single location but opening a chain of restaurants.
3. I suggest changing an authentic Chinese cuisine to a combined cuisine restaurant serving Chinese food along with other Asian, Indian, or Italian cuisines.
4. I suggest implementing online delivery and table booking options.
5. I recommend opening new establishments with higher-than-average prices, as people tend to like fine dining settings. I suggest making a price for two people about 1000 Indian Rupees or 15-20 Canadian dollars. It would be profitable even to go with higher prices.
6. I recommend looking for options to open restaurants in major New Delhi shopping malls and business areas that are in Central Delhi, West Delhi, North West Delhi, and South West Delhi.