Capstone Project for Opening a Turkish Restaurant in Amsterdam

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11 May 2019

1 Introduction

In this project, we are trying to find a solution to the stakeholders that want to open a Turkish Restaurant in Amsterdam.

Since there are lots of parameters to find a best place to open a Turkish Restaurant, we can use data science techniques to handle with this problem.

Especially important facts that must be considered are;

- How many restaurants are in a special neighbourhood?
- What type of restaurants are there?
- Is a neighbourhood special or not with people's culture who lives there? (For example there can be a lot of Turkish restaurants in the neighbourhood where mostly Turkish people live)

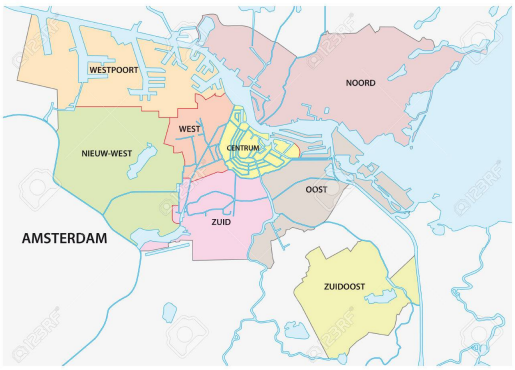

Figure 1: Map of Amsterdam

2 Data

We will use;

- Pgeocode api to get the coordinates of the neighbourhoods in Amsterdam.
- Foursquare api to get the venues in Amsterdam.

There are totally 81 neighbourhoods in Amsterdam. We get the coordinates of these neighbourhoods with pgeocode api.

After getting coordinates, it is time for foursquare api. Foursquare api provide us venuse in Amsterdam. When we fetch the data from Foursquare, We have 2611 venues in Amsterdam.

Our data frame includes the features;

- Postal code
- Neighborhood Latitude
- Neighborhood Longitude
- Venue Name
- Venue Latitude
- Venue Longitude
- Venue Category

In our project, we will mostly interested in the location and the category of the venues.

As shown in figure 2, These venues are mostly located in Amsterdam Center. There is an attraction point in Amsterdam Center. So we will take this into account for the stakeholders.

3 Methodology and Analysis

In our case, Stakeholders are looking for a place to open a Turkish Restaurant. So we take only the restaurants into consideration.

There are totally 633 restaurants and 56 unique restaurant types in Amsterdam. To understand better, we look at the frequency of different type of restaurants. As seen in figure 3, Italian restaurants are very popular in Amsterdam and also there are a large amount of restaurants without any specific category. When it comes to Turkish restaurants, there are 24 in Amsterdam. As seen in figure, The neighbourhood with 1063 postal code have 5 Turkish Restaurants, it is the highest number compared with the other neighbourhoods.

Data doesn't mean much by itself. We will implement k-means algorithm to understand data better. For k-means, we will use top ten popular restaurant types as 10 features. Top ten restaurants are;

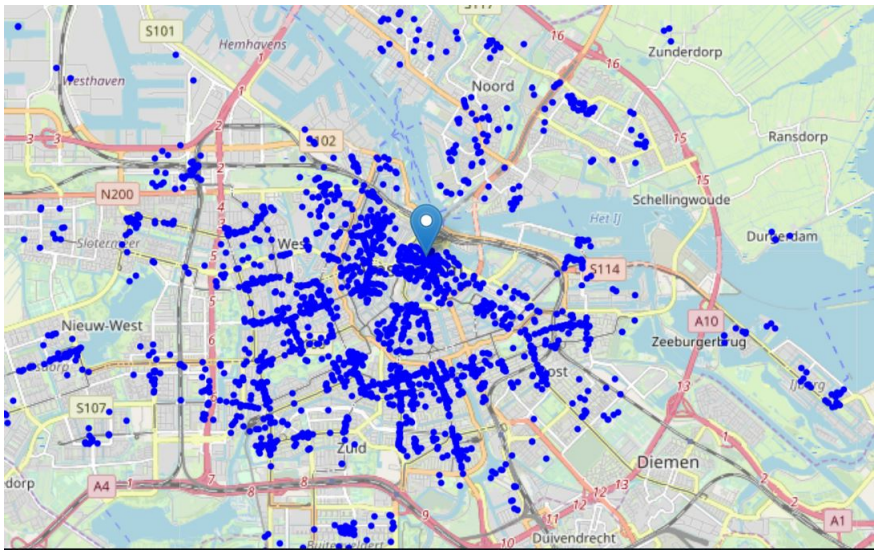

Figure 2: The venues of Amsterdam

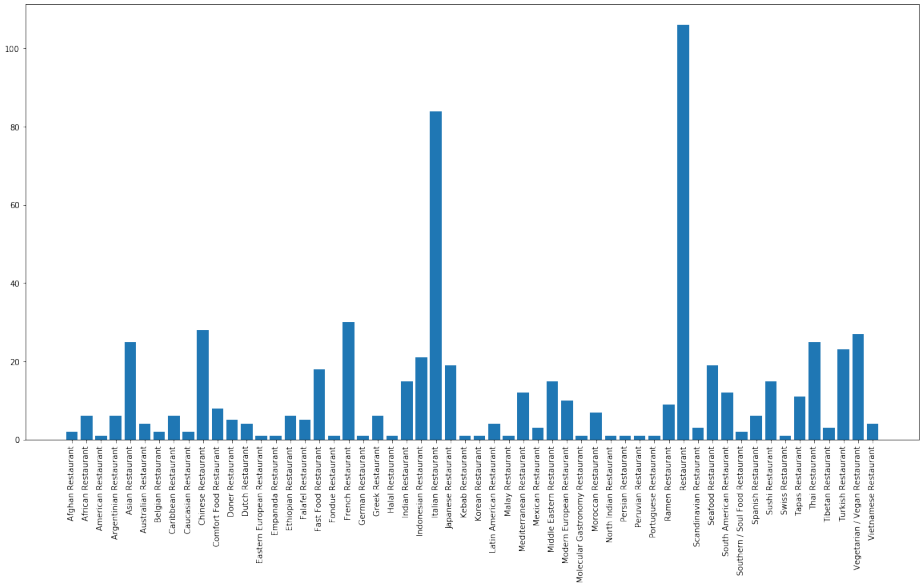

Figure 3: Frequency of restaurants in Amsterdam

- Restaurant
- Italian Restaurant

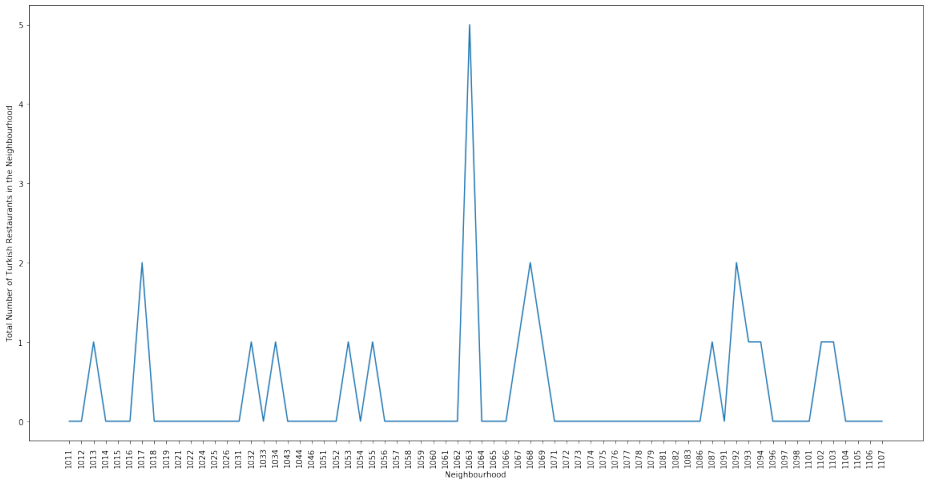

Figure 4: Turkish restaurants in Amsterdam according to postal code

- French Restaurant
- Chinese Restaurant
- Vegetarian / Vegan Restaurant
- Thai Restaurant
- Asian Restaurant
- Turkish Restaurant
- Indonesian Restaurant
- Japanese Restaurant

We determined k with elbow method. As seen in figure 4 elbow point is 6. So k is selected 6.

K-means clustering shows us the specific neighbourhoods with specific restaurants. We can see these neighbourhoods with their features.

- While cluster 0 is so common, there is not many restaurants in that areas. So we can think that we don't suggest these neighbourhoods to the stakeholders.
- Cluster 1 has more average restaurants than cluster 0. But it is really low when we compare with other clusters.
- Cluster 2 has the highest average number of Turkish Restaurants. So, maybe these neighbourhoods are places where Turkish people live.

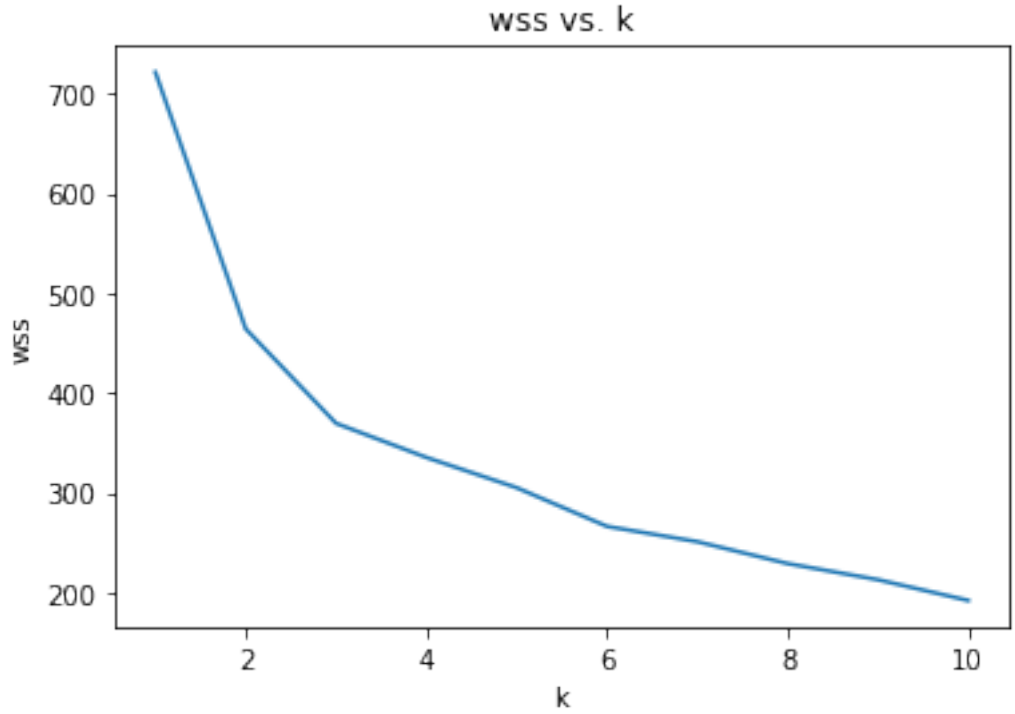

Figure 5: Selection of k for k-means clustering

- Cluster 3 has more restaurants than Cluster 2. But there are a lot of restaurants without any specific category. So, this cluster needs more research.
- Even though cluster 4 has a lot of restaurants, it has a huge number of Italian Restaurants. I can assume that the people lives in those areas really like Italian cuisine. So opening a Turkish restaurant in these neighbourhoods may not be a good idea.
- When we look at the cluster 5, it can be seen that there are many asian restaurants. So the same situation exists like cluster 4.

After clustering, we can see that cluster 2 and cluster 3 is more suitable when compared with other clusters.

So, we will decide where to open a Turkish Restaurant according to some parameters like restaurant density of the neighbourhood, distance from Amsterdam Center etc.

When we look at the distance from Amsterdam center feature, there are only 3 neighbourhoods with distance less than 2 km. They are neighbourhoods with

1013, 1016 and 1051 postal codes. But 1016 has highest number of restaurants. So the attraction point where we are looking for should be here.

After determining neighbourhood, we can dive into more details about the neighbourhood. There are 19 restaurants in our selected neighbourhood.

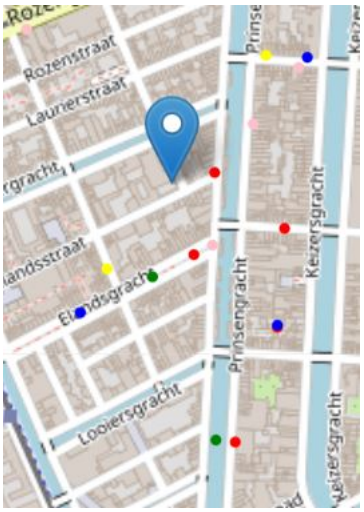

Figure 6: Restaurant types in the neighbourhood

The intersection of Elandsgracht street and Prinsengracht street is an attraction center for restaurants and people. And also there are 4 restaurants that we don't know their exact category. It is a good place to open a Turkish Restaurant but it still needs more research like;

- What are the demographic informations of the people who lives there?
- What are the exact category of these 4 restaurants?
- Do the people like Turkish food there?
- Is the market is big enough to withstand another restaurant?

4 Results

Our analysis shows that neighbourhood with 1016 postal code is the best place according to our data. Following results are written below:

- Even though there are 81 neighbourhoods across Amsterdam, many of them have a small number of restaurants. We think that it is because of the attraction of city center. So we focused on neighbourhoods that are closer to city center.

- Also there is a neighbourhood with 5 Turkish Restaurants, we don't prefer to open another Turkish restaurant there. We assume that it is a place where mostly Turkish people live. Despite it looks good to open a Turkish Restaurant in a place where mostly Turkish people live, the market is shared by only 5 Turkish restaurants.
- Italian restaurants are very popular in Amsterdam thanks to the Italian Cuisine.

5 Discussion

In addition to these results, there are also missing points to lighten for opening a Turkish Restaurant.

- What are the rental costs for restaurants compared with the market in that region?
- Is there any good place to rent in these neighbourhoods for a restaurant?
- Why are specific types of restaurants so common in some neighbourhoods? What are the exact reason? In this project, we only assumed some of these reasons.

6 Conclusion

In this project, we try to find the best place for a Turkish Restaurant according to foursquare venue data. We try to understand the characteristics of neighbourhoods by looking the venues in these places. There are some neighbourhoods with mostly one specific type of restaurants. Then, we turned our focus to neighbourhoods that have different kinds of restaurants. When the distance from the city center and the total number of restaurants of the neighbourhoods is taken into consideration, Neighbourhood with 1016 postal code is the best place to open a Turkish Restaurant.

During this project, we come to a point but it still needs more research to decide the optimal place for a Turkish Restaurant.