

## Opening a Scandinavian restaurant in Helsinki

### 1 Introduction

This is the final report for the Applied data science capstone course project, which is part of the IBM data science specialization.

In this project the target is to find out in which neighborhood of Helsinki it would be recommended to open a new Scandinavian restaurant.

Helsinki is the capital of Finland. Finland belongs to the Nordic countries together with Sweden, Norway, Denmark and Iceland, located in the Northern Europe, as shown in figure below [1]. If the tourists in Helsinki want to try and taste the food of one of those countries, typically consisting of e.g. Nordic fish, reindeer and Nordic berries, they visit one of the Scandinavian restaurants available in the city. The menu of Scandinavian restaurants usually vary from serving specifically the food from the local country, to cases where the menu is a mixture from all Nordic countries.



Naturally also the local Helsinki citizens and business people visit Scandinavian restaurants, since they usually offer high quality menus. On the other hand, the high-quality menus often imply that the price level in those restaurants is also mid-high.

The business problem of finding out in which neighborhood of Helsinki it would be recommended to open a new Scandinavian restaurant should interest people in the restaurant industry in Helsinki, and especially those who have interests towards opening a Scandinavian restaurant in Helsinki. Selecting the location for a restaurant is usually one of the most important decision for the restaurant owner.

No marketing will correct the situation, if the restaurant location is selected in the non-attractive spot with regards to the target customers.

It is also noted that the number of inhabitants of Helsinki is not very high, only 1.3 million within its extended metropolitan area [2]. For this reason, selecting the location for a new restaurant is even more important, since there are no masses of potential restaurant customers available everywhere.

## 2 Data description

The data that is needed for this project consist of names and locations of Helsinki neighborhoods, as well as most common venue information in those neighborhoods. The most common venue information is used for analyzing in which neighborhoods there are already a lot of Scandinavian restaurants and where there are still market place for those.

The neighborhoods of Helsinki are taken from Wikipedia page listing all the subdivisions of Helsinki [3]. There are 60 subdivisions altogether in Helsinki, and some of the subdivisions contain further subdivisions. It is decided to include only the 60 higher-level subdivisions, to keep the analysis simple.

The geolocations of Helsinki neighborhoods are obtained from Latitude web page [4]. On that page you can get GPS coordinates for any address, including neighborhoods of a city. The latitude and longitude coordinates for all Helsinki neighborhoods were collected from there and stored into excel.

The most common venue information for Helsinki neighborhoods are obtained from Foursquare, by utilizing Foursquare API [5].

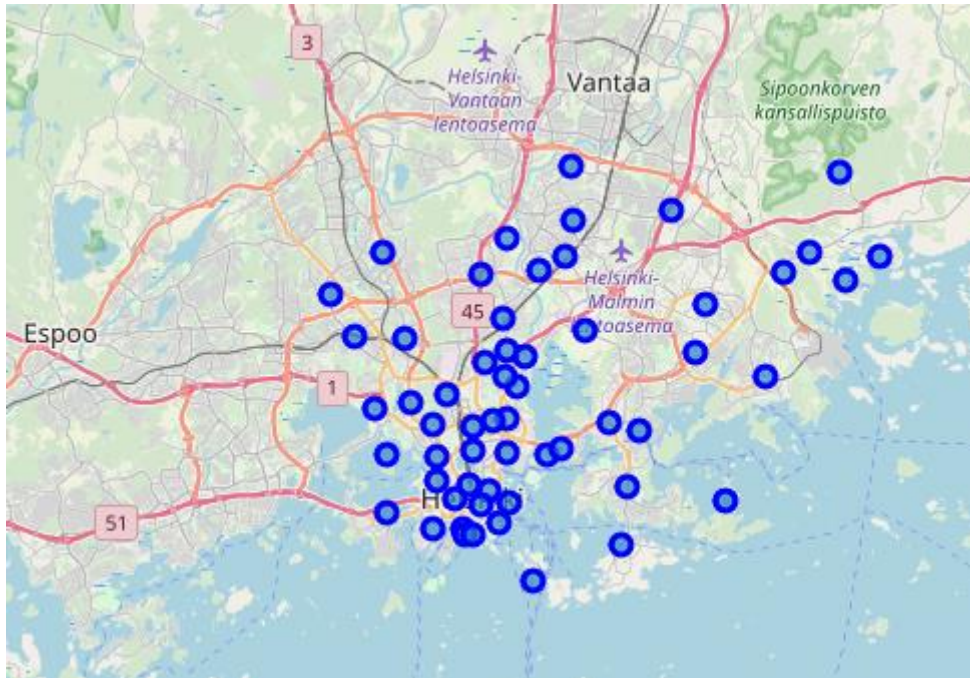
## 3 Methodology

First, the names of Helsinki neighborhoods were web-scraped from the wikipage [3], using BeautifulSoup library. Two neighborhoods were excluded in this phase, '53 Ulkosaaret' and the last in the list, '(Unnumbered) Alueneri'. The reason is that these areas contain only sea area, and are thus not relevant for this study.

Then the latitude and longitude values were collected for each neighborhood from Latitude web page [4], and stored into excel. The data from this excel was joined with the data frame containing the borough names. The head of resulting data frame looks like this:

	Borough	Latitude	Longitude
0	Kruuninhaka	60.169999	24.953830
1	Kluuvi	60.172480	24.940640
2	Kaartinkaupunki	60.165200	24.948970
3	Kamppi	60.167460	24.931070
4	Punavuori	60.156999	24.936163

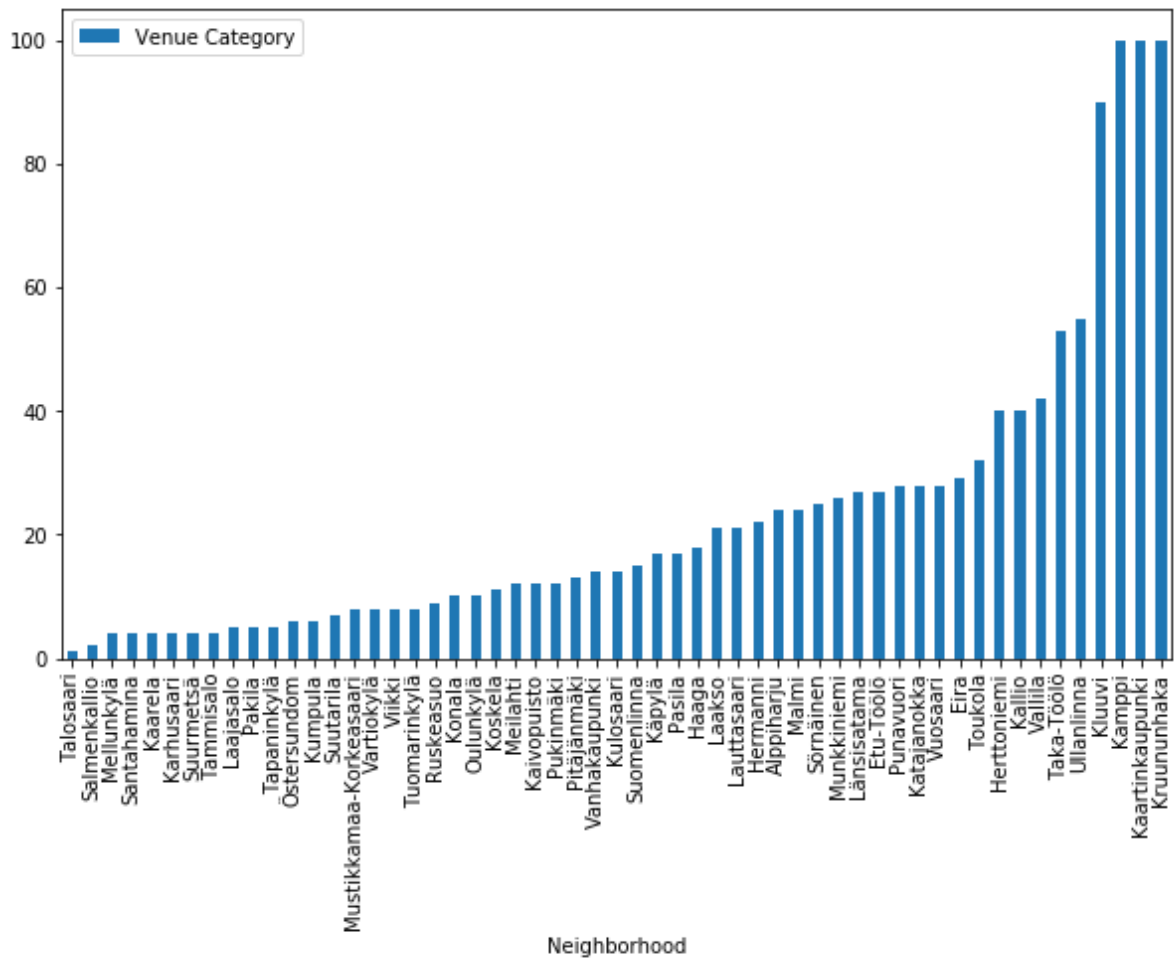
With the help of Folium library the Helsinki neighborhoods were visualized on top of a map, by utilizing the latitude and longitude values. The map is shown below:



Next, the Foursquare API was utilized to get at maximum 100 venues for each borough within a radius of 500 meters from their latitude and longitude coordinates. The head of the result is shown below.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Kruununhaka	60.169999	24.95383	Trillby & Chadwick	60.168398	24.953651	Speakeasy
1	Kruununhaka	60.169999	24.95383	Senaatintori	60.169377	24.952033	Plaza
2	Kruununhaka	60.169999	24.95383	Tuomiokirkon portaat	60.169909	24.951915	Scenic Lookout
3	Kruununhaka	60.169999	24.95383	El Fant	60.168680	24.953713	Café
4	Kruununhaka	60.169999	24.95383	Helsingin kaupunginmuseo / Helsinki City Museu...	60.168996	24.954028	History Museum

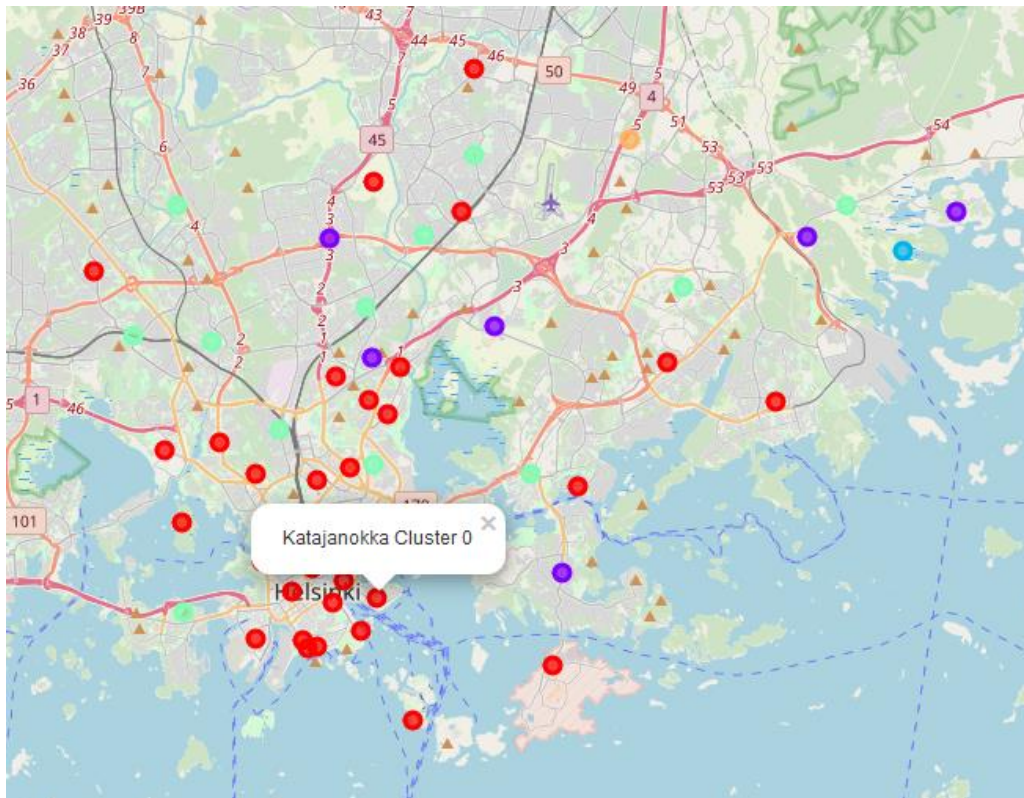
To explore the result, it was checked how many unique venue categories there were in the results: 243. Furthermore, it was checked how many venues were found for each neighborhood. In some neighborhoods, the maximum of 100 venues were found, while for some neighborhoods, much smaller number of venues were found. The bar chart below shows how many venues were found for each neighborhood.



Next, a data frame was created which contains the top ten most common venues for each neighborhood. The head of this data frame is shown below:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Alppiharju	Theme Park Ride / Attraction	Dog Run	Park	Sushi Restaurant	Dance Studio	Bar	Pub	Event Space	Gym	Blini House
1	Eira	Scandinavian Restaurant	Park	Boat or Ferry	Playground	Café	Bakery	Bistro	Coffee Shop	Beach	Pizza Place
2	Etu-Töölö	Café	Scandinavian Restaurant	Pub	Park	Theater	Bay	Gym / Fitness Center	Supermarket	Bistro	Tennis Court
3	Haaga	Bus Stop	Garden	Pizza Place	Grocery Store	Bakery	Cafeteria	Asian Restaurant	Café	Platform	Indian Restaurant
4	Hermannin	Bus Stop	Pizza Place	Bar	Tram Station	Playground	Flea Market	Restaurant	Recycling Facility	Convenience Store	Sauna / Steam Room

After all the neighborhoods have ten most common venues listed, the neighborhoods can be clustered based on this data, in order to distinguish them from each other. The K-means clustering is used with k=5 clusters. The clusters are visualized on top of Helsinki map below.



When looking at the venue data in different clusters, and also the location of the cluster within Helsinki area, the clusters can be named as follows:

- Cluster 0: Center - Cafés and Restaurants
- Cluster 1: Middle neighborhoods - Zoos
- Cluster 2: Middle neighborhoods - Gardens/parks
- Cluster 3: Outer neighborhoods - Markets
- Cluster 4: Outer neighborhoods - Stables

From the five clusters, cluster 0 is the most attractive for opening a new restaurant, since it is already now named as a restaurant cluster due to a large number of restaurants. Based on the venue data, related to restaurants, it can be assumed that there are a lot of potential customers for restaurants in general. The cluster is also situated in the center of Helsinki, where most of the tourists are spending their time. In addition, there are also a big number of local and business people in that area, looking for restaurant services, since it is an area where the density of people is largest in Helsinki area.

Next, it is calculated in which neighborhoods within cluster 0, Scandinavian Restaurant is among the top ten venues. The result is shown below - the neighborhoods with value 1 contain Scandinavian Restaurant among their top ten venues.

# Scandinavian Restaurant

Neighborhood	
Alppiharju	0
Eira	1
Etu-Töölö	1
Kaartinkaupunki	1
Kaivopuisto	1
Kallio	0
Kamppi	1
Katajanokka	1
Kluuvi	1
Konala	0
Kruununhaka	1
Kumpula	0
Käpylä	1
Laakso	0
Länsisatama	0
Malmi	0
Meilahti	1
Munkkiniemi	0
Mustikkamaa-Korkeasaari	0
Punavuori	1
Ruskeasuo	0
Santahamina	0
Suomenlinna	0
Suutarila	0
Sörnäinen	1
Taka-Töölö	0
Tammisalo	0
Toukola	0
Tuomarinkylä	0
Ullanlinna	1
Vallila	0

## 4 Results

There are 18 neighborhoods in Cluster 0 that do not have Scandinavian Restaurant in their most common venues. Among those neighborhoods that do not yet contain Scandinavian Restaurant in their most common venues, the most attractive ones are: Kallio, Länsisatama and Kluuvi.

Kallio is attractive since it is currently considered the trendiest area in Helsinki [6]. On the other hand, it is mainly a student district, and thus it may be a bit questionable whether students can afford to, and are interested to visit a mid-high price Scandinavian restaurant.

Länsisatama is attractive since there are cruise ships stopping by, bringing a lot of tourists to Helsinki [7]. On the other hand, it can be assumed that most of the tourists will be directly off to the center of Helsinki to see the attractions, and thus they will not probably stay so long time in the port area.

Out of these three, Kluuvi sounds the most attractive neighborhood. Kluuvi is the commercial center of Helsinki, containing only some hundreds of inhabitants, but 23000 jobs [8]. Most of the tourists spend their time in this area, especially if they do some shopping or visit museums. Thus opening up a Scandinavian restaurant in this area may attract both tourists as well as local people either working or shopping in that area.

## 5 Discussion

As discussed in the introduction section, the population of Helsinki is not very high, only 1.3 million within its metropolitan area. Thus it is quite important to select carefully the location of any new restaurant. The location should be selected in that way, that on one hand there are in general sufficient number of potential customers passing by, while on the other hand there is not too fierce competition with similar restaurants next to each other.

There are 60 neighborhoods in Helsinki. When leaving out two of them located in the sea area, the remaining 58 neighborhoods were clustered into 5 clusters based on the top ten most common venues in each neighborhood. This was done to distinguish those neighborhoods which clearly contain quite a few restaurants, and thus are considered to represent an area where there are customers for restaurants in general.

To improve clustering for this purpose, there could have been also data on how much there is people present or moving by in different neighborhoods. But since it was not easy to find this kind of data, it was consciously left out.

When the cluster containing a lot of restaurants as the top ten most common venues was found, i.e. cluster 0, it was analyzed within that cluster, what neighborhoods already contained Scandinavian restaurant in the top ten most common venues, and which neighborhoods did not include it.

There were altogether 18 out of 31 neighborhoods in cluster 0 which did not have Scandinavian restaurants yet in the top ten most common venues. Out of these, three neighborhoods were selected for further qualitative analysis: Kallio, Länsisatama and Kluuvi, since they all are situated in the center area of Helsinki considered to have densest traffic of people. As mentioned already above, it would have been good to have actual 'people traffic' data also available for analysis. But in this case that part was done based on qualitative analysis.

Out of these three neighborhoods, Kallio, Länsisatama and Kluuvi, Kluuvi was finally selected to be the recommended area since it is a commercial center of Helsinki, also having a lot of tourists spending their time there. Kallio and Länsisatama were excluded mainly since the former is mainly a student district and Scandinavian restaurant may have too high price level for them, while the latter is a port



area, where tourists do not necessarily spend so much time since typically directly heading for the center.

## 6 Conclusion

As a conclusion of this study, the recommendation is, that if there is a desire to open up a new Scandinavian restaurant in Helsinki, it would be opened in the neighborhood of Kluuvi [8]. Kluuvi is the commercial center of Helsinki, containing only some hundreds of inhabitants, but 23000 jobs [8]. Most of the tourists spend their time in this area, especially if they do some shopping or visit museums. Thus opening up a Scandinavian restaurant in this area may attract both tourists as well as local people either working or shopping in that area.

## 7 References

- [1] The best restaurants in the Nordics: <http://whiteguide-nordic.com/this-is-the-nordics>
- [2] Helsinki population: <http://worldpopulationreview.com/world-cities/helsinki-population/>
- [3] Helsinki neighborhoods: [https://en.wikipedia.org/wiki/Subdivisions\\_of\\_Helsinki](https://en.wikipedia.org/wiki/Subdivisions_of_Helsinki)
- [4] Latitude: <https://latitude.to>
- [5] Foursquare API: <https://developer.foursquare.com/places-api>
- [6] Most trendy areas in Helsinki: <https://theculturetrip.com/europe/finland/articles/helsinkis-most-trendy-neighbourhoods/>
- [7] Port of Helsinki: <https://www.portofhelsinki.fi/en?q=tavaraliikenne-ja-alukset/lansisatama>
- [8] Neighborhood of Kluuvi: <https://en.wikipedia.org/wiki/Kluuvi>