



WHERE TO OPEN A RESTAURANT IN HESINKI

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MARCH 9, 2021



BACKGROUND

- Helsinki is the capital city of Finland with a population of 657,674. Together with the cities of Espoo, Vantaa, and Kauniainen, and surrounding commuter towns, Helsinki forms the Greater Helsinki metropolitan area (Uusimaa), which has a population of over 1.5 million. This area is the country's most important center for politics, education, finance, culture, and research. The urbanization and development of the Uusimaa area has brought great opportunities for the tertiary sector business, including catering.



THE PROBLEM & GOAL OF THE PROJECT

- Imagining someone is seeking for a suitable place in Helsinki to open a restaurant, he or she must be interested in how restaurants are situated in this city, the most popular types of restaurants and the surrounding venues of the restaurants, i.e. other venues in the same neighborhood.
- My project will provide an analysis of the 60 neighborhoods in Helsinki area, mainly focusing on the restaurants and other popular venues in each neighborhood. The neighborhoods will finally be segmented into several clusters based on the venue situation. For those seeking for a suitable location to open a restaurant, this analysis may provide some clues.

DATA

The data that will be used in this project include:

- Subdivision (neighborhoods) of Helsinki, collected from wikipedia page (https://en.wikipedia.org/wiki/Subdivisions_of_Helsinki)

There are **60 neighborhoods** in Helsinki area

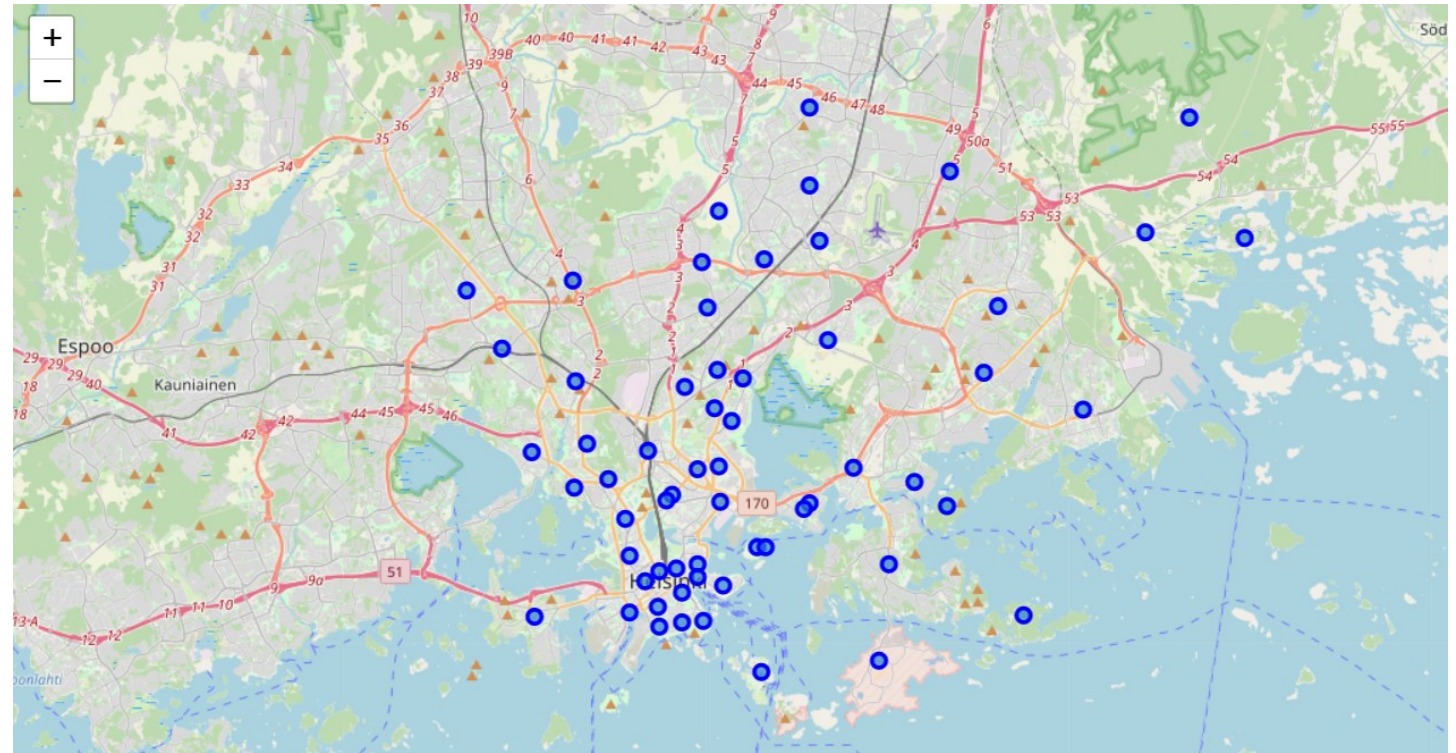
- The center coordinates of each neighborhood, collected from LatLong.net and Google Maps
- Venues data in each neighborhood, collected through Foursquare API

In total **1233 venues'** data with **241 unique categories** were collected

EXPLORATORY ANALYSIS

— HELSINKI NEIGHBORHOODS

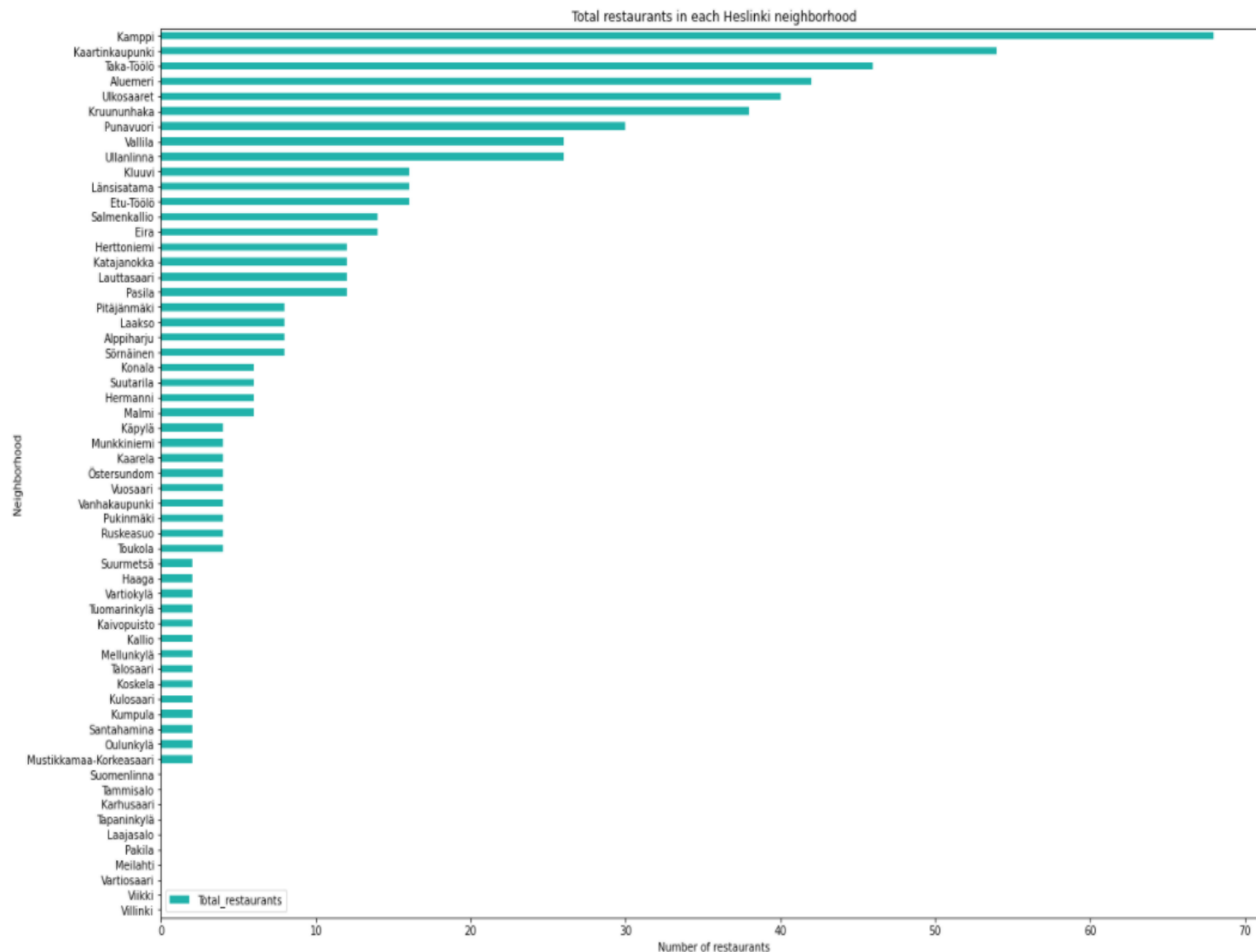
- There are 60 neighborhoods in Helsinki area.
- In the central region of Helsinki, the area of each neighborhood is quite small compared with other regions. ----> When requesting through Foursquare API, radius set to 400 meters to ensure that different neighborhoods will not share the same venue.



EXPLORATORY ANALYSIS

— TOTAL NUMBER OF RESTAURANTS IN EACH NEIGHBORHOOD

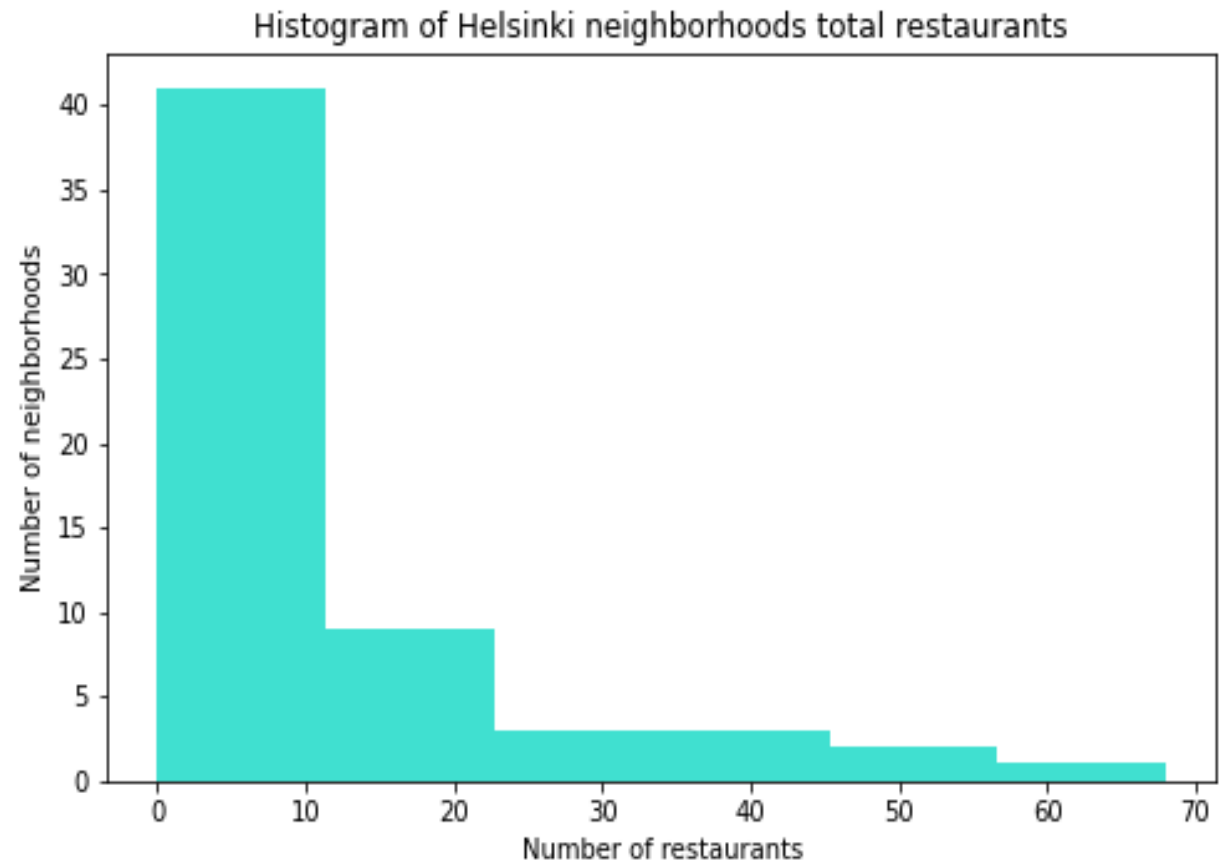
- Kamppi, Kaartinkaupunki, Taka-Töölö, Alueneri, Kruununhaka, Ulkosaaret, Punavuori, Vallila, Ullanlinna are neighborhoods which have a relatively high density of restaurants compared with other subdivisions.



EXPLORATORY ANALYSIS

— DISTRIBUTION OF THE NEIGHBORHOODS BASED ON THE TOTAL NUMBER OF RESTAURANTS

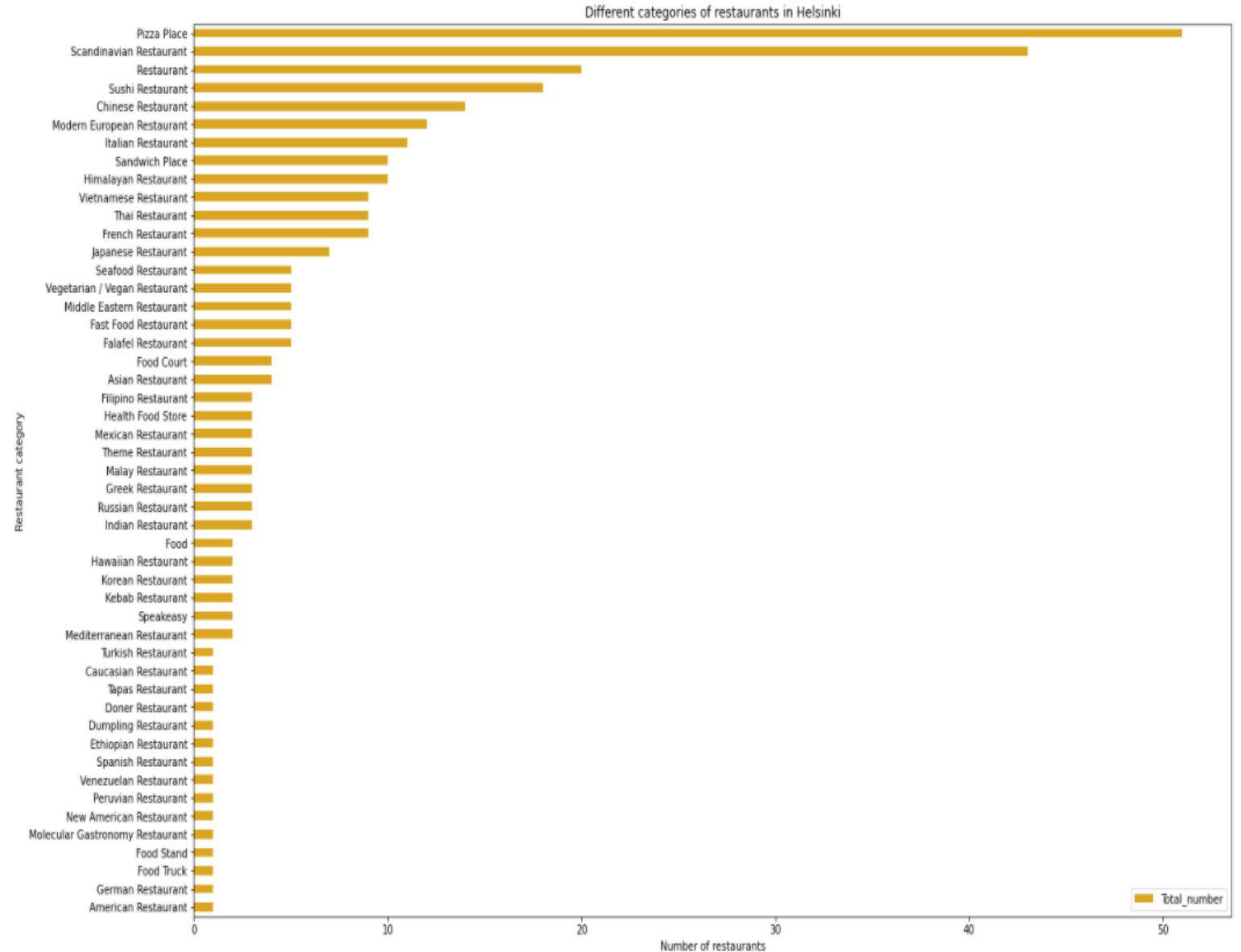
- Around 40 neighborhoods have less than 10 restaurants.
- Around 10 neighborhoods have 10-20 restaurants.
- 9 neighborhoods have more than 20 restaurants.



EXPLORATORY ANALYSIS

— THE NUMBER OF EACH RESTAURANT CATEGORY IN HELSINKI

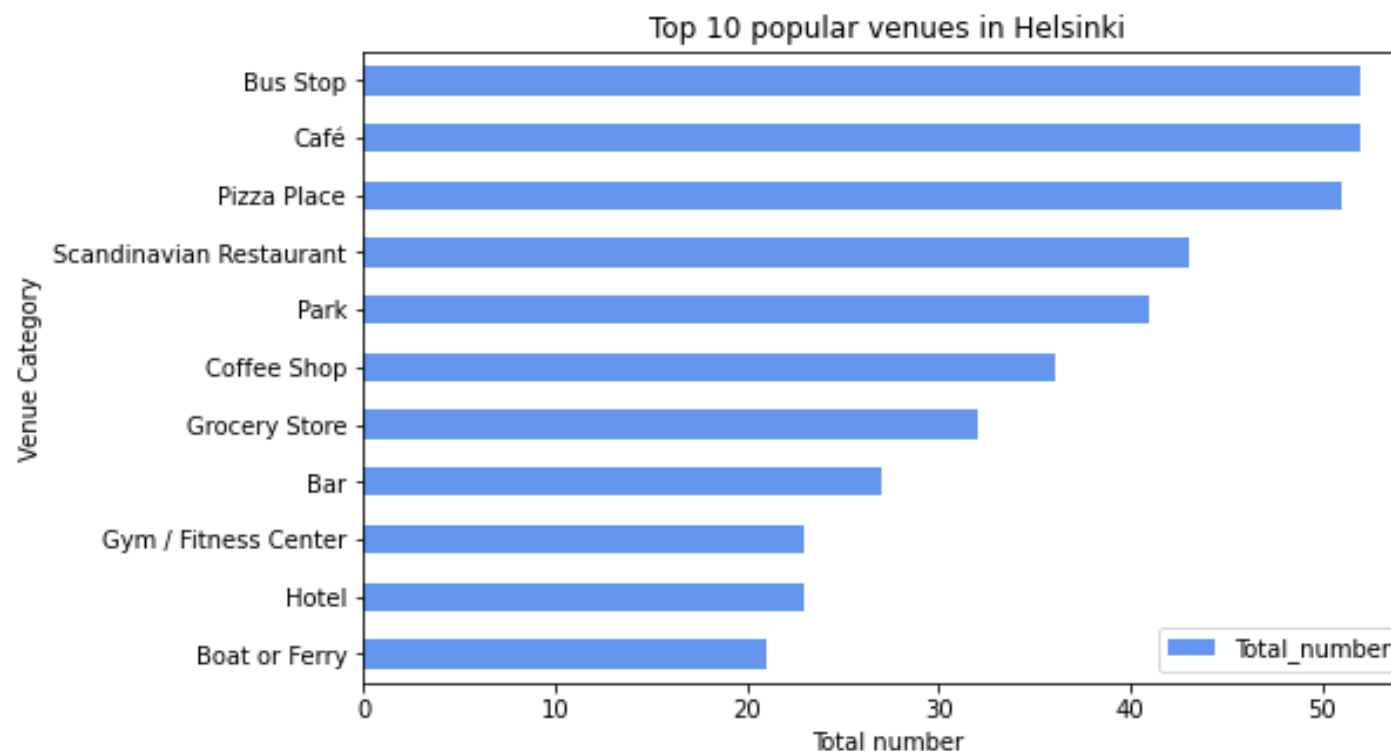
- Pizza place (51 in total) and Scandinavian restaurant (43) are the most common/popular restaurant types in Helsinki, followed by sushi restaurant (18), Chinese restaurant (14) and modern European restaurant (12).



EXPLORATORY ANALYSIS

— THE TOP 10 MOST POPULAR VENUES IN HELSINKI

- Coffee places (in total 88 Café & Coffee Shop), bus stops, restaurants (mostly pizza places and Scandinavian Restaurant), parks, grocery stores, fitness center, hotel and boat/ferry are the most common venues in Helsinki.

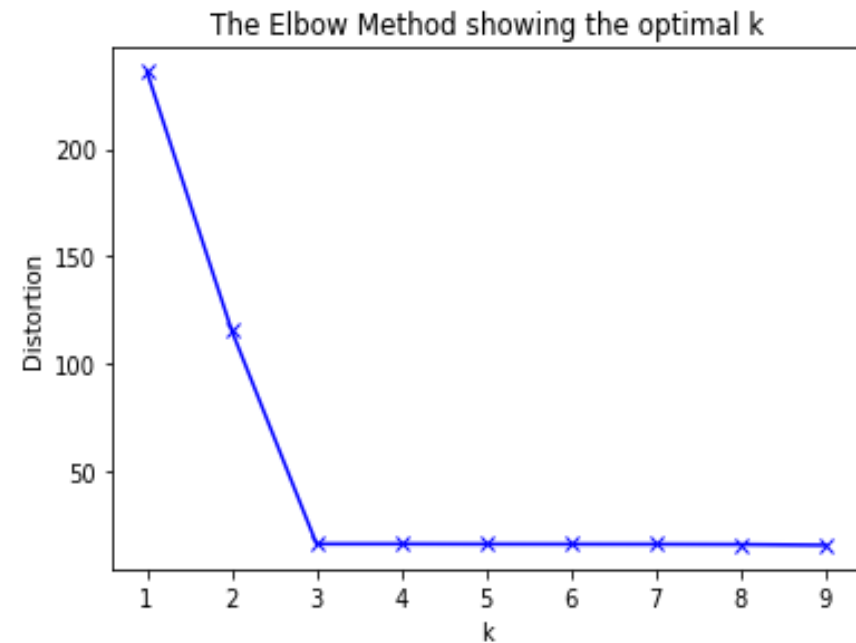


MACHINE LEARNING METHODS

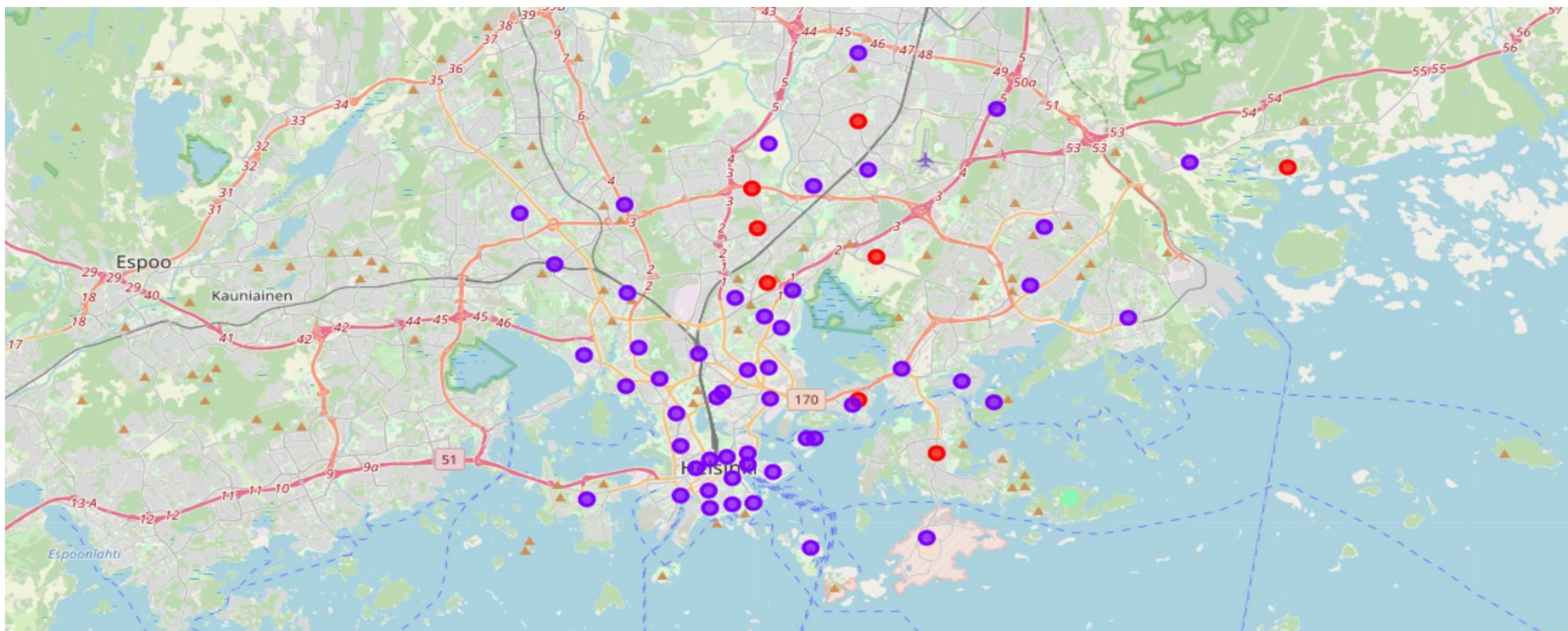
– K-MEANS CLUSTERING ALGORITHM

- Now that we have the venues data, it might be helpful if we can divide the neighborhoods to several groups based on the venue features. Then we might be able to see which group has the best potential for catering business.
- Clustering would be a suitable machine learning method for this purpose.
- K-means, which is the simplest unsupervised learning algorithm that solves clustering problem, was used for this project.

- Choosing optimal K – Elbow method



RESULTS



CLUSTER 1

- Red markers in the map
- Bus stop is the 1st most common venues in these neighborhoods.
- Restaurants only start to appear from the 3rd most common venues.
- I'll name this cluster as the "Transporation Cluster".

	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	Cluster Labels
10	Kallio	Bus Stop	Music School	Flower Shop	Taxi Stand	Grocery Store	Chinese Restaurant	Park	Dog Run	Doner Restaurant	Filipino Restaurant	0
25	Koskela	Bus Stop	Café	Pizza Place	Grocery Store	Farm	Food Truck	Food Stand	Food Court	Food	Flower Shop	0
27	Oulunkylä	Bus Stop	Grocery Store	Soccer Field	Recreation Center	Skating Rink	Fast Food Restaurant	Curling Ice	Food	Flower Shop	Flea Market	0
33	Pakila	Bus Stop	Playground	Historic Site	Grocery Store	Film Studio	Farmers Market	Fast Food Restaurant	Filipino Restaurant	Zoo Exhibit	Falafel Restaurant	0
35	Viiikki	Bus Stop	Cafeteria	Eye Doctor	Lake	Farm	Food Stand	Food Court	Food	Farmers Market	Food Truck	0
38	Tapaninkylä	Bus Stop	Gourmet Shop	Forest	Food Truck	Food Stand	Food Court	Food	Flower Shop	Flea Market	Fish & Chips Shop	0
48	Laajasalo	Bus Stop	Sauna / Steam Room	Falafel Restaurant	Food Truck	Food Stand	Food Court	Food	Flower Shop	Flea Market	Fish & Chips Shop	0
57	Karhusaari	Bus Stop	Park	Lounge	Falafel Restaurant	Food Truck	Food Stand	Food Court	Food	Flower Shop	Flea Market	0

CLUSTER 2

- Purple markers in the map
- Restaurants, café (or coffee shop) and bars (or pub) appear quite often among the top 3 most common venues in these neighborhoods.
- I'll call this cluster "Food & Drinks Cluster".
- Table on the right side just shows part of the neighborhoods in this cluster.

	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	Cl Ls
0	Kruunuhaka	Bar	Grocery Store	Café	Boat or Ferry	Pizza Place	Scandinavian Restaurant	Modern European Restaurant	Theater	Organic Grocery	German Restaurant	1
1	Kluuvi	Café	Scandinavian Restaurant	Clothing Store	Burger Joint	Hotel	Coffee Shop	Bistro	Park	Furniture / Home Store	Bookstore	1
2	Kaartinkaupunki	Scandinavian Restaurant	Hotel	Cocktail Bar	Vegetarian / Vegan Restaurant	Music Venue	French Restaurant	Furniture / Home Store	Bistro	Park	Café	1
3	Kamppi	Wine Bar	Coffee Shop	Scandinavian Restaurant	Chinese Restaurant	Burger Joint	Sushi Restaurant	Gym / Fitness Center	Food Court	Salon / Barbershop	Rock Club	1
4	Punavuori	Bakery	Coffee Shop	Pizza Place	Hotel	Scandinavian Restaurant	Sushi Restaurant	Park	Café	Gay Bar	Furniture / Home Store	1
5	Eira	Bakery	Park	Harbor / Marina	Boat or Ferry	Scandinavian Restaurant	Café	Mexican Restaurant	Beach	Modern European Restaurant	Turkish Restaurant	1
6	Ullanlinna	Scandinavian Restaurant	Grocery Store	Park	Ice Cream Shop	Coffee Shop	Plaza	Pharmacy	Nightclub	Boat or Ferry	Restaurant	1
7	Katajanokka	Boat or Ferry	Hotel	Park	Scandinavian Restaurant	Tram Station	Pub	Harbor / Marina	Film Studio	Café	Plaza	1
8	Kaivopuisto	Boat or Ferry	Park	Harbor / Marina	Monument / Landmark	Tram Station	Nightclub	Taxi Stand	Grocery Store	Scandinavian Restaurant	Coffee Shop	1
9	Sörmäinen	Thai Restaurant	Circus School	Cocktail Bar	Café	Dance Studio	Pizza Place	Burger Joint	Martial Arts School	Vietnamese Restaurant	Organic Grocery	1
11	Alppiharju	Theme Park Ride / Attraction	Park	Bar	Greek Restaurant	Café	Thai Restaurant	Dog Run	Vietnamese Restaurant	History Museum	Theater	1
12	Etu-Töölö	Scandinavian Restaurant	Pub	Bookstore	Russian Restaurant	Plaza	Indie Theater	Asian Restaurant	Gym / Fitness Center	Restaurant	Bakery	1
13	Taka-Töölö	Coffee Shop	Sushi Restaurant	Music Venue	French Restaurant	Bowling Alley	Indian Restaurant	Himalayan Restaurant	Italian Restaurant	Japanese Restaurant	Pizza Place	1
14	Meilahti	Gym / Fitness Center	Disc Golf	Tennis Court	Zoo Exhibit	Falafel Restaurant	Food Stand	Food Court	Food	Flower Shop	Flea Market	1

CLUSTER 3

- Green markers in the map
- The top 2 most common venues are memorial site and zoo exhibit. I'll name this cluster "Memorial Site & Zoo Cluster".

	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	Cluster Labels
49	Villinki	Memorial Site	Zoo Exhibit	French Restaurant	Food Truck	Food Stand	Food Court	Food	Flower Shop	Flea Market	Fish & Chips Shop	2

DISCUSSION & CONCLUSION

- As a brand-new restaurant, it is important to increase the chances that it appears in people's eyes. The simplest way is to place this restaurant among other restaurants. Competition also brings opportunities. Therefore, I would recommend people to open the restaurant in one of the "Food & Drinks Cluster" neighborhoods.
- Based on my analysis, pizza place, Scandinavian restaurant, sushi restaurant, Chinese restaurant and modern European restaurant are the top 5 most common types of restaurant in Helsinki. There would be enough demands in the market if the new restaurant is one of the above five categories. However, if someone plans to open an other type of restaurant, such as Indian restaurant, he or she might need to think more.
- Something to improve: We can get the housing price (per square meter) of the neighborhoods and add to our analysis. Housing prices in a way reflect the renting prices. Thus we will have a good view of the rental cost of the restaurant, which is also important for the selection of locaiton given limited budget.