Opening Indonesian restaurant in Strasbourg (France)

Coursera / IBM Applied Data Science

Capstone Project

Introduction and business problem

- Strasbourg is a mid-size city in France, with a population of about 277,000
- The food scene is quite varied, with a recent trend of Asian eateries opening up
- No Indonesian restaurant has been operating so far in the city

→ We will check what would be the best location to open such Indonesian restaurant in Strasbourg

Data acquisition and cleaning

- Population & Coordinates & Income & area data of the city of Strasbourg from INSEE (French Institute of statistics) census dataset:
  - Set 1: area coordinates and population
  - Set 2: Income data
- Restaurant data from Foursquare

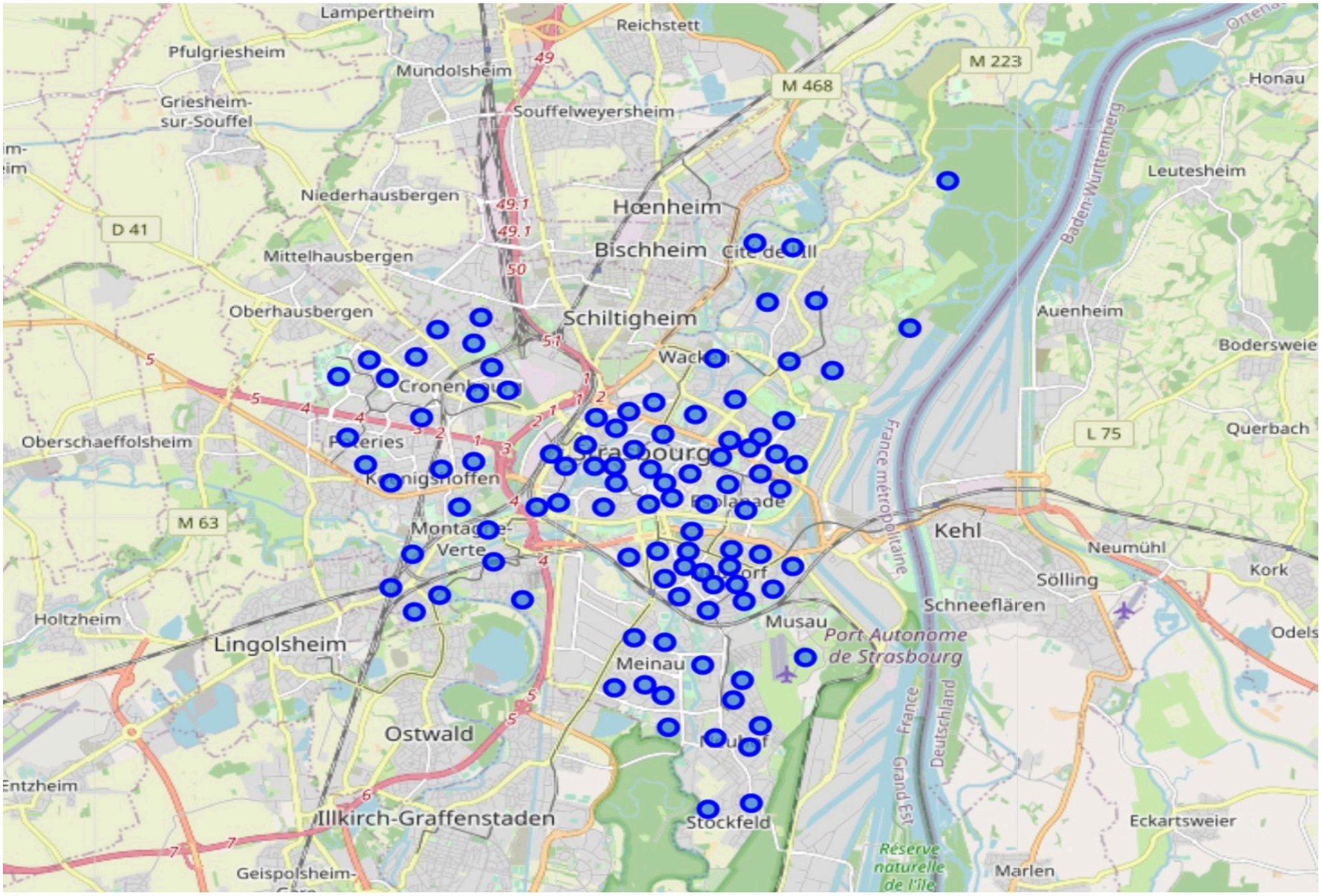
Statistical data preparation

Clean and prepare the statistical data from INSEE:

- Area codes and names using the IRIS breakdown (as not postcode breakdown is possible in our case)
- Population per area
- Mean income per area
- latitude and longitude data per area

Area_code	Mean_income	Area_name	Population	lat	lon
674822104	28728.0	Robertsau Centre	2146.842963	48.607300	7.783869
674821001	16056.0	Esplanade Sud Est	3365.658019	48.575999	7.770276
674823001	18924.0	Stockfeld Est	2267.729980	48.531956	7.771555
674822106	29956.0	Robertsau Est	2638.509955	48.603239	7.801769
674820202	22341.0	Petite France Nord Ouest	2292.148315	48.582471	7.741456

Mapping of the city’s areas



Restaurant data extraction

Using Foursquare API, we find there 1,322 food venus in Strasbourg, in the following categories:

```
array(['French Restaurant', 'Diner', 'Bakery', 'Pizza Place',
       'Sandwich Place', 'Middle Eastern Restaurant', 'Taco Place',
       'Fast Food Restaurant', 'Gastropub', 'Doner Restaurant',
       'Brasserie', 'Steakhouse', 'Restaurant', 'Brazilian Restaurant',
       'Asian Restaurant', 'Belgian Restaurant', 'Café',
       'Italian Restaurant', 'Spanish Restaurant',
       'Vietnamese Restaurant', 'Alsatian Restaurant', 'Bistro',
       'Vegetarian / Vegan Restaurant', 'Mediterranean Restaurant',
       'Sushi Restaurant', 'Cigkofte Place', 'Bagel Shop',
       'Thai Restaurant', 'Japanese Restaurant', 'Tapas Restaurant',
       'German Restaurant', 'Trattoria/Osteria', 'Burger Joint',
       'Chinese Restaurant', 'Mexican Restaurant', 'Indian Restaurant',
       'Cafeteria', 'Food Truck', 'Comfort Food Restaurant',
       'Snack Place', 'Fried Chicken Joint', 'Dim Sum Restaurant',
       'Korean Restaurant', 'Lebanese Restaurant', 'Mac & Cheese Joint',
       'Deli / Bodega', 'Paella Restaurant', 'Kebab Restaurant',
       'BBQ Joint', 'Food Court', 'Falafel Restaurant',
       'Fish & Chips Shop', 'Turkish Restaurant', 'Portuguese Restaurant',
       'American Restaurant', 'Moroccan Restaurant', 'Creperie', 'Food',
       'Greek Restaurant'], dtype=object)
```

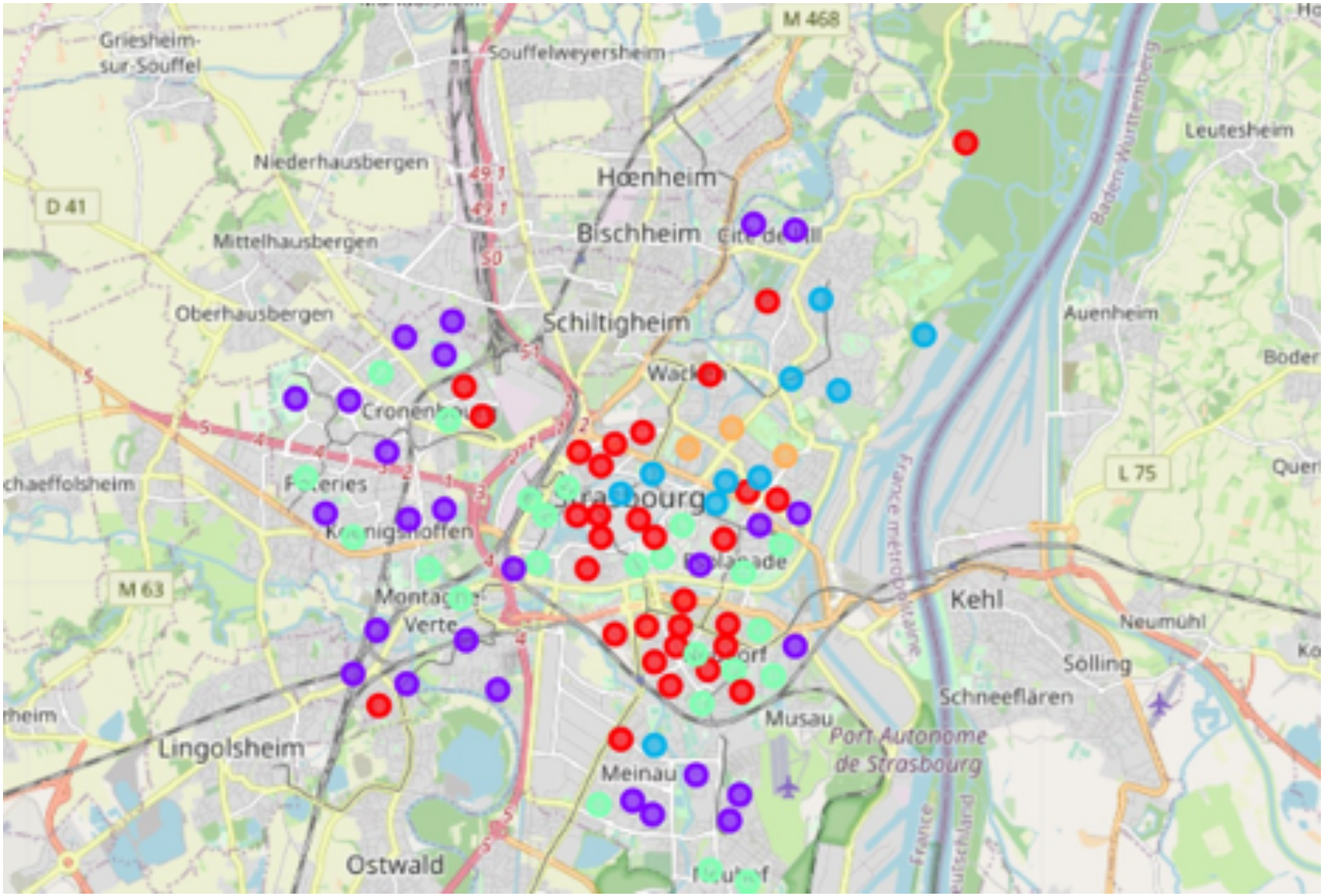
Interestingly there is no Indonesian restaurant in Strasbourg, so **we would be the first one** !

Data exploration

After classifying restaurants in Asian / Non Asian categories and merging both datasets, we can get following insights:

- Mean income per person in an area is 19,456 EURO yearly income
- Mean population of an area is 2,670 inhabitants
- Mean number of Asian restaurants per area is 1.27
- Mean number of Non Asian restaurants per area is 12.8

Clustering areas with k-means



Cluster statistics

Five clusters have been found with following characteristics:

Cluster Labels	Area_name	Asian	Non Asian	Mean_income	Population
0	31	61	636	22713.935484	76350.318941
1	26	9	120	10723.730769	71045.257264
2	10	8	110	29032.500000	24785.413978
3	24	40	317	18434.958333	69242.979112
4	3	1	20	37735.333333	9569.493565

Cluster analysis

- **Cluster 0:** the most populated cluster with 31 areas and 76,350 inhabitants, income of 22,713 Euros is above the city's mean income 19,456 Euros, and the highest number of restaurants → **Good potential cluster**
- **Cluster 1:** the mean income is too low for our case
- Cluster 2: a smaller cluster with less than 25,000 people however there is a very high income of 29,032 Euros, almost 10,000 Euros higher than the mean income in the city → **Good potential cluster**
- **Cluster 3:** the mean income is too low as we are looking for cluster above the mean income of the city
- **Cluster 4:** a very small cluster with less than 10,000 inhabitants but a the highest mean income in the city, also there is only one Asian restaurant in this cluster Good potential cluster

Target areas selection criterias

Based on the performed exploratory analysis and clustering, we can tell the best areas in which to open an Indonesian restaurant in Strasbourg have following characteristics:

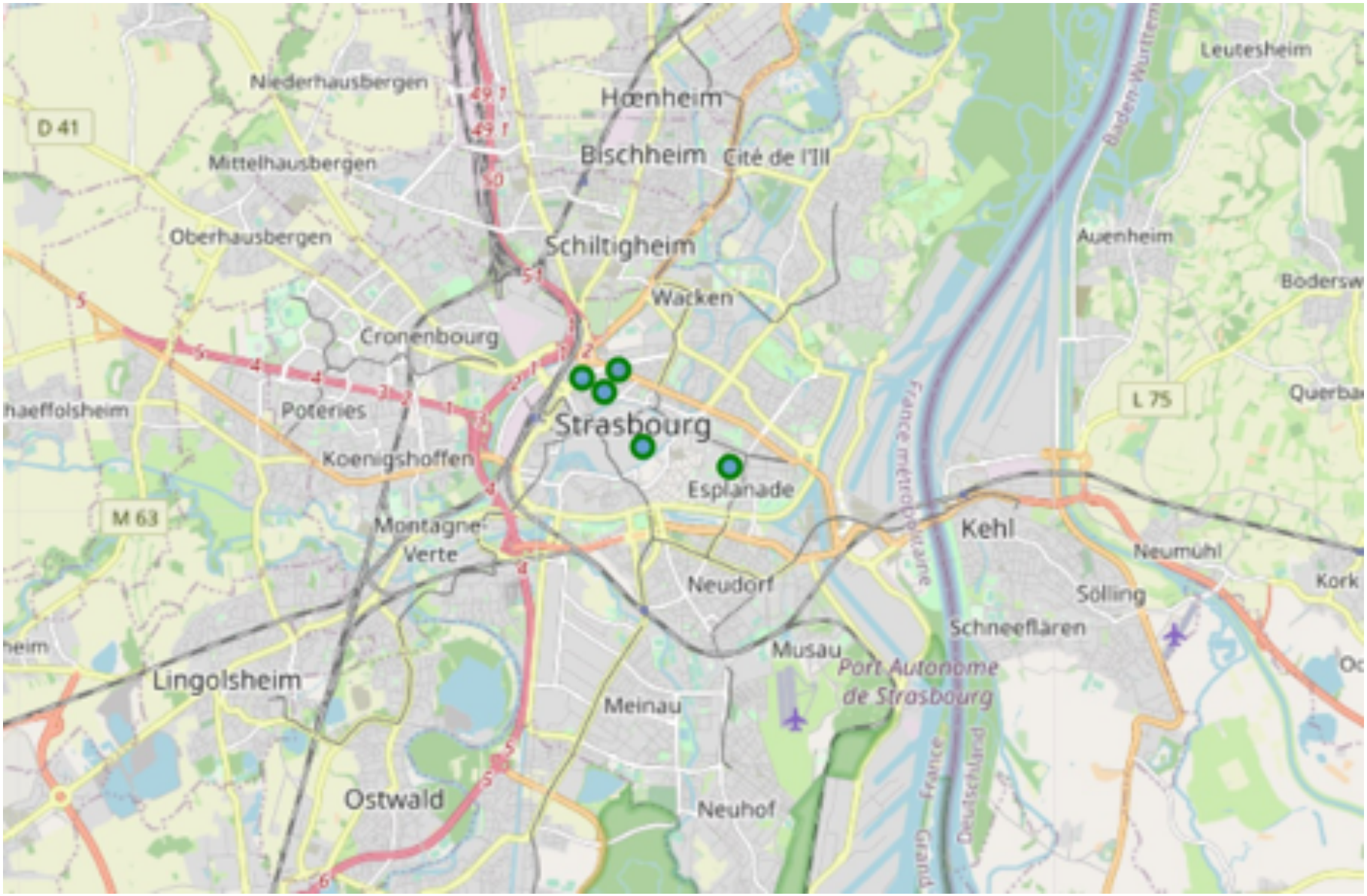
- Mean income bigger than the city's mean income
- Population of the area bigger than the mean area population
- Density of Non Asian restaurants in the area bigger than the city's mean density (to ensure there is enough customer traffic and validate the area population is eating out)
- Area is located in clusters 0, 2 or 4

Target areas list

Five areas fulfilling our requirements

Cluster Labels	Area_name	Asian	Non Asian	Area_code	Mean_income	Population	lat	lon
0	Esplanade Nord Ouest	1	16	674821005	22360.0	2746.041336	48.579749	7.766852
0	Kable Sud Ouest	2	19	674820503	23270.0	2962.160086	48.590608	7.748234
0	Mairie Sud	5	69	674820102	24812.0	3741.745583	48.582155	7.752335
0	Poincare Est	4	15	674820402	22446.0	2975.528259	48.588116	7.745589
0	Poincare Ouest	6	26	674820401	23068.0	3754.317640	48.589735	7.741896

Target areas map



Conclusion

Based on our analysis we found that there are five suitable areas where to open an Indonesian restaurant in Strasbourg:

- Esplanade Nord Ouest
- Kable Sud Ouest
- Mairie Sud
- Poincare Est
- Poincare Ouest

This is a good starting point for exploring further these pre-selected areas. The decision of the precise location needs to be made also based on other factors such as real estate availability, rental prices, accessibility of the location.