



# IBM CAPSTONE PROJECT

## The Battle of Neighborhoods:

Cluster Analysis of Paris : Seafood restaurant

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# Business Problem



The closest sea to Paris is 194 km away, it's necessary to be close to the fish shops to get fresh fish for our new restaurant.



What are the demographic trends in the neighborhood ?

What are the characteristics of the individuals frequenting the neighborhood (residents, transients, employees, workers...)? Age, sex, activity, purchasing power, intentions, behavior ?



# Data



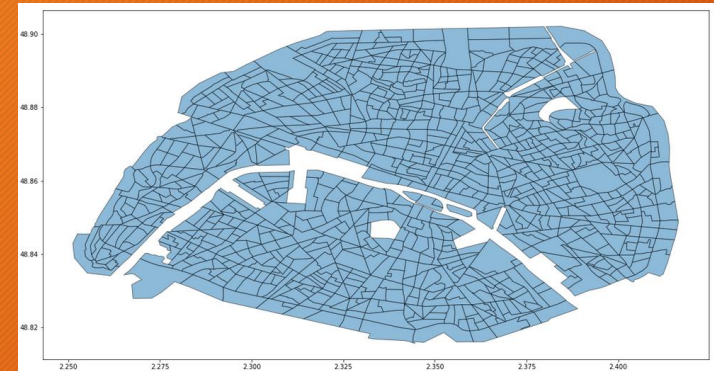
INSEE had developed a division of the territory into homogenously sized grids called IRIS2000. This acronym stood for “Ilots Regrouped for Statistical Information” and referred to the target size of 2,000 inhabitants per elementary grid cell.

Density population



Foursquare API to explore neighborhoods in PARIS and seafood restaurant.

GoogleMap for fish shop



# Methodology and Analysis



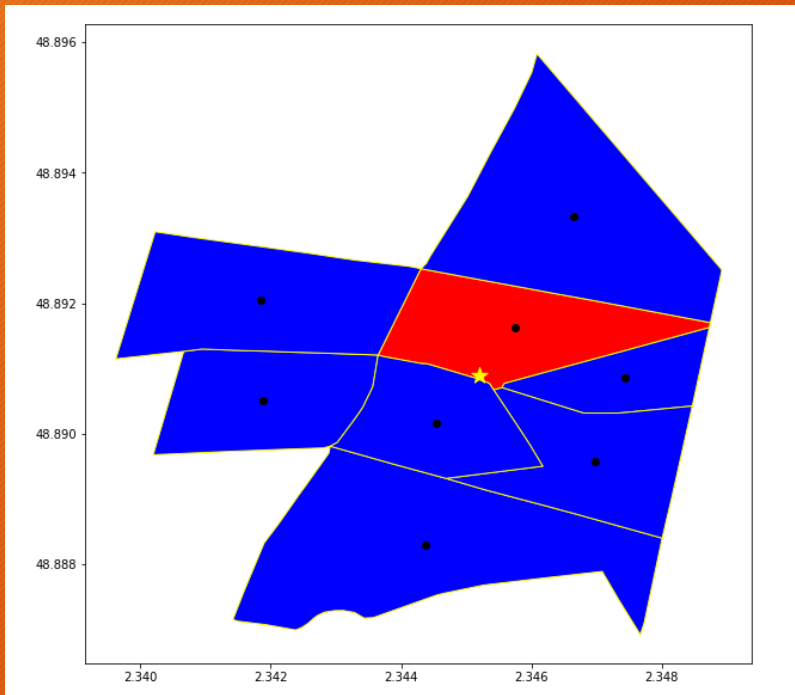
- 1 Download the IRIS dataset
- 2 Clean the IRIS dataset
- 3 Analyze the IRIS dataset
- 4 Visualize the IRIS dataset
- 5 Utilize the Foursquare API to explore the neighborhoods and seafood restaurant in Paris
- 6 Merge cleaned IRIS dataset with seafoods restaurant
- 7 Segment neighborhoods using k-means clustering to locate seafood restaurant
- 8 Overlay clusters with restaurants, fish shops and activity people
- 9 Take places that are far from restaurants and near to fish shops according to the density of the people



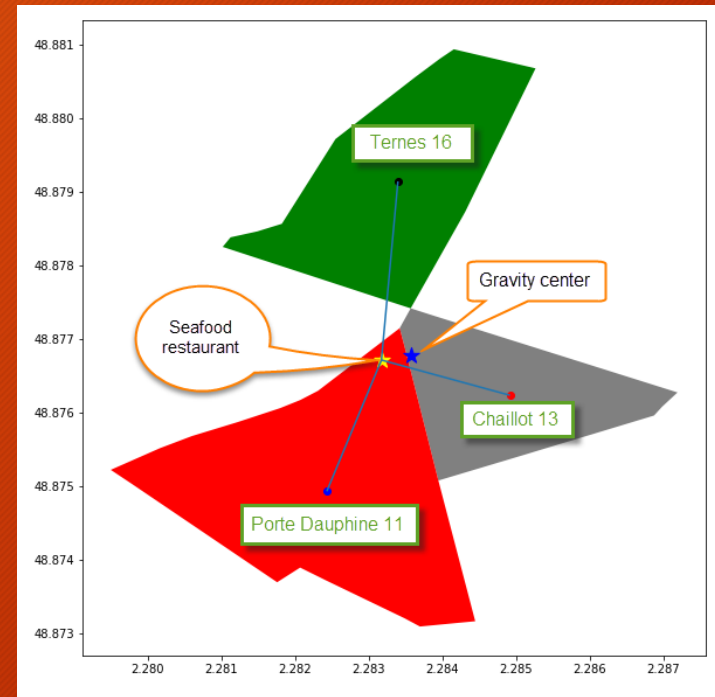
# Methodology and Analysis : Foursquare API



Looking for a group of venues in 160 meters distance of each of the neighborhood

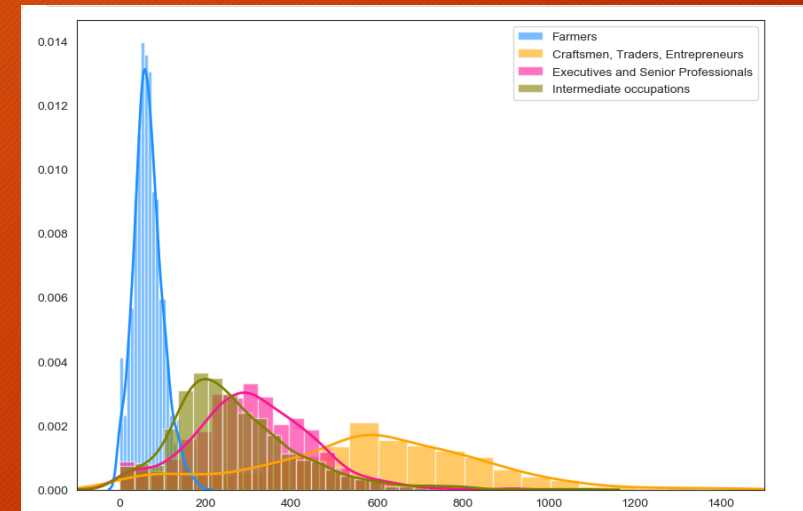
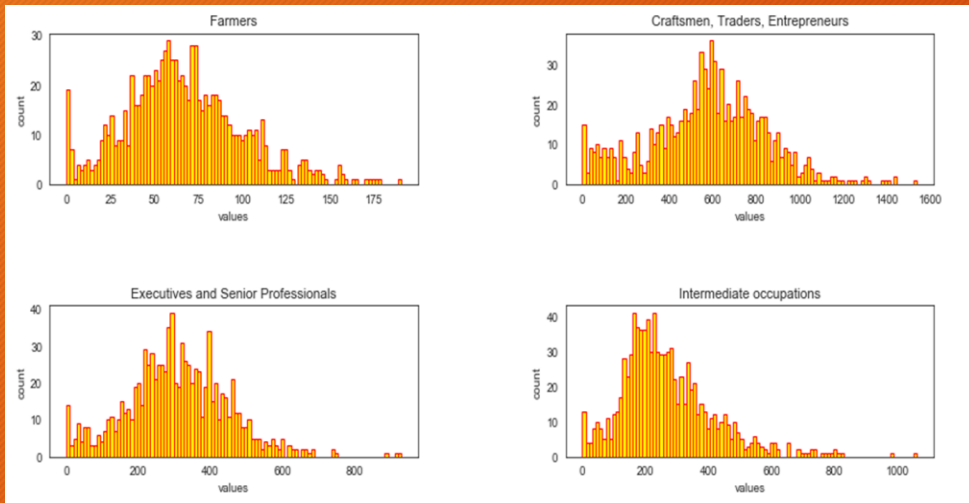


Some restaurants are located between 8 polygons



A seafood restaurant can be between several polygon, we only keep the polygon where it belongs.

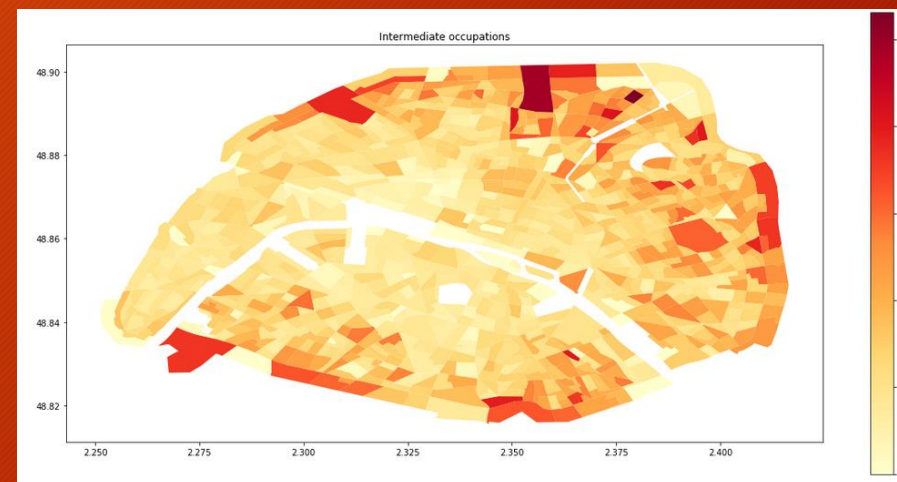
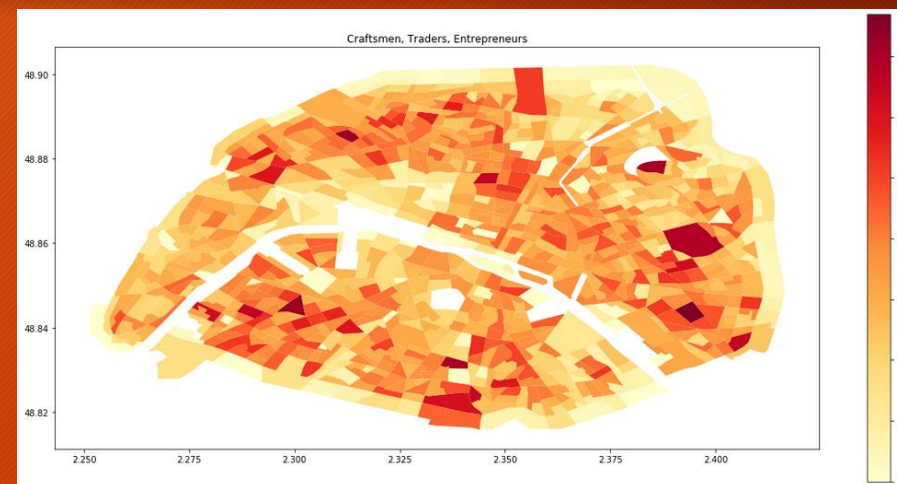
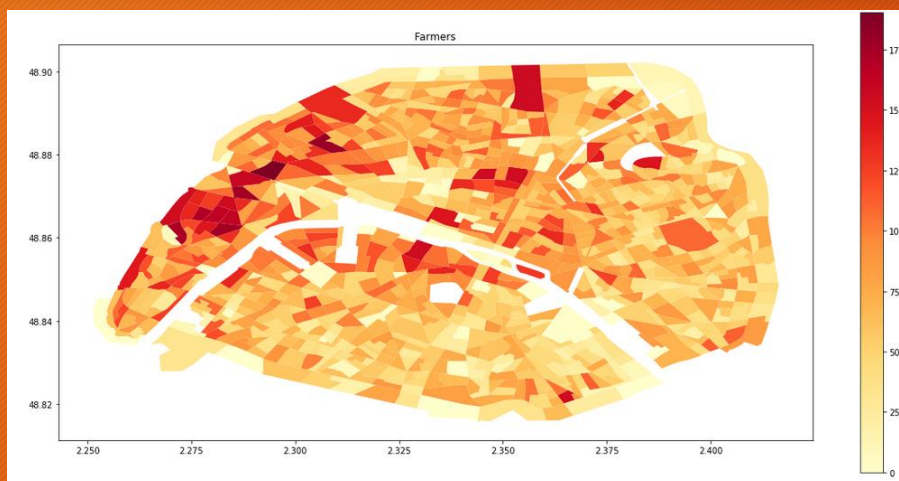
# Methodology and Analysis : Population density



The histogram almost follows a normal distribution law flattened to the right.



# Mathodology and Analysis : population densisty



# Methodology and Analysis : Seafood Restaurant and fish shop



Use Foursquare API to get information about some venues around these seafood restaurant

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Bonne Nouvelle 4	48.868051	2.350229	La Criée	48.870531	2.348942	Seafood Restaurant
Folie Mericourt 5	48.865572	2.368173	Léon de Bruxelles	48.866902	2.365757	Seafood Restaurant
Montparnasse 7	48.842309	2.326291	Le Bistrot du Dôme	48.842079	2.329204	Seafood Restaurant
Montparnasse 7	48.842309	2.326291	Le Bar à Huitres	48.841755	2.329892	Seafood Restaurant
Plaisance 23	48.835816	2.321115	Vins et Marée	48.836444	2.323069	Seafood Restaurant

Use the csv file fishs\_paris to get information about fish shop in Paris

	Venue	geom	rate	nb	arr	Latitude	Longitude
0	Paris Pêche Poissonnerie	48.8496521,2.3761939	4.1	80.0	12.0	48.8496521	2.3761939
1	Poissonnerie du Dôme	48.8553539,2.29108	4.6	35.0	14.0	48.8553539	2.29108
2	Poissonnerie du Bac	48.8553593,2.3239106	4.1	26.0	7.0	48.8553593	2.3239106
3	Poissonnerie de Passy	48.8574656,2.2422722	4.0	5.0	16.0	48.8574656	2.2422722
4	Soguisa	48.8653066,2.3448942	3.7	34.0	2.0	48.8653066	2.3448942

Venue : name of fish shop

Rate : rating

Nb : number of rating

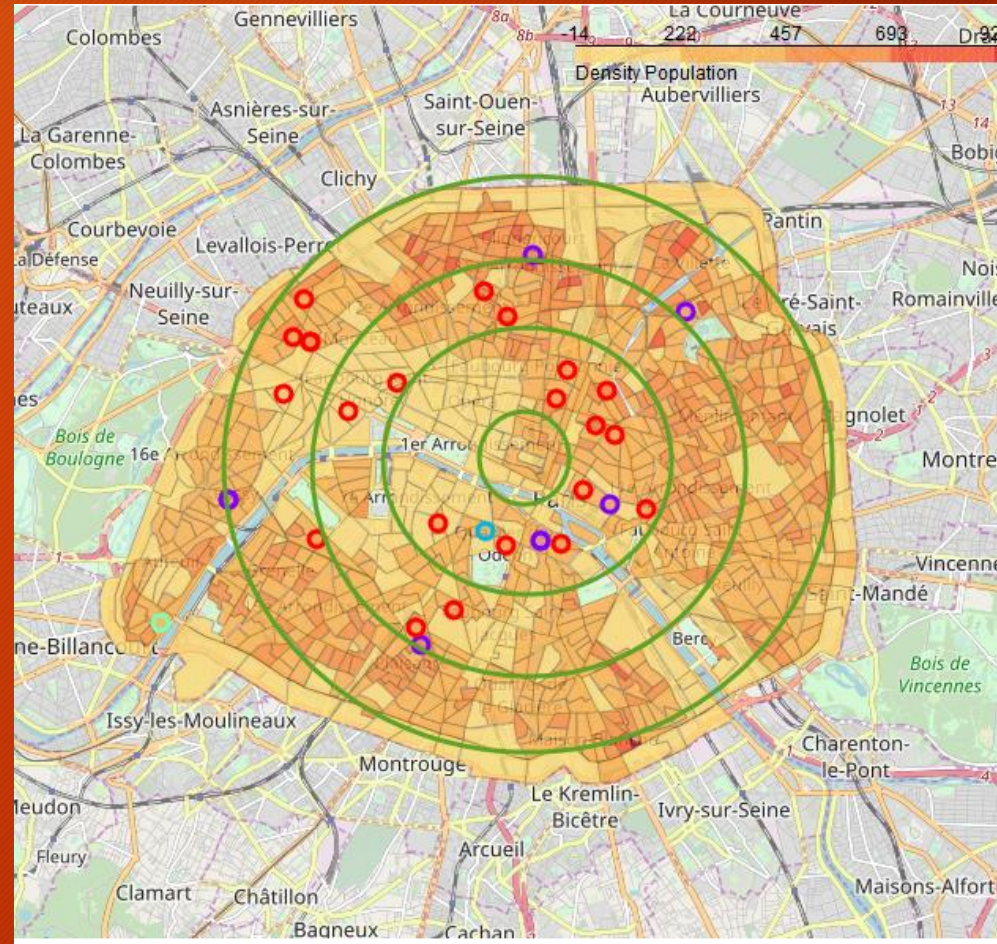
Arr : Paris region



# Methodology and Analysis : K-Means

With silhouette Method I choose 5 as number of cluster

The majority of the restaurants are located outside the centre of Paris.



# Results and Discussions



Cluster 0: It is the largest cluster where you can find all the people who work in Paris.

Cluster 1: it's mostly travellers who go to hotels...

Cluster 2: it's the people who love shows, there's the odeon theatre and film studios.

Cluster 3: less urbanized, people who escape from the center of Paris.

Cluster 4: people who like to go for a walk in Paris.



# Results and Discussion

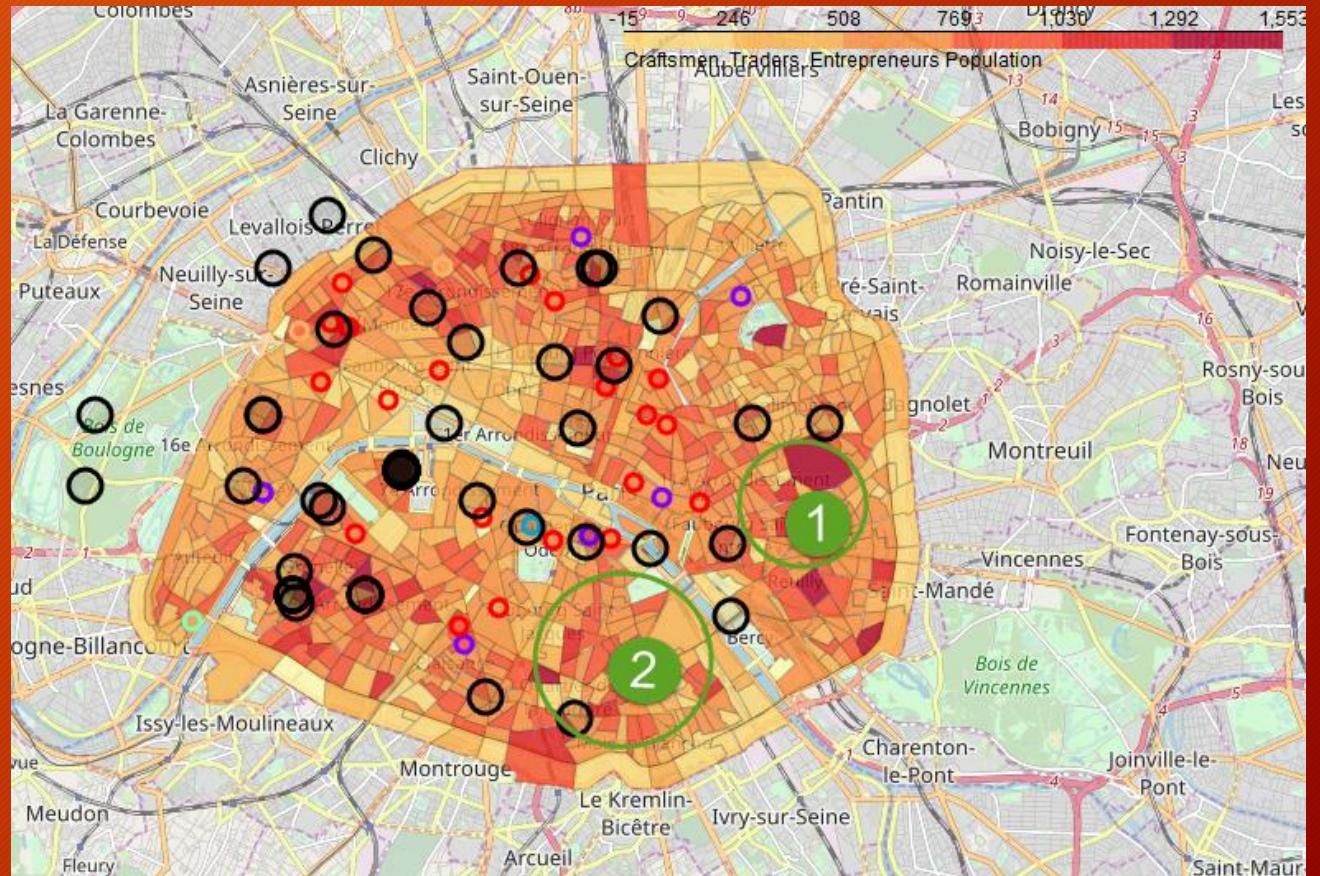


## Executives and Senior Professionals density

The black circles are the placements of the fresh fish vendors.

The best place for seafood restaurant should be in green circle number 1 and number 2

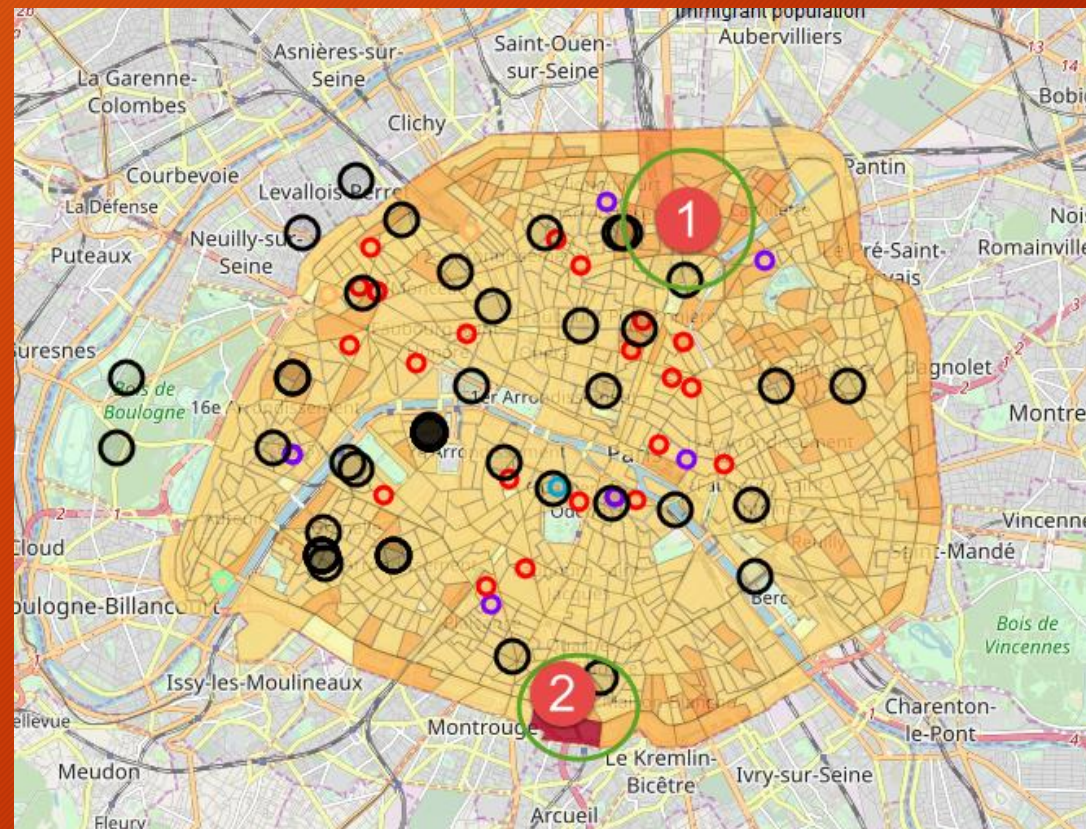
These places are far from the conquerors, close to the fish sellers and surrounded by an interesting population density.





# Result and Discussions

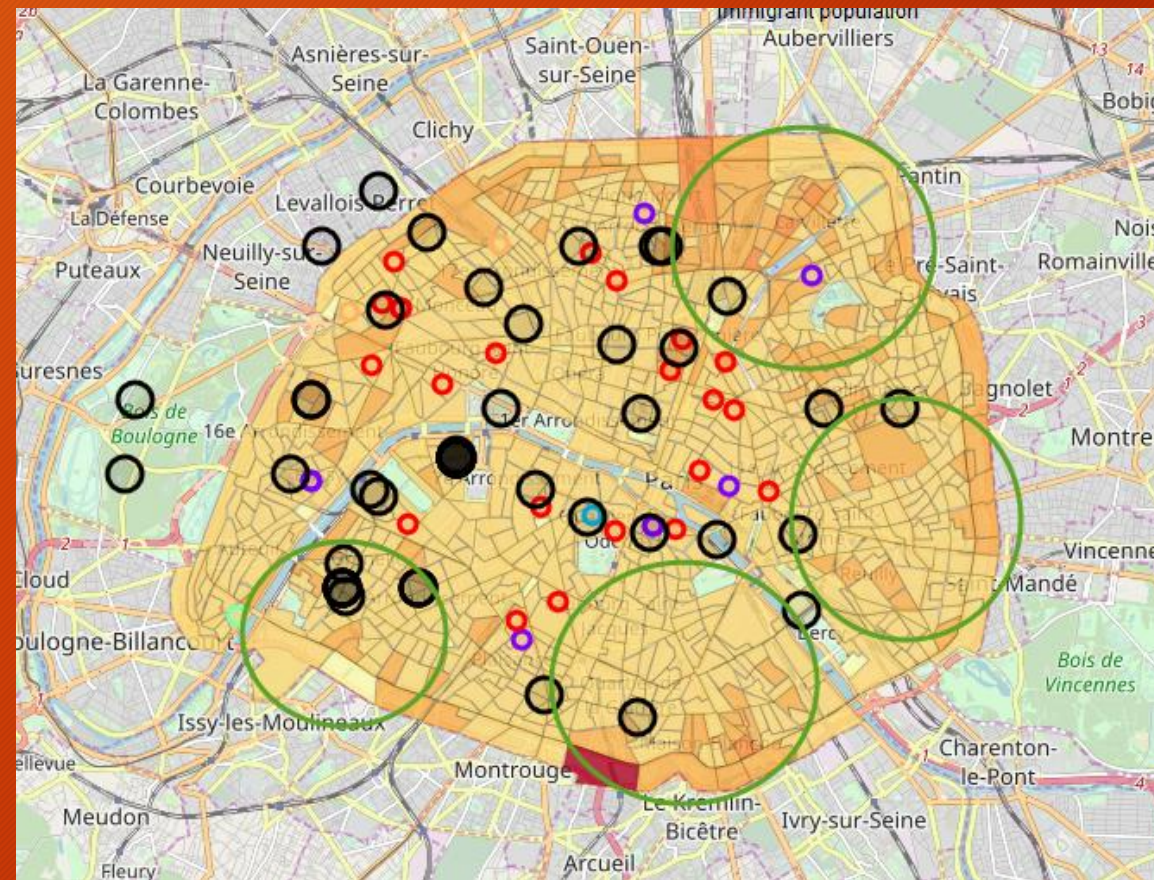
If you want a restaurant next to immigrants, the best places are in the green circle.





# Conclusion

It's best to choose the new seafood restaurant in the green circles, it depends on people's activities.





# Conclusion



The best locations are often already taken or extremely difficult to obtain. The amount of the lease fee can quickly skyrocket.

In this project I use the demographic trends in the neighbourhood and the characteristics of the individuals frequenting the neighbourhood (residents, transients, employees, workers...).

we can use others criteria for choosing a good commercial location.

- The flow of passers-by (or cars).
- Ease of access
- The attractiveness of the business environment.
- Visibility
- The exhibition.
- Future urban developments

