# Find best location for new coffee shop

Use location data to look for the best location

- There are ~400 coffee shops in Nha Trang city, a small beautiful beach city of Vietnam.
- Due to the high density of coffee shops, making decision for the location of a new coffee shop is challenging.
- This study presents a method to look for the best location candidates that meet conditions:
  - Is not so far the center of the city.
  - Do not have so many coffee shops around.

Data acquisition and cleaning

- Use Google Geocoding and Foursquare APIs to get the address of location candidates as well as venues within 6km from the center of the city.
- Google Geocoding API returns addresses from users so that we need to clean addresses for same address template.
- Foursquare API returns multiple venue categories that we need to limit to "coffee".
- We also need to clean up very expensive locations using domain knowledge.

Exploratory Data Analysis
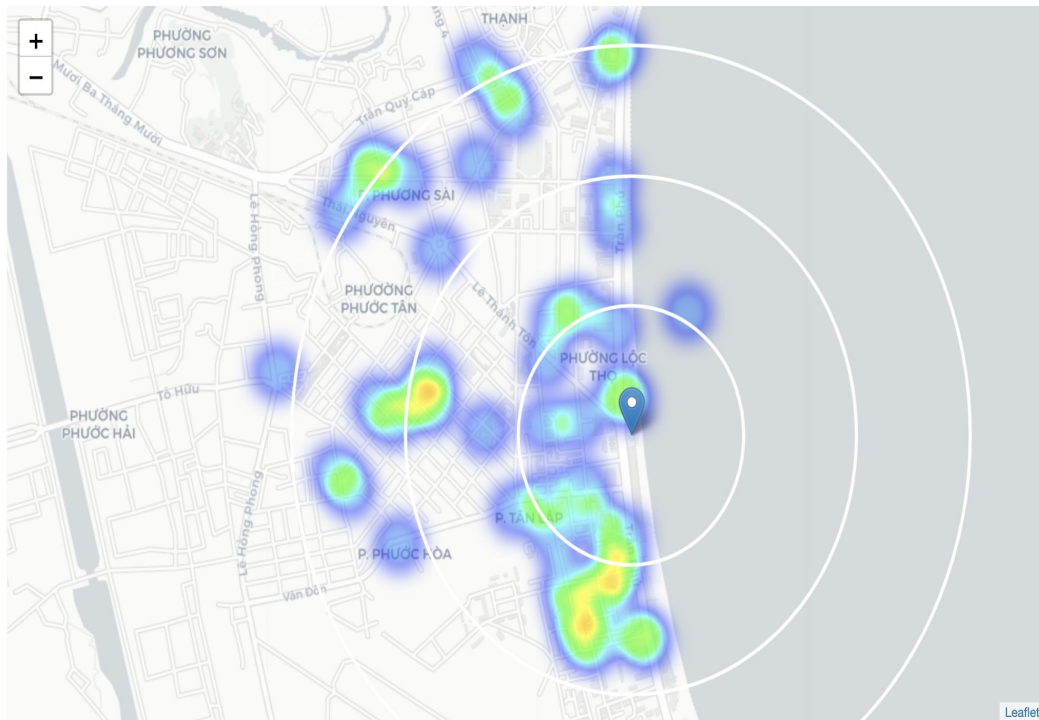
- The marker is the center of the city, is selected by domain knowledge.
- Coffee shop density is made by heatmap. The input is the number of coffee shops that returned by Foursquare.
- The circles are 500m, 1000m, 1500m from the center of the city.

Exploratory Data Analysis (Con't)
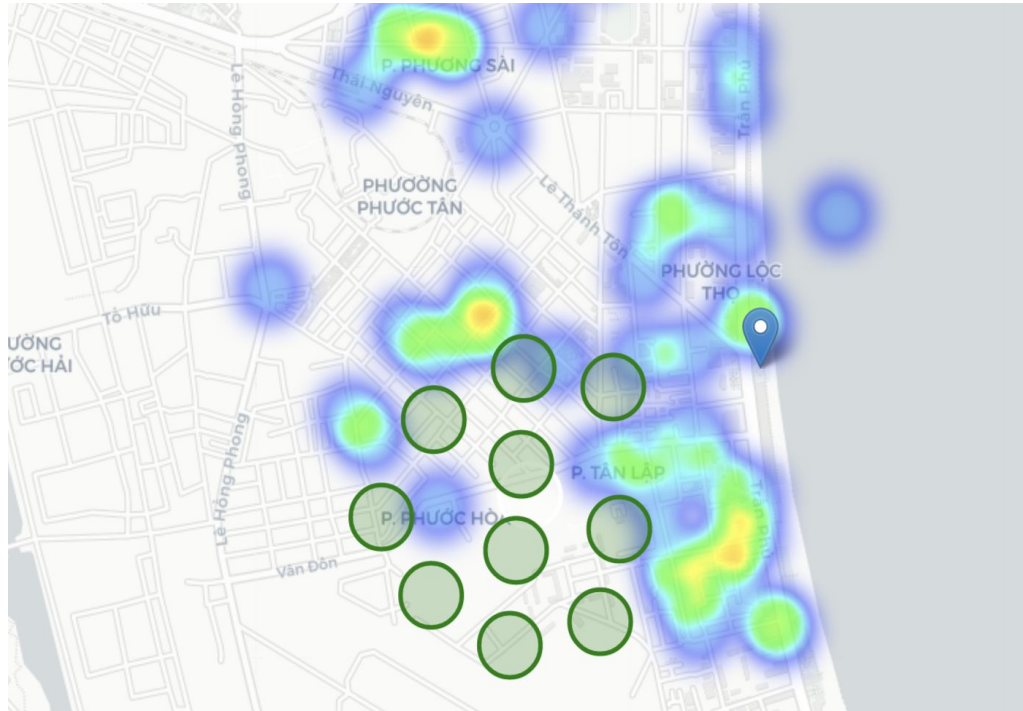
- We ignore the north-west from the center of the city because this location is very expensive (domain knowledge).
- Create grid around the south-west of the center of the city.
- Using KMeans to cluster grids by number of coffee shop around

Narrow down candidates
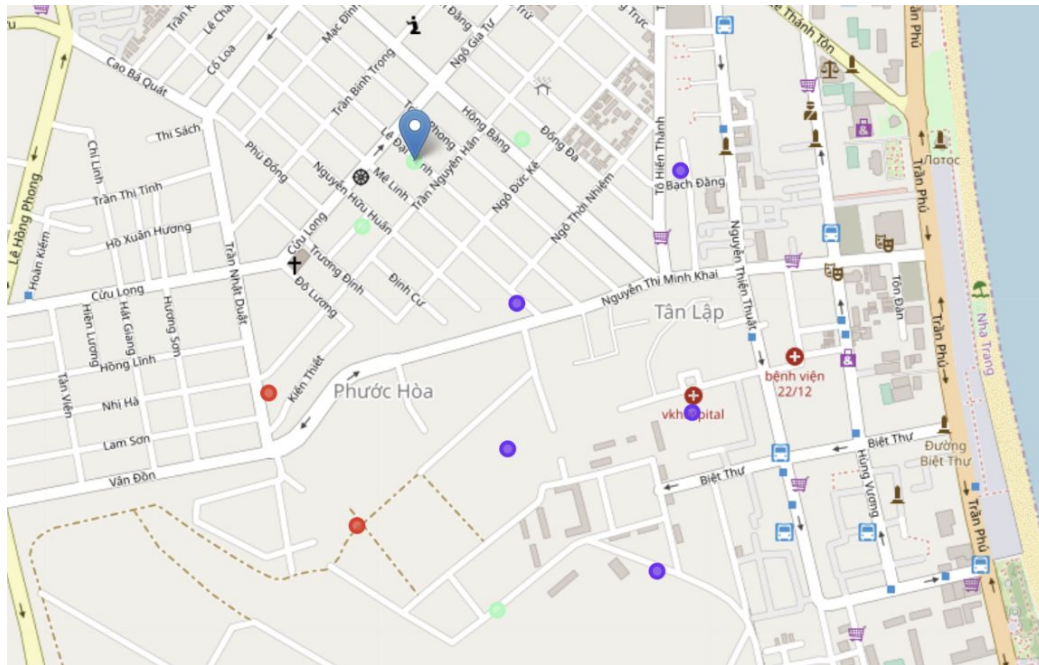
- We add one more location that is the interest location (a successful coffee shop, or an interest location)
- Using KMeans to cluster the dataset that contains all venues nearby the center of each location candidates.
- The best candidates are the one that same label with interest location.

Cluster result

	Longitude	Latitude	Neighborhood	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	109.187359	12.239194	56 Nguyễn Hữu Huân, Tân Lập, Thành phố Nha Tra...	2	Café	Hotel	Vietnamese Restaurant	Seafood Restaurant	Asian Restaurant
1	109.189593	12.233002	Biệt Thự, Phước Hoà, Thành phố Nha Trang, Khán...	2	Hotel	Café	Vietnamese Restaurant	Seafood Restaurant	Hostel
9	109.190000	12.240601	75 Hồng Bàng, Tân Lập, Thành phố Nha Trang, Kh...	2	Café	Hotel	Asian Restaurant	Spa	Convenience Store
10	109.188217	12.240251	40 Le Dai Hanh, Nha Trang, Viet Nam	2	Café	Vietnamese Restaurant	Hotel	Seafood Restaurant	Asian Restaurant

- We found out that the candidates are located nearby common venues.
- Common venues are Hotel and Restaurant.

Conclusion and future directions

- Build a model to find the low density area of coffee shops that met conditions.
- The model uses domain knowledges including center of the city, very expensive locations. In the case that these information are not ready, center of the city could be found by popularity of venues, and expensive locations could be scrape from online information such as house/office buy/sell.
- From the candidates, there will be the next steps to take more factors in consideration such as traffic, tax policy,..