Choosing Best Neighborghood to Open Restaurant in New York City
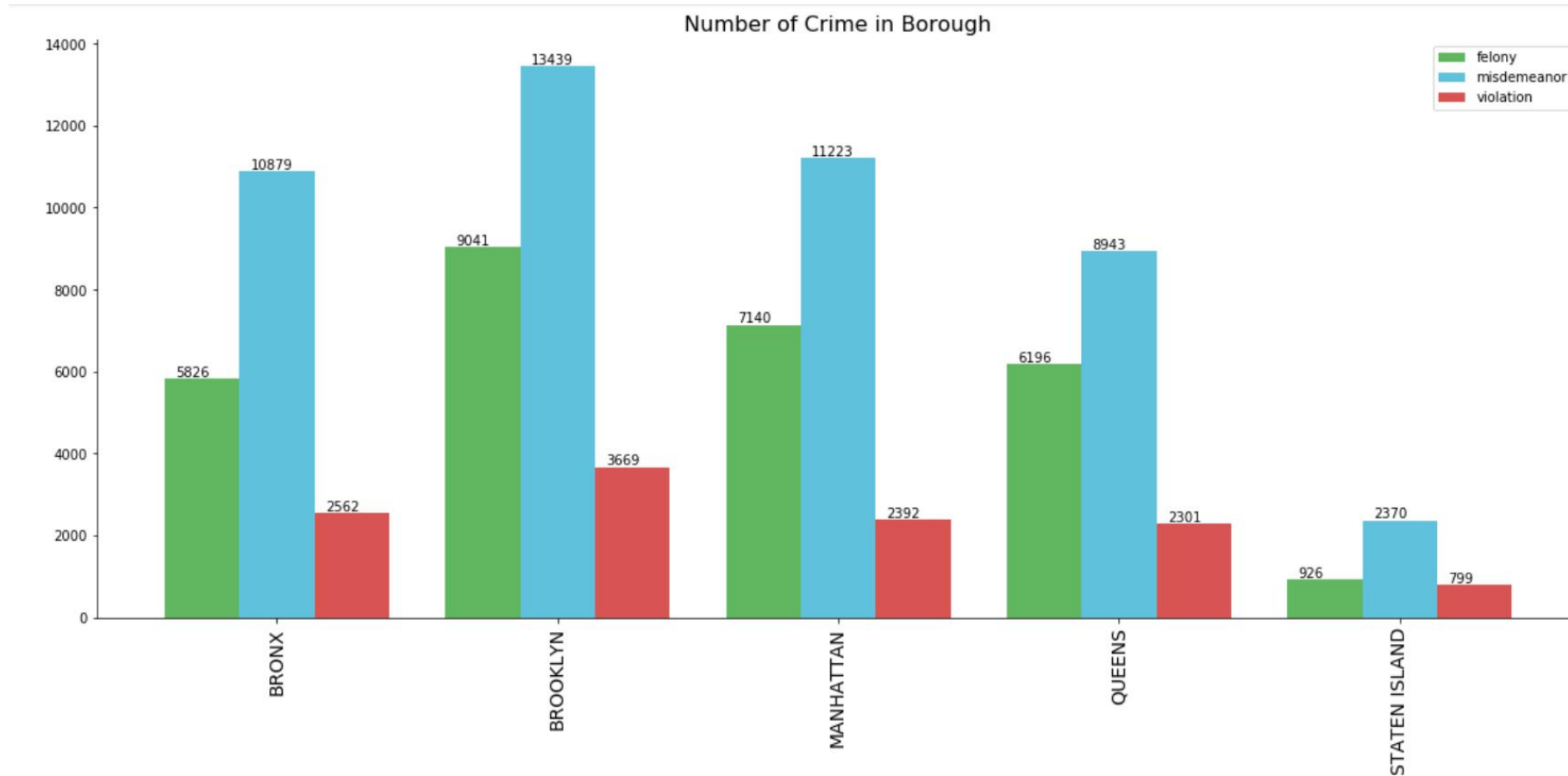
Data Science Course Final Project

Introduction

- Background
  - high crime rate will affect restaurant business in a negative way so does high concentration of similar restaurants
  - it is advantageous for people to know the crime rate and existing venue while picking locations to open restaurant.
- Problem
  - Data that might contribute to determining future restaurant profit include location, neighborhood crime rate, nearby existing restaurant type, etc. This project will be finding the best neighborhood in New York City to open a restaurant.
- Interest
  - Obviously, people who want to open a new restaurant in New York City would be interested in.

Data

- Data sources
  - [New York City crime data](#) provided by NYC OpenData includes all valid felony, misdemeanor, and violation crimes reported to the New York City Police Department (NYPD) from 2006 to the end of last year (2017)
  - Foursquare API. The Foursquare API is used to explore neighborhoods in New York City.

- Data cleaning
  - Due to file size, NYPD crime data is per-cleaned before imported to the notebook, only data from 2016-2017 is included and 7 relavent columns are kept.
  - No change in the Foursquare API is made.

Staten Island the safest borough in New York City

Top 5 most common crimes in Staten Island

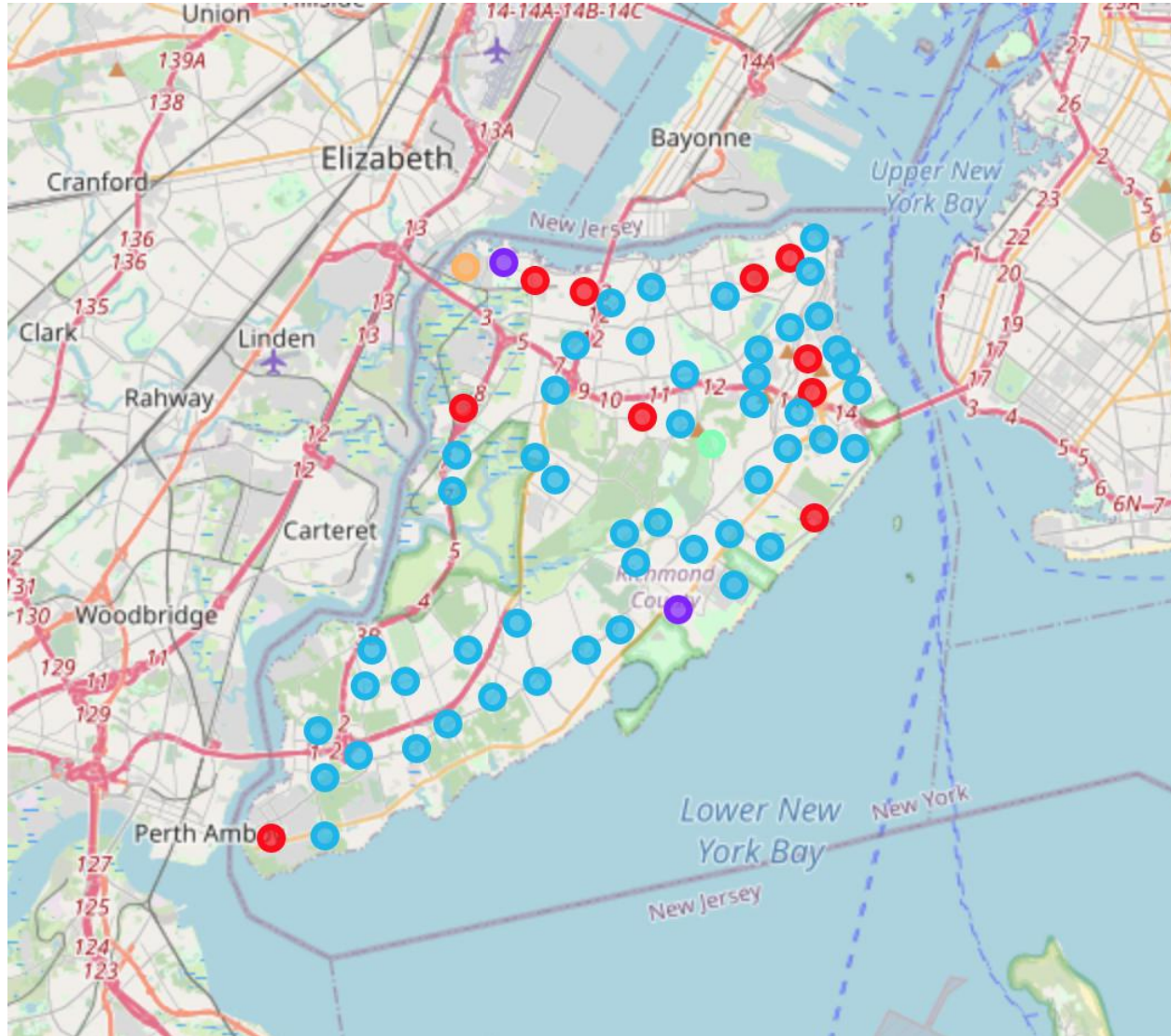| Type	Borough	Counts
HARRASSMENT 2	STATEN ISLAND	797
PETIT LARCENY	STATEN ISLAND	676
CRIMINAL MISCHIEF & RELATED OF	STATEN ISLAND	523
ASSAULT 3 & RELATED OFFENSES	STATEN ISLAND	419
OFF. AGNST PUB ORD SENSBLTY &	STATEN ISLAND	289

Top 10 most common venue in each neighborhood in Staten Island

	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	Annadale	Pizza Place	American Restaurant	Sports Bar	Dance Studio	Cosmetics Shop	Restaurant	Pharmacy	Food	Diner	Train Station
1	Arden Heights	Deli / Bodega	Pizza Place	Coffee Shop	Pharmacy	Yoga Studio	Fast Food Restaurant	French Restaurant	Food Truck	Food & Drink Shop	Food
2	Arlington	Bus Stop	American Restaurant	Boat or Ferry	Furniture / Home Store	Deli / Bodega	Intersection	Asian Restaurant	Fish & Chips Shop	Gastropub	Gas Station
3	Arrochar	Italian Restaurant	Deli / Bodega	Bus Stop	Pharmacy	Polish Restaurant	Supermarket	Middle Eastern Restaurant	Outdoors & Recreation	Mediterranean Restaurant	Sandwich Place
4	Bay Terrace	Italian Restaurant	Supermarket	Home Service	Playground	Salon / Barbershop	Donut Shop	Sushi Restaurant	Shipping Store	Farmers Market	Food & Drink Shop
5	Bloomfield	Recreation Center	Bus Stop	Burger Joint	Theme Park	Dog Run	Donut Shop	French Restaurant	Diner	Food Truck	Discount Store
6	Bulls Head	Bus Stop	Pizza Place	Sandwich Place	Pharmacy	Chinese Restaurant	Deli / Bodega	Ice Cream Shop	Italian Restaurant	Gym / Fitness Center	Mattress Store
7	Butler Manor	Baseball Field	Pool	Convenience Store	Yoga Studio	Furniture / Home Store	French Restaurant	Food Truck	Food & Drink Shop	Food	Flower Shop
8	Castleton Corners	Pizza Place	Indian Restaurant	Bank	Grocery Store	Tattoo Parlor	Sandwich Place	Mini Golf	Bar	Bagel Shop	Go Kart Track
9	Charleston	Big Box Store	Cosmetics Shop	Coffee Shop	Burger Joint	Supplement Shop	Gift Shop	Pizza Place	Sporting Goods Shop	Furniture / Home Store	American Restaurant
10	Chelsea	Steakhouse	Park	Spanish Restaurant	Sandwich Place	French Restaurant	Food Truck	Food & Drink Shop	Food	Flower Shop	Fish & Chips Shop

Top 10 least common venue in each neighborhood in Staten Island

	Neighborhood	1st least Common Venue	2nd least Common Venue	3rd least Common Venue	4th least Common Venue	5th least Common Venue	6th least Common Venue	7th least Common Venue	8th least Common Venue	9th least Common Venue	10th least Common Venue
0	Annadale	Italian Restaurant	Music Venue	Nail Salon	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Music Store
1	Arden Heights	American Restaurant	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Park	Peruvian Restaurant	Nail Salon
2	Arlington	Italian Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Park	Peruvian Restaurant	Pet Store	Pharmacy
3	Arrochar	American Restaurant	Music Venue	Nail Salon	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outlet Mall	Park	Music Store
4	Bay Terrace	American Restaurant	Music Venue	Nail Salon	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Music Store
5	Bloomfield	American Restaurant	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Park	Peruvian Restaurant	Nail Salon
6	Bulls Head	Yoga Studio	Martial Arts Dojo	Massage Studio	Supplement Shop	Mediterranean Restaurant	Mexican Restaurant	Middle Eastern Restaurant	Mini Golf	Miscellaneous Shop	Mobile Phone Shop
7	Butler Manor	American Restaurant	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Park	Peruvian Restaurant	Pet Store
8	Castleton Corners	American Restaurant	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Park	Peruvian Restaurant	Nail Salon
9	Charleston	Italian Restaurant	Music Store	Nail Salon	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Museum
10	Chelsea	American Restaurant	Nail Salon	New American Restaurant	Nightlife Spot	Optical Shop	Other Repair Shop	Outdoors & Recreation	Outlet Mall	Peruvian Restaurant	Music Venue

Cluster Graph

Results

- The safest borough in New York City is Staten Island.
- The most and the least common venue varies a lot by neighborhood for example Italian Restaurant is the least common venue in Annadale but the most common in Arrachor.
- In general, according to the cluster results, American restaurant is the least common venue restaurant in Staten Island and Italian restaurant is the most common venue restaurant in Staten Island.

Discussion

- If one would like to open a new restaurant, Staten Island is the most recommended borough.
- In term of neighborhood it depends on the type of restaurant based on the number of similar restaurant nearby.
  - American Restaurant, Chelsa or Castlelon are recommended
  - Italian restaurant, Charleston is recommended

Conclusion

- Besides crime rate and similar restaurant nearby, other factors play such as leasing price, surrounding environment(i.e. places surrounding by companies will attract workers on weekdays results a much higher business profit).

- Also, the data used is out of date, therefore, the significance may lower than expected.