

Coursera Capstone Project

--The Battle of Neighborhoods

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Outline

- 1. BUSINESS PROBLEM**
- 2. DATA**
- 3. METHODOLOGY**
- 4. RESULTS**
- 5. DISCUSSION**
- 6. CONCLUSION**

1. BUSINESS PROBLEM

Background: To the freshmen entering the university, finding a suitable apartment near the university is an important issue.

Problem: In this scenario, our client is a student who have been offered from New York University. He has lived in the downtown of Toronto for 18 years and enjoyed many amenities in his home area, such as grocery shops, cafes, international restaurants and entertainments. Now the client wants to find a convenient and suitable place which has the similar living environment he enjoyed.

Our client wants to find the most suitable area for living and set some demands of the apartment to make evaluations of the rental options in Manhattan:

- Apartment with 2 bedrooms & 2 bathrooms
- Less than \$5000 per month
- Close to NYU
- Near to grocery shops, international restaurants, coffee shops

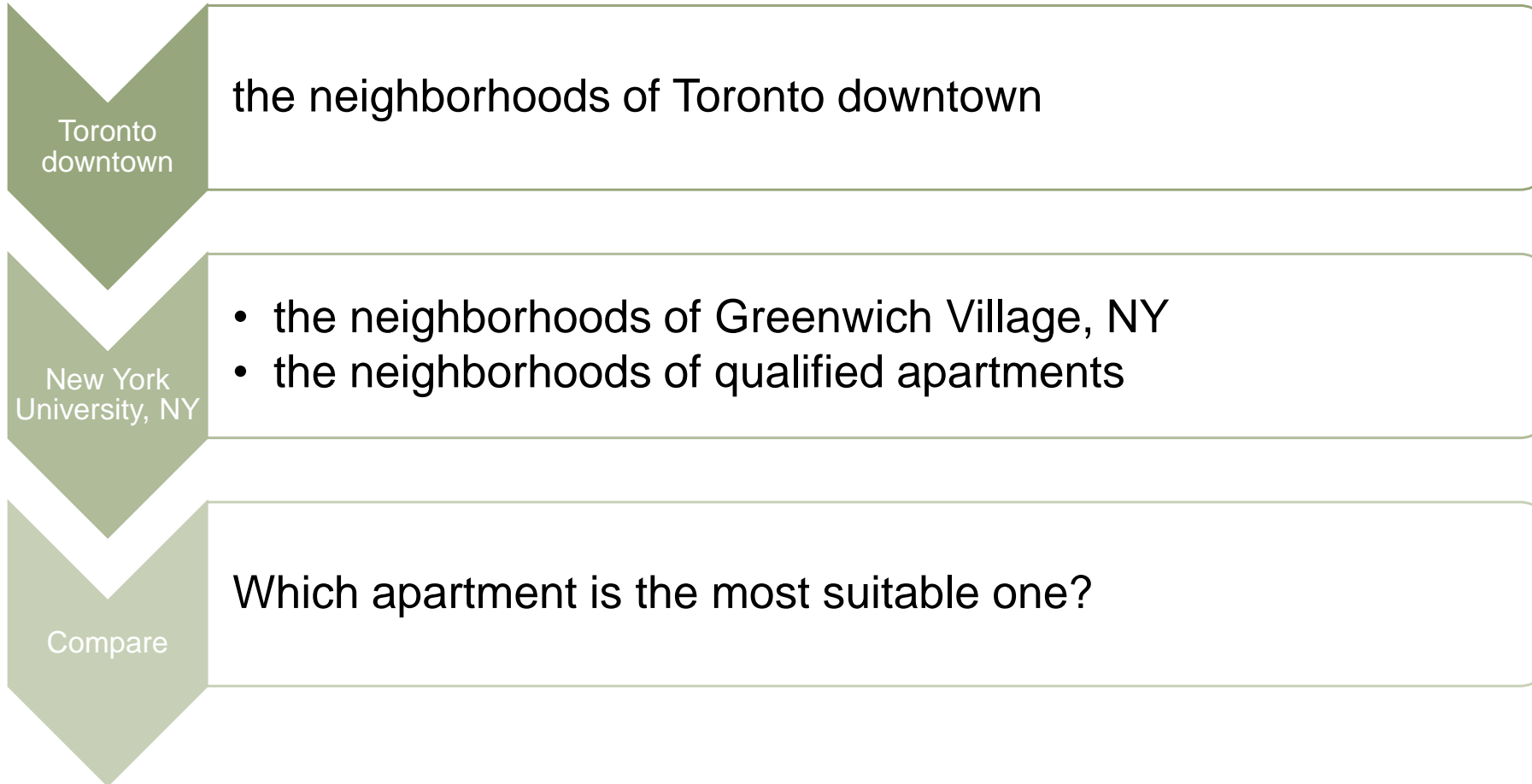
Targeted audience: This scenario can be applied on any college freshmen who are moving to a new place for study. This methodology can be adjusted to satisfy anyone who are going to move to a new city, a new place.

2. DATA

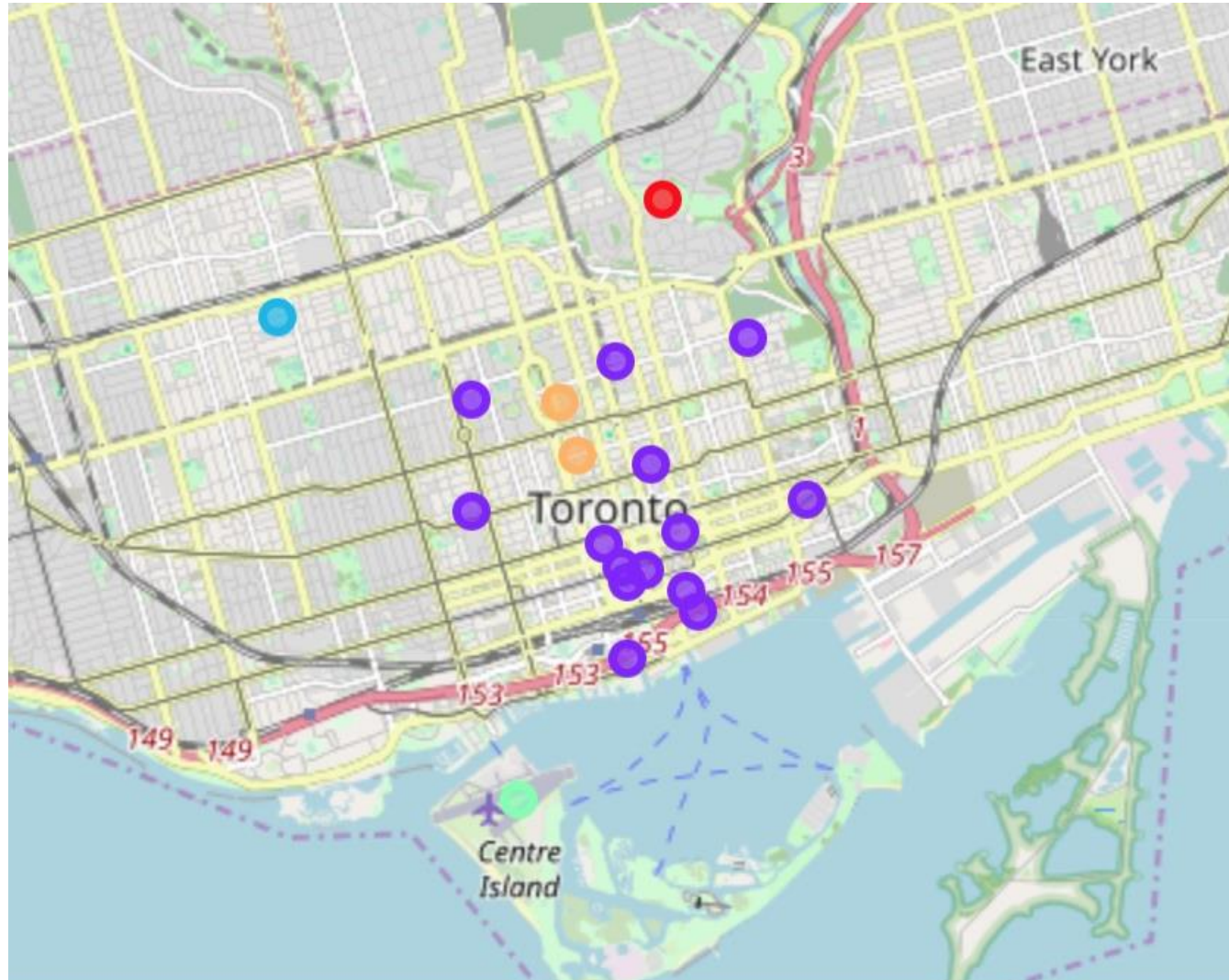
Data Description:

- The Data of Downtown Toronto: a csv file(toronto_merged.csv) produced from the previous assignment was applied here.
- Extract the neighborhoods of the NYC from the following link: https://geo.nyu.edu/catalog/nyu_2451_34572
- Geodata (latitude & longitude) of NYU & its neighborhoods: Geocoder Python package
- Apartments for rent with additional requirements (\$3000/month, 2B2B, etc):https://www.apartments.com/off-campus-housing/ny/new-york/new-york-university-washington-square-campus/apartments/2-bedrooms-2-bathrooms-under-3000/student-housing/?bb=8qk_7q33vHzs555c

3. Methodology



The neighborhoods of Toronto downtown



The neighborhoods of Toronto downtown

```
In [4]: Cluster_1=torontoDT_merged.loc[torontoDT_merged['Cluster Labels'] == 1, torontoDT_merged.columns[[1] + list(range(5, torontoDT_merged.shape[1]))]]
Cluster_1
```

Out[4]:

| | PostalCode | Longitude | Cluster Labels | 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 |
|---|------------|------------|----------------|-----------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|-----------------------|--------------------------|
| 1 | M4X | -79.367675 | 1 | Coffee Shop | Pizza Place | Restaurant | Pub | Italian Restaurant | Bakery | Café | Caribbean Restaurant |
| 2 | M4Y | -79.383160 | 1 | Japanese Restaurant | Coffee Shop | Gay Bar | Restaurant | Sushi Restaurant | Yoga Studio | Men's Store | Mediterranean Restaurant |
| 4 | M5B | -79.378937 | 1 | Clothing Store | Coffee Shop | Cosmetics Shop | Middle Eastern Restaurant | Japanese Restaurant | Bubble Tea Shop | Café | Bookstore |
| 5 | M5C | -79.375418 | 1 | Coffee Shop | Café | Restaurant | American Restaurant | Cocktail Bar | Beer Bar | Cosmetics Shop | Japanese Restaurant |
| 6 | M5E | -79.373306 | 1 | Coffee Shop | Cocktail Bar | Seafood Restaurant | Café | Beer Bar | Farmers Market | Bakery | Restaurant |
| 8 | M5H | -79.384568 | 1 | Restaurant | Coffee Shop | Café | Bar | Bakery | Thai Restaurant | Gym | Asian Restaurant |
| 9 | M5J | -79.381752 | 1 | Coffee Shop | Aquarium | Italian Restaurant | Hotel | Café | Restaurant | Brewery | Fried Chicken Joint |

```
In [5]: First_most_count = dict(Cluster_1['1st Most Common Venue'].value_counts())
First_most_count
```

Out[5]: {'Coffee Shop': 8,
'Café': 2,
'Japanese Restaurant': 1,
'Restaurant': 1,
'Clothing Store': 1}

The neighborhoods of Greenwich Village, NY

Compare the data of Greenwich Village to the data of downtown Toronto(Coffee Shop: 8,

| | catagory | freq |
|----|---------------------|------|
| 31 | Italian Restaurant | 0.06 |
| 0 | American Restaurant | 0.05 |
| 10 | Coffee Shop | 0.05 |
| 12 | Cosmetics Shop | 0.04 |
| 9 | Cocktail Bar | 0.03 |

Café: 2,

Japanese Restaurant: 1,

Clothing Store: 1,

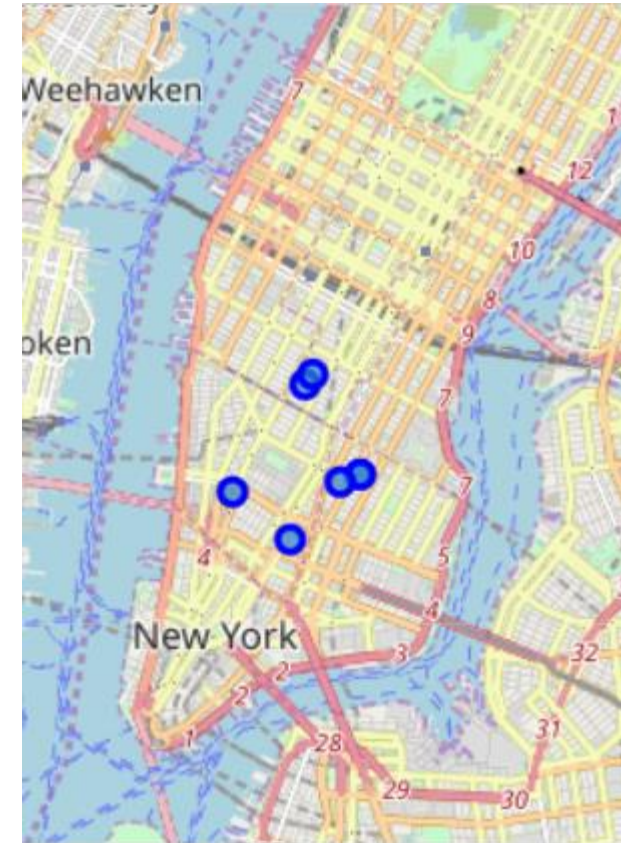
Restaurant: 1),

the living environment are highly similar. Our client should be enjoying his new college life in Greenwich Village.

The neighborhoods of qualified apartments

GeoData of qualified apartments:

| | Address | Rental_Price | Postal_Code | Latitude | Longitude |
|---|-------------------------|--------------|-------------|----------|-----------|
| 0 | 30 W 18th St Unit 3F | 4840 | NY10011 | 40.73902 | -73.99358 |
| 1 | 25W 19th St Unit 4-F | 4195 | NY10011 | 40.73987 | -73.99269 |
| 2 | 209 E 10th St Unit 2 | 4000 | NY10003 | 40.72968 | -73.98601 |
| 3 | 209 E 10th St Unit 2-A | 4000 | NY10003 | 40.72968 | -73.98601 |
| 4 | 17 King St Unit 4W | 4500 | NY10014 | 40.72779 | -74.00341 |
| 5 | 240 Mulberry St Unit 16 | 4900 | NY10012 | 40.72278 | -73.99567 |
| 6 | 28 St Marks Pl Unit 3A | 4095 | NY10003 | 40.72873 | -73.98865 |



The neighborhoods of qualified apartments

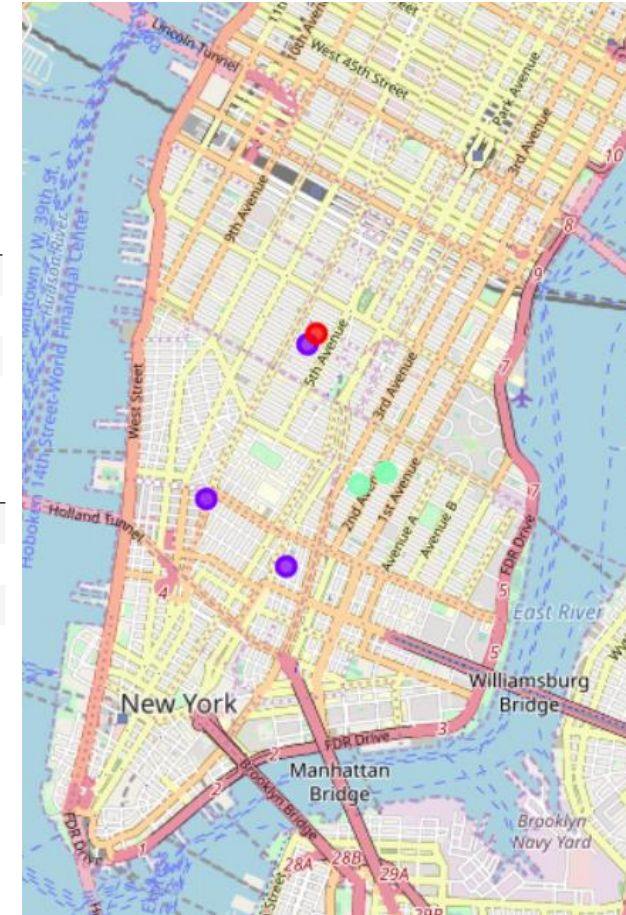
The neighborhoods of qualified apts with venue clusters:

| | Address | Rental_Price | Postal_Code | Latitude | Longitude | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
|---|-------------------------|--------------|-------------|----------|-----------|----------------|-----------------------|-------------------------------|--------------------------|-------------------------------|-------------------------------|
| 0 | 30 W 18th St Unit 3F | 4840 | NY10011 | 40.73902 | -73.99358 | 1 | Acupuncturist | Bookstore | Cycle Studio | Paper / Office Supplies Store | Italian Restaurant |
| 1 | 25W 19th St Unit 4-F | 4195 | NY10011 | 40.73987 | -73.99269 | 0 | Gym | Spa | Salon / Barbershop | Coffee Shop | Wine Shop |
| 2 | 209 E 10th St Unit 2 | 4000 | NY10003 | 40.72968 | -73.98601 | 2 | Dessert Shop | Vegetarian / Vegan Restaurant | Shabu-Shabu Restaurant | Record Shop | Pizza Place |
| 3 | 209 E 10th St Unit 2-A | 4000 | NY10003 | 40.72968 | -73.98601 | 2 | Dessert Shop | Vegetarian / Vegan Restaurant | Shabu-Shabu Restaurant | Record Shop | Pizza Place |
| 4 | 17 King St Unit 4W | 4500 | NY10014 | 40.72779 | -74.00341 | 1 | Wine Shop | Italian Restaurant | Mediterranean Restaurant | Japanese Curry Restaurant | Bookstore |
| 5 | 240 Mulberry St Unit 16 | 4900 | NY10012 | 40.72278 | -73.99567 | 1 | Italian Restaurant | Wine Shop | Café | Department Store | Paper / Office Supplies Store |
| 6 | 28 St Marks Pl Unit 3A | 4095 | NY10003 | 40.72873 | -73.98865 | 2 | Japanese Restaurant | Taiwanese Restaurant | Szechuan Restaurant | Bubble Tea Shop | Chinese Restaurant |

The neighborhoods of qualified apartments

| | Rental_Price | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
|---|--------------|----------------|-----------------------|-----------------------|--------------------------|-------------------------------|-------------------------------|
| 0 | 4840 | 1 | Acupuncturist | Bookstore | Cycle Studio | Paper / Office Supplies Store | Italian Restaurant |
| 4 | 4500 | 1 | Wine Shop | Italian Restaurant | Mediterranean Restaurant | Japanese Curry Restaurant | Bookstore |
| 5 | 4900 | 1 | Italian Restaurant | Wine Shop | Café | Department Store | Paper / Office Supplies Store |

| Rental_Price | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | |
|--------------|----------------|-----------------------|-----------------------|-------------------------------|------------------------|-----------------------|--------------------|
| 2 | 4000 | 2 | Dessert Shop | Vegetarian / Vegan Restaurant | Shabu-Shabu Restaurant | Record Shop | Pizza Place |
| 3 | 4000 | 2 | Dessert Shop | Vegetarian / Vegan Restaurant | Shabu-Shabu Restaurant | Record Shop | Pizza Place |
| 6 | 4095 | 2 | Japanese Restaurant | Taiwanese Restaurant | Szechuan Restaurant | Bubble Tea Shop | Chinese Restaurant |



4. Result

Based on the data methodology section, the bellowing apartments were provided to our client for him to make decision.

240 Mulberry St Unit 16 : \$4900

17 King St Unit 4W : \$4500

5. Discussion

| | Unnamed: 0 | Toronto downtown | 240 Mulberry St Unit 16 | 17 King St Unit 4W |
|---|-----------------------|---------------------|-----------------------------|---------------------------|
| 0 | 1st Most Common Venue | Italian Restaurant | Italian Restaurant | Wine Shop |
| 1 | 2nd Most Common Venue | American Restaurant | Wine Shop | Italian Restaurant |
| 2 | 3rd Most Common Venue | Coffee Shop | Café | Mediterranean Restaurant |
| 3 | 4th Most Common Venue | Cosmetics Shop | Department Store | Japanese Curry Restaurant |
| 4 | 5th Most Common Venue | Cocktail Bar | Paper/Office Supplies Store | Bookstore |

According to the client's requirement which is the apartment should be close to grocery shops, cafes, international restaurants and entertainments, **240 Mulberry St Unit 16** best meets these requirements with Italian restaurant, wine shop cafe as well as department store surrounded. In the meanwhile, the rent is also within his budget. However, **17 King St Unit 4W** is another choice for him. This apartment is close to various international restaurants with a lower rental price at the same time.

6. Conclusion

After all the considerations above, I would most recommend **240 Mulberry St Unit 16** to my client.