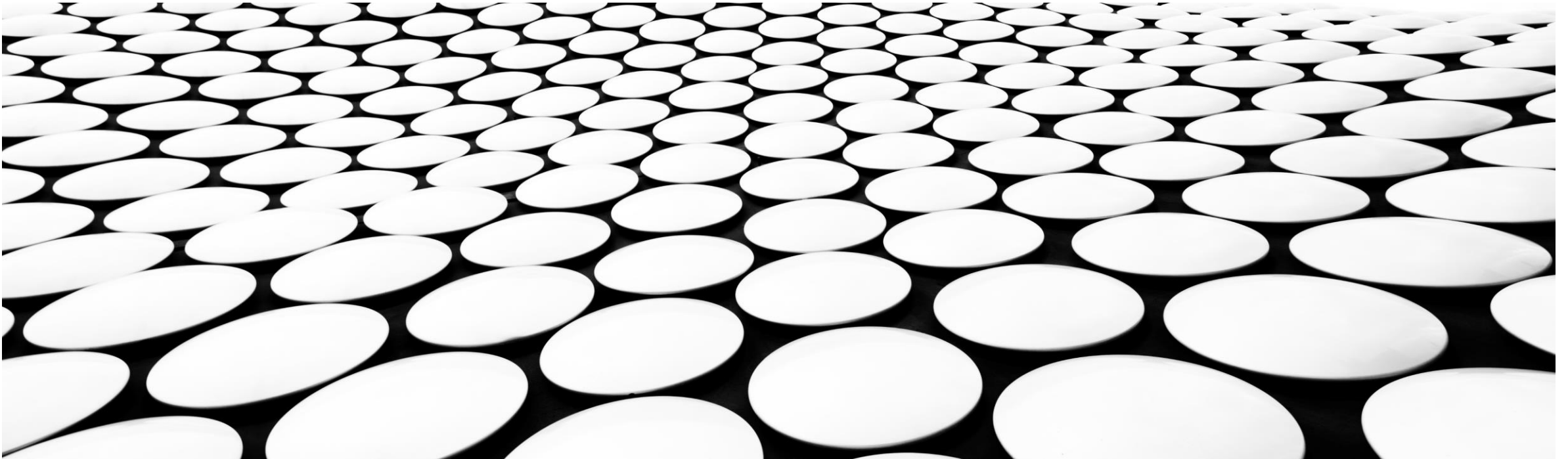

COMPARING NEIGHBORHOODS OF NEW YORK & TORONTO

APPLIED DATA SCIENCE CAPSTONE PROJECT PRESENTATION





PROBLEM STATEMENT

- In this project we will try to find compare the neighbourhoods of New York City and the city of Toronto to compare and contrast the them. This report will be targeted for a prospect who is considering to re-locate to either of the cities. It is also targeted for other stakeholders like re-location consultants providing such services at a fee.
- Since both the cities are large, we will after an exploratory analysis narrow down to the downtown neighbourhoods in these cities. We will be particularly interested in option for the food, leisure, and transportation in these neighbourhoods.
- We will use our data science powers to generate a few most promising neighbourhoods based on these criteria. Advantages of each area will then be clearly expressed so that best possible final location can be chosen by stakeholders.

DATA ACQUISITION AND CLEANING

- The dataset for New York will be used from the web https://geo.nyu.edu/catalog/nyu_2451_34572
- For the city of Toronto, the data scrapped from the Wikipedia page will be used:
- https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
- Then Foursquare Places API will be used to explore the neighbourhoods to segment them. Different end points of the API will be used to get info of the interesting places like restaurants, leisure places, transportation facilities of the neighbourhood.

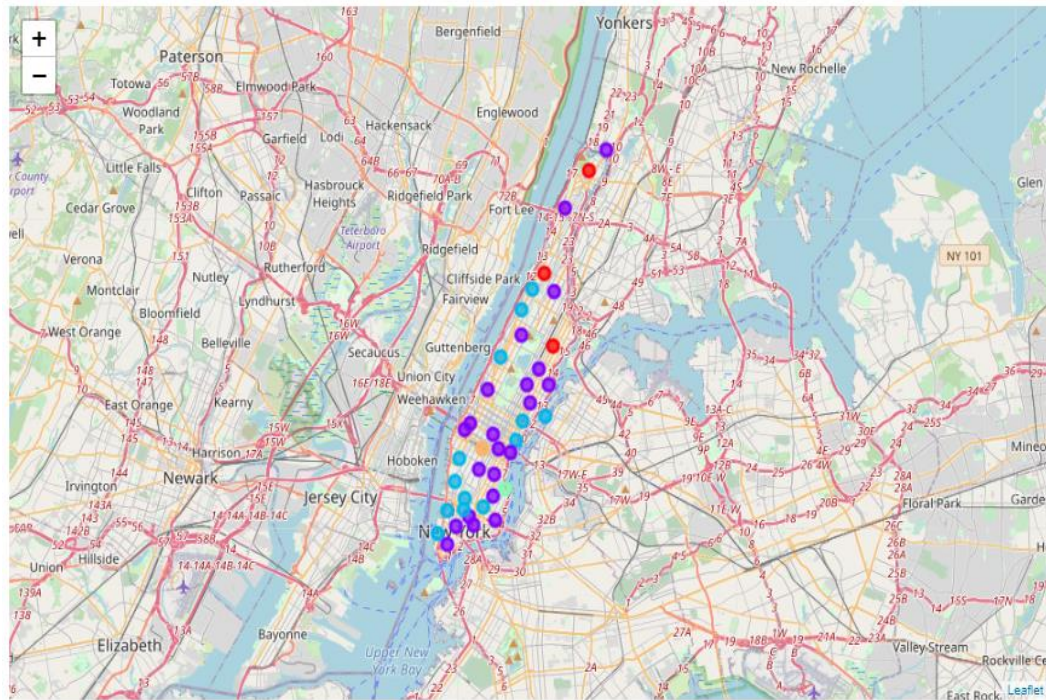
Method	Endpoint Group	Endpoint	Usage
GET	venues	search	Search for Venues
GET	venues	explore	Get Venue Recommendations
GET	venues	trending	Get Trending Venues
GET	venues	categories	Get Venue Categories
GET	venues	similar	Get Similar Venues

METHODOLOGY

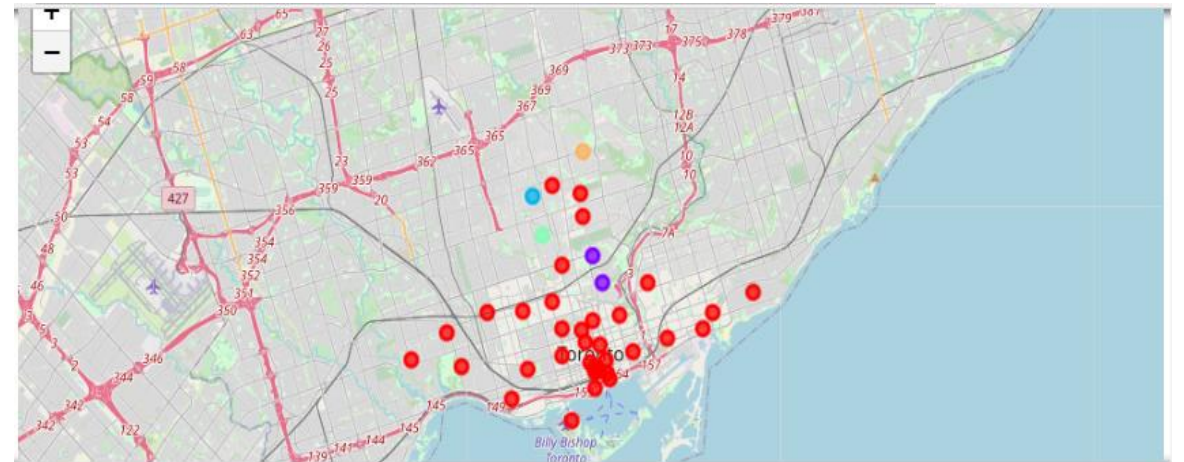
- In this project we will direct our efforts on detecting the neighbourhoods of New York City and City of Toronto which are comparable in terms of the availability of food leisure and transport. We will limit search to neighbourhoods in downtown boroughs.
- In first step we have collected the required for New York / Manhattan neighbourhood and second step was to collect the data of downtown boroughs of Toronto. This was done using **geopy** and **foursquare APIs**.
- In the third step clustering of the neighbourhood was done using **k-means clustering** and data from foursquare APIs.
- The neighbourhood was clustered into 5 based on the venue categories. The maps with the clustered data was generated using folium libraries.
- Finally, neighbourhoods which are similar have been noted.

CLUSTERED NEIGHBORHOODS IN NEW YORK & TORONTO

Map of clustered neighbourhoods of Manhattan



Map of clustered neighbourhoods of Toronto



MANHATTAN CLUSTER 1

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
Marble Hill	Sandwich Place	Gym	Coffee Shop	Yoga Studio	Deli / Bodega	Shop	Steakhouse	Restaurant	Pizza Place	Store
Chinatown	Bakery	Restaurant	Cocktail Bar	Optical Shop	Barbershop	Restaurant	Spa	Bar	Coffee Shop	Pizza Place
Washington Heights	Café	Bakery	Restaurant	Shop	Grocery Store	Coffee Shop	Supermarket	Restaurant	Gym	Shop
Central Harlem	Restaurant	Center	Restaurant	Restaurant	Bar	Cosmetics Shop	Restaurant	Restaurant	Café	Market
Upper East Side	Restaurant	Bakery	Exhibit	Center	Spa	Restaurant	Juice Bar	Pizza Place	Yoga Studio	Wine Shop
Yorkville	Coffee Shop	Restaurant	Gym	Restaurant	Bar	Deli / Bodega	Wine Shop	Pizza Place	Restaurant	Diner
Lenox Hill	Restaurant	Coffee Shop	Pizza Place	Restaurant	Café	Cocktail Bar	Burger Joint	Gym	Center	Bakery
Lincoln Square	Center	Plaza	Café	Restaurant	Concert Hall	Theater	Venue	Restaurant	Wine Shop	Theater
Clinton	Theater	Coffee Shop	Center	Gym	Wine Shop	Hotel	Restaurant	Sandwich Place	Spa	Restaurant
Midtown	Hotel	Coffee Shop	Clothing Store	Theater	Restaurant	Gym	Spa	Pizza Place	Tailor Shop	Cosmetics Shop
Murray Hill	Sandwich Place	Restaurant	Center	Pizza Place	Restaurant	Hotel	Bar	Liquor Store	Burger Joint	Restaurant
East Village	Pizza Place	Coffee Shop	Juice Bar	Cocktail Bar	Restaurant	Bar	Restaurant	Restaurant	Restaurant	Bagel Shop
Lower East Side	Café	Restaurant	Art Gallery	Cocktail Bar	Restaurant	Juice Bar	Restaurant	Restaurant	Restaurant	Yoga Studio
Little Italy	Restaurant	Restaurant	Spa	Pizza Place	Restaurant	Bakery	Restaurant	Café	Shop	Cosmetics Shop
Manhattan Valley	Yoga Studio	Pizza Place	Restaurant	Bar	Restaurant	Restaurant	Restaurant	Restaurant	Park	Restaurant
Gramercy	Restaurant	Coffee Shop	Playground	Pizza Place	Bar	Grocery Store	Cocktail Bar	Spa	Barbershop	Taco Place
Financial District	Hotel	Coffee Shop	Center	Café	Restaurant	Salad Place	Restaurant	Pizza Place	Juice Bar	Memorial Site
Carnegie Hill	Coffee Shop	Café	Yoga Studio	Pizza Place	Bar	Bookstore	Gym	Center	Restaurant	Restaurant
Civic Center	Hotel	Coffee Shop	Restaurant	Spa	Restaurant	Center	Cocktail Bar	Yoga Studio	Park	Café
Tudor City	Café	Park	Deli / Bodega	Center	Restaurant	Pizza Place	Restaurant	Garden	Dog Run	Diner
Flatiron	Center	Restaurant	Gym	Park	Café	Coffee Shop	Cosmetics Shop	Juice Bar	Sculpture	Yoga Studio
Hudson Yards	Restaurant	Restaurant	Center	Hotel	Café	Park	Dog Run	Restaurant	Coffee Shop	Gym

MANHATTAN CLUSTER 2

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
Manhattanville	Coffee Shop	Restaurant	Restaurant	Deli / Bodega	Park	Restaurant	Café	Bike Trail	Restaurant	Boutique
Roosevelt Island	Park	Playground	Gym	Market	Shop	Pizza Place	Soccer Field	Supermarket	Metro Station	School
Upper West Side	Restaurant	Wine Bar	Coffee Shop	Bakery	Bar	Restaurant	Bagel Shop	Restaurant	Restaurant	Ice Cream Shop
Chelsea	Art Gallery	Coffee Shop	Restaurant	Restaurant	Ice Cream Shop	Cupcake Shop	Café	Bakery	Market	Juice Bar
Greenwich Village	Restaurant	Coffee Shop	Café	Restaurant	Wine Bar	Dessert Shop	Restaurant	Gym	Jazz Club	Gourmet Shop
Tribeca	Restaurant	Park	Wine Bar	Café	Spa	Restaurant	Restaurant	Poke Place	Hotel	Art Gallery
Soho	Restaurant	Coffee Shop	Restaurant	Dessert Shop	Art Gallery	Gym	Restaurant	Café	Clothing Store	Jewelry Store
West Village	Wine Bar	Restaurant	Restaurant	Park	Coffee Shop	Restaurant	Restaurant	Cycle Studio	Steakhouse	Jazz Club
Morningside Heights	Park	Bookstore	Coffee Shop	Restaurant	Deli / Bodega	Burger Joint	Tennis Court	Cafeteria	Salad Place	Restaurant
Battery Park City	Park	Hotel	Gym	Boat or Ferry	Memorial Site	Restaurant	Gourmet Shop	Burger Joint	Food Court	Shopping Mall
Noho	Restaurant	Coffee Shop	Sandwich Place	Restaurant	Grocery Store	Wine Shop	Wine Bar	Pizza Place	Restaurant	Restaurant
Sutton Place	Restaurant	Coffee Shop	Center	Park	Bagel Shop	Hotel	Bakery	Beer Bar	Beer Garden	Home Store
Turtle Bay	Restaurant	Park	Café	Coffee Shop	Hotel	Restaurant	Wine Bar	Deli / Bodega	Restaurant	Restaurant

TORONTO CLUSTER 0

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
Davisville	Sandwich Place	Dessert Shop	Restaurant	Coffee Shop	CafÃ©	Pizza Place	Gym	Restaurant	Restaurant	Park
North Toronto West	Clothing Store	Coffee Shop	Yoga Studio	Spa	Bagel Shop	CafÃ©	Restaurant	Restaurant	Shop	Location
South Hill / Forest Hill SE /	Coffee Shop	Pub	Restaurant	Restaurant	Supermarket	Sports Bar	Bank	Pizza Place	Joint	Liquor Store
Yorkville	Sandwich Place	CafÃ©	Coffee Shop	BBQ Joint	Pharmacy	Restaurant	Flower Shop	Liquor Store	Museum	Burger Joint
Berczy Park	Coffee Shop	Cocktail Bar	CafÃ©	Cheese Shop	Beer Bar	Bakery	Restaurant	Restaurant	Restaurant	Market
Central Bay Street	Coffee Shop	Restaurant	CafÃ©	Sandwich Place	Salad Place	Restaurant	Ice Cream Shop	Restaurant	Burger Joint	Shop
Christie	Grocery Store	CafÃ©	Park	Restaurant	Baby Store	Sports	Restaurant	Diner	Candy Store	Coffee Shop
Church and Wellesley	Restaurant	Coffee Shop	Restaurant	Restaurant	Yoga Studio	Gay Bar	Restaurant	Men's Store	Pub	Hotel
Railway Lands / Harbourfront	Airport Service	Airport Lounge	Terminal	Plane	Garden	Location	Coffee Shop	Marina	Boat or Ferry	Boutique
Hotel	Coffee Shop	Restaurant	CafÃ©	Hotel	Gym	Restaurant	Restaurant	Deli / Bodega	Restaurant	Restaurant
Underground city	Coffee Shop	CafÃ©	Hotel	Restaurant	Restaurant	Gym	Restaurant	Restaurant	Steakhouse	Restaurant
Garden District, Ryerson	Clothing Store	Coffee Shop	CafÃ©	Cosmetics Shop	Shop	Restaurant	Restaurant	Restaurant	Restaurant	Lingerie Store
Station / Toronto Islands	Coffee Shop	Aquarium	CafÃ©	Hotel	Restaurant	Scenic Lookout	Restaurant	Joint	Shop	Brewery
Chinatown / Grange Park	CafÃ©	Coffee Shop	Restaurant	Restaurant	Bakery	Dessert Shop	Bar	Store	Grocery Store	Gaming Cafe
Provincial Government	Coffee Shop	Restaurant	Diner	Yoga Studio	Burger Joint	Spa	Beer Bar	Restaurant	Sandwich Place	Restaurant
Regent Park / Harbourfront	Coffee Shop	Pub	Bakery	Park	Breakfast Spot	Restaurant	CafÃ©	Theater	Dessert Shop	Shoe Store
Richmond / Adelaide / King	Coffee Shop	CafÃ©	Restaurant	Deli / Bodega	Restaurant	Hotel	Gym	Restaurant	Clothing Store	Salad Place
St. James Town	CafÃ©	Coffee Shop	Cocktail Bar	Gastropub	Restaurant	Restaurant	Clothing Store	Cosmetics Shop	Creperie	Lingerie Store
Cabbagetown	Restaurant	Coffee Shop	Bakery	Pub	Restaurant	CafÃ©	Pizza Place	Beer Store	Park	Restaurant
Stn A PO Boxes	Coffee Shop	Restaurant	CafÃ©	Restaurant	Restaurant	Beer Bar	Hotel	Cocktail Bar	Restaurant	Market
Design Exchange	Coffee Shop	Hotel	CafÃ©	Restaurant	Restaurant	Restaurant	Restaurant	Restaurant	Salad Place	Concert Hall
Harbord	CafÃ©	Restaurant	Bar	Bookstore	Restaurant	Bakery	Restaurant	Yoga Studio	Beer Bar	Beer Store
CentrE	Station	Yoga Studio	Smoke Shop	Restaurant	Market	Studio	Auto Workshop	Spa	Restaurant	Pizza Place
West	Restaurant	Restaurant	Pizza Place	Brewery	Restaurant	Restaurant	Liquor Store	Burrito Place	Ice Cream Shop	Pub
Studio District	CafÃ©	Coffee Shop	Restaurant	Brewery	Bakery	Gastropub	Yoga Studio	Bar	Restaurant	Ice Cream Shop
The Danforth West / Riverdale	Restaurant	Coffee Shop	Restaurant	Ice Cream Shop	Bookstore	Home Store	CafÃ©	Restaurant	Restaurant	Brewery
Exhibition Place	CafÃ©	Breakfast Spot	Coffee Shop	Bar	Bakery	Intersection	Restaurant	Climbing Gym	Restaurant	Venue
Dufferin / Dovercourt Village	Bakery	Pharmacy	Restaurant	Center	CafÃ©	Bar	Bank	Supermarket	Pizza Place	Brewery
High Park / The Junction South	Restaurant	Restaurant	CafÃ©	Flea Market	Bakery	Speakeasy	Restaurant	Restaurant	Restaurant	Store
Little Portugal / Trinity	Bar	Restaurant	Restaurant	Vegan	CafÃ©	Restaurant	Men's Store	Shop	Boutique	Brewery
Parkdale / Roncesvalles	Gift Shop	Restaurant	Dessert Shop	Bookstore	Bar	Restaurant	Dog Run	Movie Theater	Coffee Shop	Breakfast Spot
Runnymede / Swansea	CafÃ©	Coffee Shop	Pub	Restaurant	Restaurant	Pizza Place	Yoga Studio	Dessert Shop	Boutique	Sandwich Place

TORONTO CLUSTER 4

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
Davisville North	Park	Store	Breakfast Spot	Sandwich Place	Shop	Hotel	Store	Center	Donut Shop	Restaurant
Forest Hill North & West	Park	Jewelry Store	Trail	Bus Line	Restaurant	Deli / Bodega	Restaurant	Donut Shop	Restaurant	Dog Run
Lawrence Park	Park	Restaurant	Bus Line	Swim School	Restaurant	European	Restaurant	Donut Shop	Restaurant	Dog Run
Rosedale	Park	Trail	Playground	Cupcake Shop	Restaurant	Donut Shop	Restaurant	Dog Run	Center	Discount Store



CONCLUSION

- Purpose of this project was to identify areas in New York City and City of Toronto which would be suitable for re-location based on availability of options for food and leisure.
- In order to aid stakeholders in narrowing down the search for optimal location we narrowed down to Manhattan in New York City and the borough near Toronto Downtown. Clustering of neighbourhoods in those locations was then performed in order identify those neighbourhoods of interest.
- Final decision on ideal neighbourhood for re-location will be made by stakeholders based on specific characteristics of neighbourhoods taking into consideration additional factors like proximity to schools, real estate price etc.