

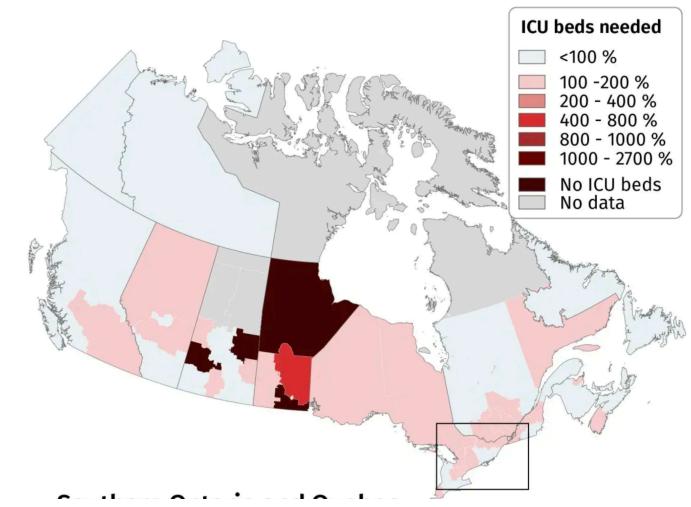
Health Facility Distributions in Neighbourhood of Toronto amid Corvid-19

Capstone Project - The Battle of Neighborhoods

by Jieun Kim

Introduction: Background

- This project is about analysing health facilities' distribution in Toronto area. Toronto has been heavily hit by Corvid-19 among any other large cities in Canada. There are currently 2,881 confirmed and probable cases of the virus in Toronto, including 147 death as of 17 April.
- Toronto is the largest city, however, recorded relatively lower density of population compared to Vancouver for instance. Many scientists are wondering why Toronto becomes most victim in this pandemic.
- The project looks for the number of hospital facilities and their distributions in the neighbourhood. This attempts will help diagnose the current overcrowding situation and support health-related decision makers concerning how to improve health system in Toronto, in particular.



Introduction: Problem

- The object of this project is to analyse neighbourhood of Toronto, where health facilities has not sufficiently reached, or overly populated. With the help of Data Science Methodology and machine learning techniques, we can certainly build an analysis to raise issues about following question
- Are health facilities in Toronto equally distributed through the neighborhood

Methodology (1) Data Source

1) Wikipedia Canada Ontario-Toronto postcode data

https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

2) Foursquare : Search query (Hospital, Pharmacy)

3) Statistics of Corvid-19 Canada

Methodology (2) Data Analysis

- The analytic approach for this problem is to perform unsupervised learning technique such as K-means Clustering. This will help to identify various patterns based on neighbourhoods in Tronto.
- We would require data such as list of Boroughs and Neighbourhood of Toronto, also the Corvid data for Toronto area)
- Once we have noted the data requirements, the next step is data collection. We need to scrape data from the online websites using libraries such as Beautiful Soup. Also, using Foursquare.

Data gathering : Hospital (n=14)

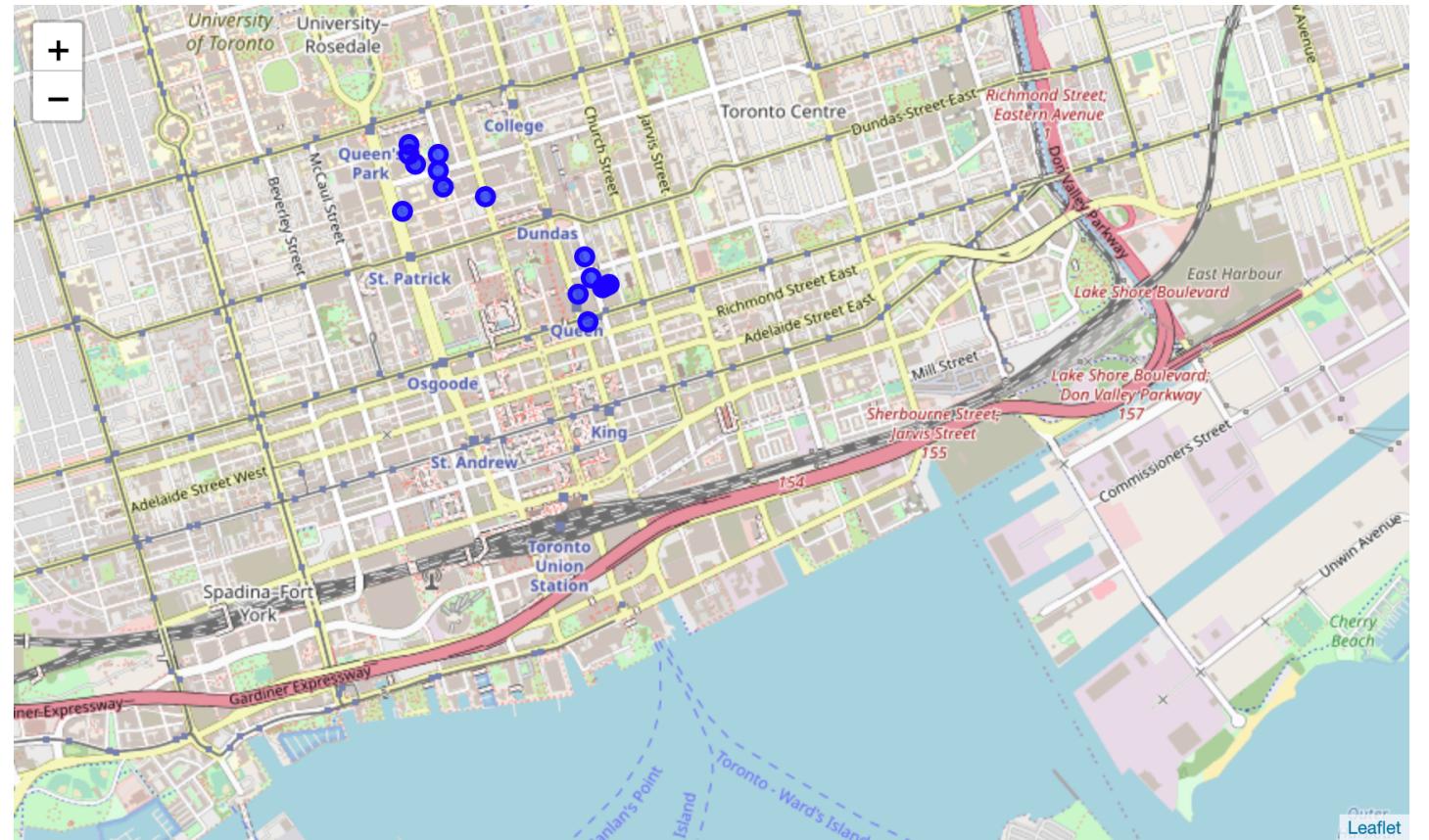
		name	categories	address	lat	lng	postalCode	state	neighborhood
0	The Hospital for Sick Children (SickKids)	Hospital	555 University Ave.	43.657499	-79.386512	M5G 1X8	ON		NaN
1	Toronto General Hospital	Hospital	190 Elizabeth St	43.658762	-79.388292	M5G 2C4	ON		NaN
2	St. Michael's Hospital	Hospital	30 Bond St	43.653784	-79.377809	M5B 1W8	ON		NaN
6	Inpatient Lounge - St. Michael's Hospital	Hospital		Nan	43.653428	-79.379383	Nan	Nan	NaN
7	MRI Department Sick Kids Hospital	Hospital	555 University Ave.	43.657149	-79.384323	Nan	ON		NaN

Data gathering : Phamarcy (n=50)

	name	categories	address	lat	long	postalCode	state	ne
0	I.D.A. - Pharmacy By The Grange	Pharmacy	275 Dundas St W	43.654158	-79.390490	M5T 1G1	ON	
1	On Care Pharmacy	Pharmacy	481 Dundas West	43.653188	-79.397056	M5T 1H1	ON	
2	U & C Pharmacy	Pharmacy	700 University Ave,112	43.658808	-79.390989	M5G 1Z5	ON	
3	RK Pharmacy	Pharmacy	302 Spadina Avenue	43.653262	-79.398402	NaN	NaN	
4	Leslie L. Dan Pharmacy Building	College Academic Building	144 College St.	43.659963	-79.391329	M5S	ON	
5	Guardian - Morelli's Pharmacy	Pharmacy	15 York St	43.642418	-79.380937	M5J 0A3	ON	
6	I.D.A. - The Palmerston Pharmacy & HomeCare	Pharmacy	499 College St	43.655889	-79.409718	M6G 1A5	ON	
7	Pharmacy PMH	Pharmacy	Nan	43.656351	-79.391775	NaN	ON	
8	Guardian Pharmacy	Pharmacy	755 Dundas St. W	43.655781	-79.383859	NaN	ON	
9	Victor Pharmacy	Pharmacy	123 Edward St.	43.655445	-79.386335	NaN	ON	

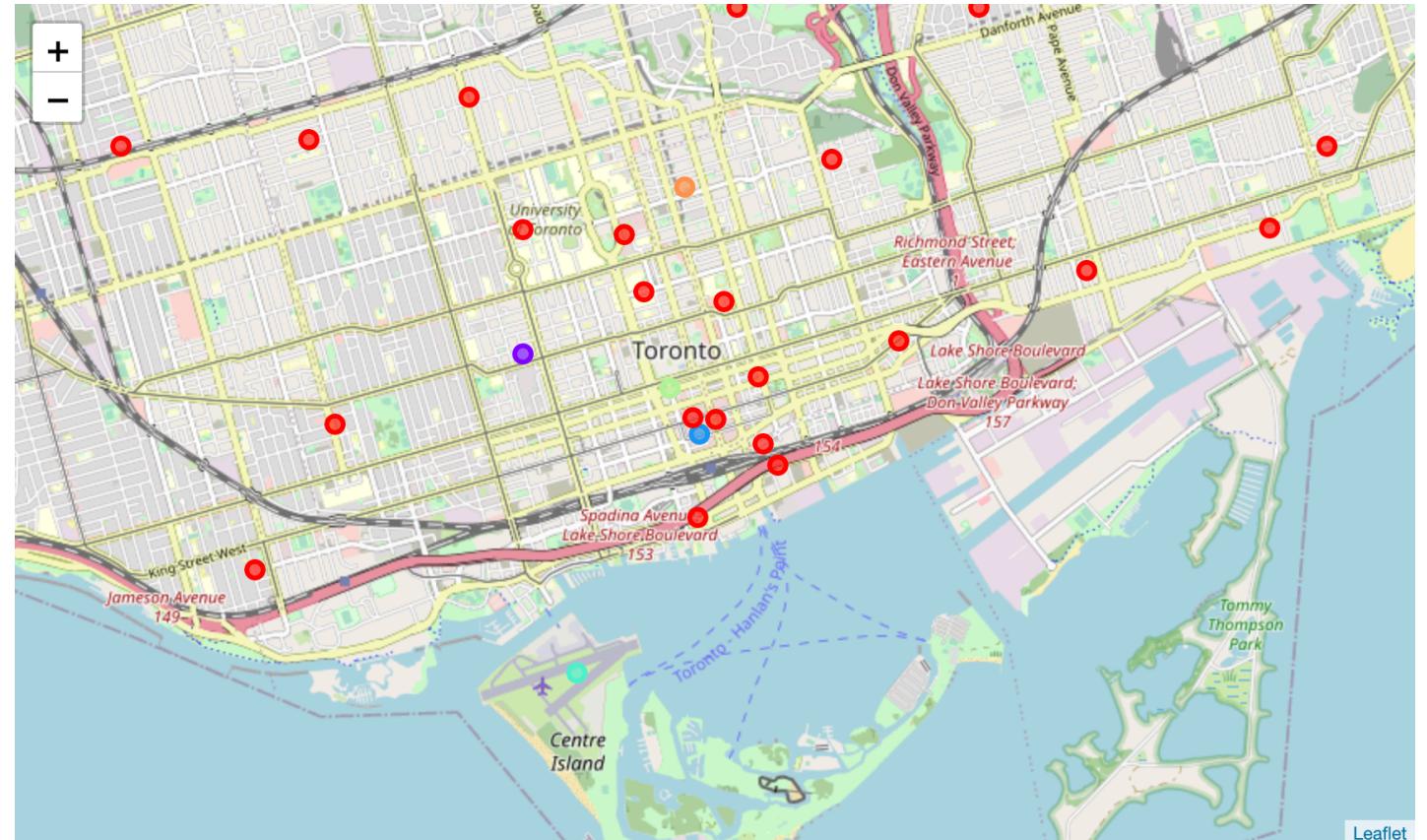
Distribution of Health facility marked

- Health Facilities including hospital, emergency unity, and pharmacy, are not populated in Foursquare site.
- More facilities are marked toward university zone.



Characterising Neighborhood : K-mean cluster analysis (K=6)

- Neighbourhood in main area of Toronto is likely to show similar popular venue (Cluster 1 in red)
- Populated with many restaurants and also gym & yoga studio



Discussion

- As per analysis done in this project, it is recommended to disperse hospital facility in neighbourhood of Toronto
- Cluster 1 includes cities such as CN Tower / King and Spading and University area , they are the one's with high density of hospital facility .
- However, this results might be biased as long as the current capstone rely on Foursquare data only for venue makered which is highly popular for “attractions” and “restaurants”,

Conclusion

- With the help of Foursquare API and various machine learning techniques we can perform analysis on various other venues and can answer many business problem.
- Basis on the Data visualization we can have a good understanding why a particular neighbourhood is overwhelmed with hospitals, and others are not.

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