

# PR\_Assign\_W4

December 2, 2020

## 1 Project Title: Analysis of COVID cases in Ontario, CA

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### 1.1 Week 4 - Part A: Statement of the Problem

In this study, we plan to analyze the COVID-19 cases in Ontario province. Currently, we observe the second wave of pandemic and the government plans to impose additional restrictions on different counties. Given the venues in the neighborhood of a medical center and the number of confirmed cases, we try to cluster similar cities/counties in terms of COVID behaviour and consult the government to make decisions accordingly. In the first section we analyze the data, then we try to map it, later the neighborhood venues will be extracted using FourSquare, and as the final step the data will be clustered to 5 different categories to restrict the interactions. The first audience of this study would be the Government of Ontario and the Mayors and City councils, but the citizens also could be the second audience.

#### 1.1.1 Import libraries

The required libraries are installed or called in this section.

Libraries imported. - Confirmed

### 1.2 Week 4 - Part B: Data Section

The data is live COVID data that is being posted on the "https://data.ontario.ca". It includes all reported cases since the start of pandemic. The columns for each case are the exact episode date, age grouped by decade, gender, outcome (recovered, active, and death), Reporting PHU ID, PHU name, postal code, latitude and longitude. Furthermore, using the Foursquare website, the venues near each public health unit (PHU) is extracted to find a relation between venues and the number of confirmed cases. Data URL: <https://data.ontario.ca/dataset/f4112442-bdc8-45d2-be3c-12efae72fb27/resource/455fd63b-603d-4608-8216-7d8647f43350/download/conposcovidloc.csv>

After cleaning, number of confirmed cases are: 119915

Table 1: Daily COVID-19 Cases, Ontario Province

[5]:	Row_ID	Accurate_Episode_Date	Age_Group	Client_Gender	Outcome1	\
	0	1	2020-11-18	60s	FEMALE	Not Resolved
	1	2	2020-10-30	50s	MALE	Resolved
	2	3	2020-10-28	50s	MALE	Resolved
	3	4	2020-11-17	50s	MALE	Resolved

4	5	2020-11-06	60s	MALE	Resolved
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	Reporting_PHU_ID	Reporting_PHU	Reporting_PHU_Postal_Code	\
0	4913	Southwestern Public Health	N5P 1G9	
1	4913	Southwestern Public Health	N5P 1G9	
2	4913	Southwestern Public Health	N5P 1G9	
3	2234	Haldimand-Norfolk Health Unit	N3Y 4N5	
4	2227	Brant County Health Unit	N3R 1G7	

	Reporting_PHU_Latitude	Reporting_PHU_Longitude
0	42.777804	-81.151156
1	42.777804	-81.151156
2	42.777804	-81.151156
3	42.847825	-80.303815
4	43.151811	-80.274374

Table 2: Grouped number of confirmed cases for each PHU

[6]:

	Reporting_PHU	Row_ID
0	Algoma Public Health Unit	61
1	Brant County Health Unit	608
2	Chatham-Kent Health Unit	510
3	Durham Region Health Department	4636
4	Eastern Ontario Health Unit	853

### 1.3 Define Foursquare Credentials and Version

### 1.4 Nearby Venues attached to each PHU

Table 3: Venues around each Public Health Unit (PHU)

(2355, 7)

[12]:

	Reporting_PHU	Neighborhood Latitude	Neighborhood Longitude	\
0	Algoma Public Health Unit	46.532373	-84.314836	
1	Algoma Public Health Unit	46.532373	-84.314836	
2	Algoma Public Health Unit	46.532373	-84.314836	
3	Algoma Public Health Unit	46.532373	-84.314836	
4	Algoma Public Health Unit	46.532373	-84.314836	

	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Shogun Sushi	46.530801	-84.319091	Sushi Restaurant
1	Burger Don	46.522580	-84.319638	Burger Joint
2	Fratellis	46.542842	-84.318774	Italian Restaurant
3	YMCA	46.521494	-84.316275	Gym / Fitness Center
4	North 82	46.527674	-84.319183	Steakhouse