Grocery Shopping in London (Ontario) During COVID-19

1. Introduction

The COVID-19 has a severe impact on almost every aspect of life throughout the entire world. Although most of the residents are not able to control the disease, there is something that can be done to reduce the risk of being infected. And one of the most important and effective approaches is to avoid going to the places that are crowded. However, the grocery store is one of the exceptions since having enough food is indispensable for maintaining daily lives. During the pandemic, to enforce social distancing, most of the stores include nearly all the grocery stores that allow only a certain number of customers to stay inside. As a consequence, it happens frequently that many customers have to wait in a queue outside the store, sometimes can be very long.

Therefore, choosing an appropriate time and location could have a significant impact on the shopping experience. If one can choose a store at the right time where there is not a large number of customers, then he or she could not only avoid waiting for a long time outside but can further reduce the risk of being infected.

London is a city inside the Ontario Province in Canada. It is not as large as those big cities such as Toronto or Vancouver, its size is still relatively large with a considerable amount of population. And thus, it can provide a valuable guidance to residents especially those who are new to the city if we can systematically investigate the locations and hours (include popular hours) of the primary grocery stores. It not only saves the times of the residents but helps to slow down the spread of COVID-19 as well.
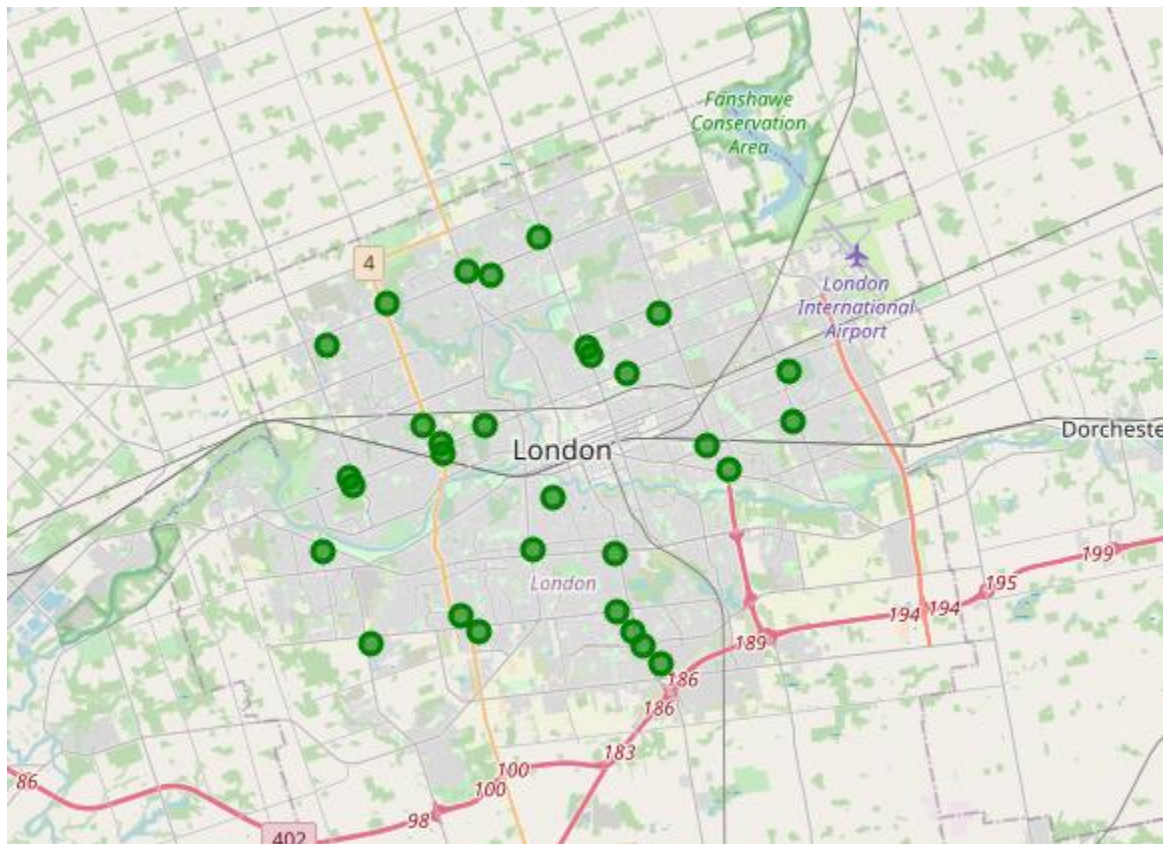
2. Data collection

Most of the data are collected through the Foursquare API. There is a category ID specific to grocery stores which makes the searching much easier. Once the stores are found, we can then make a query about the hours of each store. This is a type of premium call, but since the total number of large grocery stores in London is around 30, it should be fine for the free users. What is useful is that the results include not only the regular hours but the popular hours as well. This information is essential during the pandemic for people to choose a time that the store opens but not crowded.

3. Methodology

In the first step, the we need to find all the grocery stores in London (Ontario) by specifying the name of the city. But if we search directly with the keyword "grocery", it turned out that many of the grocery stores are not in the result, and some of the stores in the result do not serve groceries. Therefore, we in turn use the Category ID specific for grocery store in Foursquare (4bf58dd8d48988d118951735). One problem of the raw result is that some of the stores are located in other cities close to London (e.g., Dorchester, St. Thomas, etc.). Clearly, they are not the ideal options for residents in London to go shopping. And these stores are filtered out. And this generates the original data frame. There are 30 stores found.

	name	categories	address	cc	city	country	crossStreet	formattedAddress	labeledLatLngs	lat	lng
0	Metro	Supermarket	1030 Adelaide St N	CA	London	Canada	at Cheapside St.	[1030 Adelaide St N (at Cheapside St.), London...	[{'label': 'display', 'lat': 43.00733418607895...	43.007334	-81.239668
1	Loblaws	Grocery Store	1740 Richmond St N	CA	London	Canada	at Fanshawe Park Rd. E.	[1740 Richmond St N (at Fanshawe Park Rd. E.),...	[{'label': 'display', 'lat': 43.028231, 'lng':...	43.028231	-81.282219
2	Farm Boy	Grocery Store	1415 Beaverbrook Ave	CA	London	Canada	NaN	[1415 Beaverbrook Ave, London ON N6H 0J1, Canada]	[{'label': 'display', 'lat': 42.98962229915124...	42.989622	-81.297794
3	Adrian's No Frills	Grocery Store	1925 Dundas St E, West Argyle Mall	CA	London	Canada	at Clarke Rd.	[1925 Dundas St E, West Argyle Mall (at Clarke...	[{'label': 'display', 'lat': 43.003134, 'lng':...	43.003134	-81.171855
4	Brent & Jennie's No Frills	Grocery Store	960 Hamilton Rd	CA	London	Canada	NaN	[960 Hamilton Rd, London ON N5W 1A3, Canada]	[{'label': 'display', 'lat': 42.978555, 'lng':...	42.978555	-81.192596

And then, we use the folium library to visualize the locations of those stores. It seems that they are located across the entire city, indicating that no matter where the residents live, they should be able to find one or more stores within a relatively short distance.

After that, based on the ID of each store, we obtained their opening hours and popular hours. However, among those 30 stores, only the first 23 of them have this data available. According to the data from these 23 stores, we first summarized the number of stores opened at each hour from Monday to Sunday.

	0	1	2	3	4	5	6	7	8	9	...	14	15	16	17	18	19	20	21	22	23
Monday	0	0	0	0	0	0	0	4	22	23	...	23	23	23	23	23	23	20	10	5	0
Tuesday	0	0	0	0	0	0	0	4	22	23	...	23	23	23	23	23	23	20	10	5	0
Wednesday	0	0	0	0	0	0	0	4	22	23	...	23	23	23	23	23	23	20	10	5	0
Thursday	0	0	0	0	0	0	0	4	22	23	...	23	23	23	23	23	23	20	10	5	0
Friday	0	0	0	0	0	0	0	4	22	23	...	23	23	23	23	23	23	20	10	5	0
Saturday	0	0	0	0	0	0	0	4	22	23	...	23	23	23	23	23	22	19	9	5	0
Sunday	0	0	0	0	0	0	0	4	19	23	...	23	23	23	23	22	19	17	9	5	0

Similarly, we summarized the number of stores that are popular at each hour, that is, there are more customers inside the store during those hours.
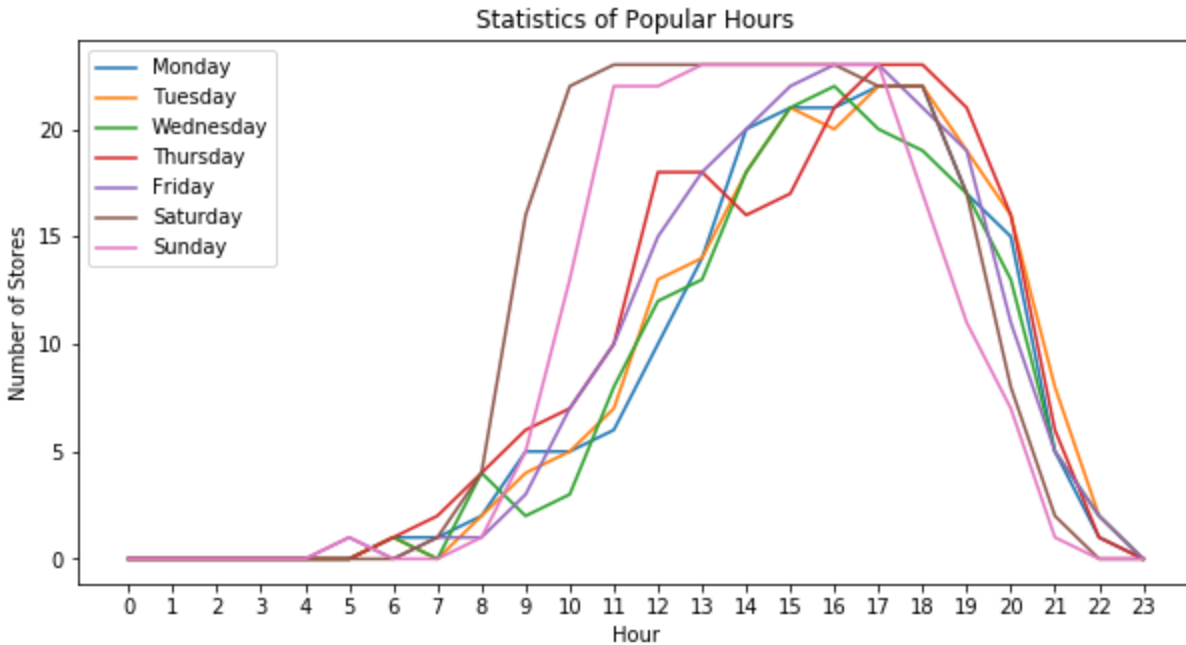
	0	1	2	3	4	5	6	7	8	9	...	14	15	16	17	18	19	20	21	22	23
Monday	0	0	0	0	0	0	1	1	2	5	...	20	21	21	22	22	17	15	5	1	0
Tuesday	0	0	0	0	0	0	1	0	2	4	...	18	21	20	22	22	19	16	8	2	0
Wednesday	0	0	0	0	0	0	1	0	4	2	...	18	21	22	20	19	17	13	5	2	0
Thursday	0	0	0	0	0	0	1	2	4	6	...	16	17	21	23	23	21	16	6	1	0
Friday	0	0	0	0	0	1	0	1	1	3	...	20	22	23	23	21	19	11	5	2	0
Saturday	0	0	0	0	0	0	0	1	4	16	...	23	23	23	22	22	17	8	2	0	0
Sunday	0	0	0	0	0	1	0	0	1	5	...	23	23	23	23	17	11	7	1	0	0

To help the residents (especially new residents) living in different areas of London to have a general idea about the grocery stores in the region where they live, we performed the automatic clustering with K-means algorithm. According to the location information, the stores across the city are categorized into 4 regions. We then summarized the name of the stores and the corresponding addresses in each area so that residence can check and make decision.
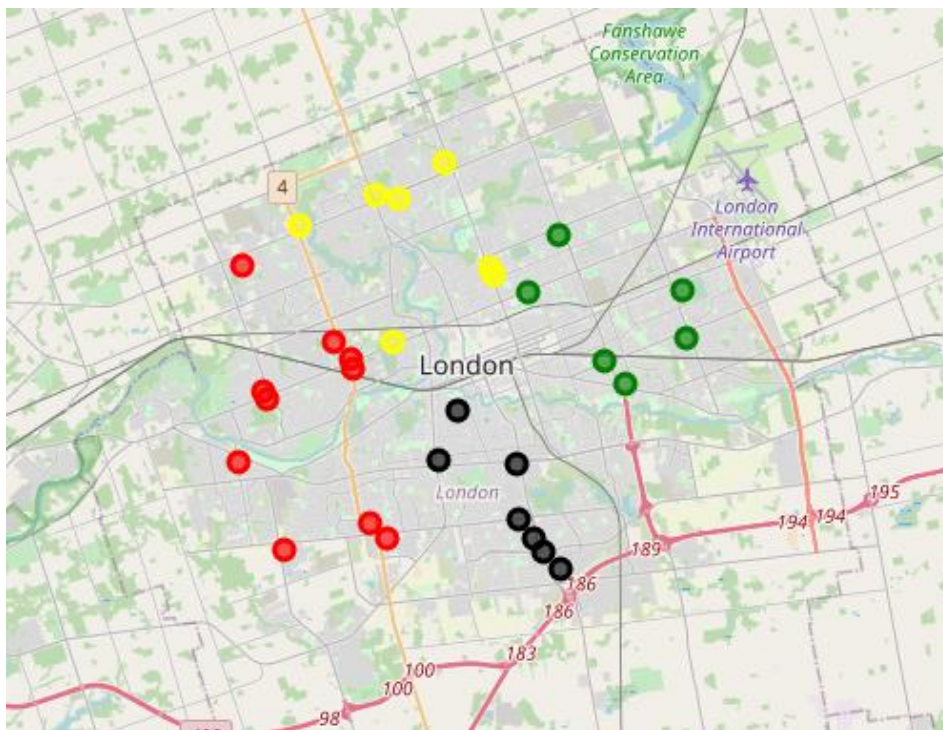
4. Results

During the pandemic, to protect the safety of their employees and make extra cleaning, most of the stores are operating on reduced hours. According to the information of regular hours, only 4 stores open at 7 AM. But most of the stores open at 8 AM which should not have a significant impact on most customers. The closing time varies. From Monday to Friday, a few stores close at 8 PM. But most of the stores close at 9 or 10 PM. For those who need to work regularly during the normal business hours, they should still be able to find some grocery stores available after work.

What is more important is the popular hours. The number of stores that are popular at each hour can be visualized from the following plot:

Statistics of Popular Hours

It is clear from the graph that there are still a lot more customers that prefer to go shopping during the weekends, especially on Saturday. From Monday to Friday, the popular hours have slight variation, but in general, the peaks are located in the afternoon and early evening. Since those stores typically open at 8 AM, if it is possible, going to the store before noon should be a better option to reduce the chance of being located in the crowd.

We also divided the stores in London into four regions which are labeled in different colors in the map below (Region 1: green, Region 2: yellow, Region 3: red, Region 4: black).

The names of the stores and their addresses are summarized here as well:

Region 1:

Name	Address
Adrian's No Frills	1925 Dundas St E, West Argyle Mall
Brent & Jennie's No Frills	960 Hamilton Rd
FreshCo	1298 Trafalgar St.
Darryll & Tracy's No Frills	1275 Highbury Ave
Real Canadian Superstore	825 Oxford St E
Metro	155 Clarke Rd

Region 2:

Name	Address
Metro	1030 Adelaide St N
Loblaws	1740 Richmond St N
Robert & Tracey's No Frills	599 Fanshawe Park Rd W
Sobeys North London	1595 Adelaide St N
Metro	301 Oxford St W
Farm Boy	109 Fanshawe Park Rd E
United Supermarket	1062 Adelaide St. N.

Region 3:

Name	Address
Farm Boy	1415 Beaverbrook Ave
Metro	1244 Commissioners Rd W
Real Canadian Superstore	1205 Oxford St
Walmart Grocery Pickup	1280 Fanshawe Park Rd W
Remark Fresh Markets	1180 Oxford St. W
Masse's No Frills	925 Southdale Rd W
Loblaws	3040 Wonderland Rd S
FreshCo	981 Wonderland Rd. S.
Sobeys	661 Wonderland Rd N
Food Land Supermarket	530 Oxford Street West

Region 4:

name	address
Cayle's No Frills	635 Southdale Rd E
Gary's No Frills	7 Baseline Rd E
Farm Boy	1045 Wellington Rd
John's valu-mart	179 Wortley Rd
FreshCo Commissioners & Wellington	645 Commissioners Rd E
Bulk Barn	1070 Wellington Rd.
National Grocers	1055 Hargrieve Street

5. Discussion

Normally, time for grocery shopping is not that important as long as one is free. But during the pandemic, to minimize the chance of being infected, choosing a proper time is critical. According to the data, the grocery stores in London typically open between 8 AM and 21 PM, although there are exceptions. Since many customers go shopping in the afternoon, it is best to avoid this period. If it is possible, the ideal option is to go to the store in the morning between Monday and Friday. Of course, this may not be possible for those who have to work regularly. In such cases, it is better to check the specific hours for each store. Many stores have more detailed information on their website such as the average number of customers at each hour. This information is more useful than simply labeling popular or not.

The store information in each region is useful for those who are new to the city. Although it makes sense to consider the price and some other factors, safety should undoubtedly be taken into priority. It is best to make a comprehensive review before making the decision.

6. Conclusion

This work briefly studied the grocery store information in London (Ontario) especially the hours. It also summarizes the stores in different regions. It can be a guideline for residents in the city to choose when and where to go grocery shopping during the pandemic.