

Project Report - The Battle of Neighborhoods (Week 2)

Title: Suggest a neighbourhood for Noah to open a pizzeria that can give good business.

Introduction

Noah is from East York, Canada and he wants to open a pizzeria in East York. He intends to make maximum business while avoiding competition or clashes with existing pizza places. So, he has asked our help to find the best neighbourhood in East York to open his pizzeria considering these constraints.

Business Problem

To find out the best neighbourhood to open the pizzeria, we would require information about all the neighbourhoods in Toronto. Then, we need to analyze each neighbourhood to find out if there will be enough customers and that there will not be too much competition around the place.

The main idea should be the neighbourhood where Noah will be opening his pizzeria should have greater probability of fetching good business.

Data

In order to address the problem in hand we would need the following data;

1. The neighbourhoods of Toronto, Canada. This can be extracted from wikipedia page https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
2. Geospatial data for these neighbourhoods, in order to obtain the latitudes and longitudes. This is found in the below url https://cocl.us/Geospatial_data
3. Foursquare data for exploring the neighbourhoods in terms of various pizza places, schools, offices and parks in various neighbourhoods of East York, Toronto. Neighbourhoods having more schools, offices and parks has been considered in this project as places which might fetch more business to a pizza place. Foursquare data for these places will be fetched by specifically passing the respective category ids.

The above said venues have been considered for the analysis of the problem at hand because of the following reasons:

- Pizza Place: This data is acquired to consider the existing pizza places and as much as possible try to avoid competition.
- Schools: This data is acquired since school children; especially high school kids can be good customers for pizzeria.
- Offices: This data is also important as office personnel are even more better customers since they can spend more money than school kids.

- Parks: Parks are places where kids come along with their parents or guardians usually as an outing or joyous picnic. So, if a pizzeria can be opened nearby one of the parks, then probably business might be good.

Methodology

1. The list of Neighbourhoods in Canada for different Boroughs was extracted from the wikipedia page as given in the Data Section, following which the postal codes were extracted from geospatial data and merged to the neighbourhood data.
2. Data for only East York has been considered since Noah is interested in opening the pizzeria in East York. Geographical coordinates for the Neighbourhoods in East York was obtained. This is shown in the table below.

	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M4B	East York	Woodbine Gardens	43.706397	-79.309937
1	M4B	East York	Parkview Hill	43.706397	-79.309937
2	M4C	East York	Woodbine Heights	43.695344	-79.318389
3	M4G	East York	Leaside	43.709060	-79.363452
4	M4H	East York	Thornccliffe Park	43.705369	-79.349372

3. Now, for each of these neighbourhoods, all the nearby venues were collected from Foursquare. Out of those venues, the following venues have been considered to solve the business problem by passing the corresponding category ids:
 - i. Pizza Places
 - ii. Schools
 - iii. Offices
 - iv. Parks
4. Once, we have these data, weightages were allocated considering the customer requirement and venue importance as below:
 - i. Pizza places have been given a negative weight, since Noah wants to avoid competition
 - ii. Schools will offer a good business so a weight of 1 has been given
 - iii. Office employees are even better customers so a weightage of 1.5 has been given
 - iv. Parks offer even more promising customers to a pizzeria, so a weight of 2 has been given.
5. With these weights, a popularity score has been computed for each neighbourhood. This has been calculated as the weighted sum of the number of venues in each of these 4 venue categories.

Results

Table below shows the result of the analysis.

- Thorncliffe Park with a Popularity Score of 17.0 is the best neighbourhood to open a pizzeria.
- Woodbine Gardens and Parkview Hill with score of 16.5 are the next options.

These neighbourhoods show us the promise of a good business without having large competition.

	Neighbourhood	Popularity Score
4	Thorncliffe Park	17.0
0	Woodbine Gardens	16.5
1	Parkview Hill	16.5
2	Woodbine Heights	13.5
5	East Toronto	9.5
3	Leaside	7.5

Discussion

As per the result of the analysis Thorncliffe Park is the best neighbourhood for Noah to open a pizzeria. He can also consider options Woodbine Gardens and Parkview Hill since the score is behind by just 0.5.

Analysis can also be done considering other venue categories like existing fast food joints, universities, hospitals, etc., which will in turn increase the accuracy of the analysis.

Conclusion

The analysis using the neighbourhood data and the geospatial data of Canada accompanied by Foursquare data, a suggestion was made to Noah regarding the probable neighbourhood where he could open his pizzeria, keeping in mind his constraints that he had shared.

It has been found that Thorncliffe Park is the best neighbourhood for Noah to open a pizzeria.