Optimal Bare Bones Ice Distribution Network in North York, Toronto

Coursera IBM Data Science Capstone Project Report

Mayank Panwar

The University of XYZ, ABC

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Table of Contents

Introduction

After their huge success in Sydney, an Australian startup “Bare Bones Ice Company” decided to expand their business overseas. As one of the founding members of this company was from North York, Toronto, Canada they decided to set up their manufacturing and distribution center there. There is a saying - “Ice is the equivalent to a stove for a chef”. Heat, and Cold, both change every aspect of the final product.

The company makes crystal clear ice which is in demand at many restaurants, bars, pubs, diners, lounges, and nightclubs serving drinks like liquor, cocktails, and mocktails. The temperature affects how the drink feels, by numbing the taste buds. They say that a big cube of perfectly clear, hand-cut ice, is clearly the perfect serve, and won’t overly dilute the drink. Also, cooler temperatures can smooth an average liquor by rounding its edges.

The company wants to make an optimal distribution network in North York to achieve the timely delivery of Ice pops/cubes/slabs to their potential customers. For this, the stakeholders want to segment all the presumable targets into clusters and then assign each cluster a cold storage truck for delivery for better and efficient delivery.

Data Source

1. We will need a list of all the neighborhoods in North York, Toronto, Canada. The list can be extracted from the Wikipedia Page “List of postal codes of Canada: M” having URL:https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M. For web scraping, we will use the beautifulsoup4 Python package and for data wrangling, we will use the Pandas Python package.

   Example:

	PostalCode	Borough	Neighborhood
0	M3A	North York	Parkwoods
1	M4A	North York	Victoria Village
2	M6A	North York	Lawrence Manor, Lawrence Heights
3	M3B	North York	Don Mills
4	M6B	North York	Glencairn

2. We will also need the GPS coordinates of each neighborhood. For this, we will use the PGeoCoder package that can give the query results based on postal codes.

   Example:

	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.7545	-79.3300
1	M4A	North York	Victoria Village	43.7276	-79.3148
2	M6A	North York	Lawrence Manor, Lawrence Heights	43.7223	-79.4504
3	M3B	North York	Don Mills	43.7450	-79.3590
4	M6B	North York	Glencairn	43.7081	-79.4479

3. We also need the list of all the pubs, bars, restaurants, nightclubs, diner, and lounge for each neighborhood within the radius of 1.5kms. This data will be extracted from FourSquare Server using FourSquare APIs.

   Example:

	PostalCode	Neighborhood	N_Latitude	N_Longitude	Venue_id	Venue	Venue_Category	V_Latitude	V_Longitude
0	M3A	Parkwoods	43.7545	-79.33	4b8991cbf964a520814232e3	Allwyn's Bakery	Caribbean Restaurant	43.759840	-79.324719
1	M3A	Parkwoods	43.7545	-79.33	4bd4846a6798ef3bd0c5618d	Donalda Golf & Country Club	Golf Course	43.752816	-79.342741
2	M3A	Parkwoods	43.7545	-79.33	4e8d9dcdd5fbbbb6b3003c7b	Brookbanks Park	Park	43.751976	-79.332140
3	M3A	Parkwoods	43.7545	-79.33	4b8ec91af964a520053733e3	Graydon Hall Manor	Event Space	43.763923	-79.342961
4	M3A	Parkwoods	43.7545	-79.33	4b149ea4f964a52029a523e3	Darband Restaurant	Middle Eastern Restaurant	43.755194	-79.348498