Analysis of Commuter Data and Venue Data for Ottawa, ON, Canada (Part 1)

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1 – Introduction

1.1 – Background

As urban populations increase and metropolitan areas of municipalities expand, commuting times between work and home have been increasing globally. Cities across Canada are not immune to these rising statistics. Between 1996 and 2016, the percentage of people working and living within their city's core has decreased drastically. In the Ottawa-Gatineau census metropolitan area (CMA), there has been a drop in city core commuting by over 50% within this timeframe [1]. Indeed the rise of other forms of commuting have come to replace it, including: traditional commuting (outside-to-inside city core), reverse commuting (inside-to-outside city core), commuting between suburbs as well as commuting within a suburb.

Ottawa, Ontario is the capital city of Canada and in 2016 boasted a population of 934,243 as well as a metropolitan population of 1,323,783 [2]. The CMA is divided into 23 distinct wards – a mix of urban and suburban districts, each represented by their own City of Ottawa councillor. Out of the eight largest CMAs in Canada, the Ottawa-Gatineau region exhibited the second-highest median commuting distance in 2016, second only to Toronto [1].

The locations that people choose to live in have a big impact on commuting distances. While real estate costs play a role in where people choose to live, aspects such as nearby venues and amenities are also important to consider. Furthermore, municipal infrastructure such as access to transit plays an integral role in determining the mode of commuting a person may use to get to work each day. The recently opened Confederation Line – a light rail train, with future plans for expansion to some of the outer wards – is one example of this type of infrastructure.

1.2 – Problem

For this study, we want to determine if it is possible to cluster groups of communities in the City of Ottawa based on venue availability and commuter data. Additionally, we will explore if these clustered groups have any obvious discernable differences based on venue availability and commuter data.

1.2 – Interest

This study could be of great interest to the City of Ottawa as well as to its transit association OC Transpo. Furthermore, the insights discovered from this analysis could prove useful to other municipalities in Canada and abroad.

2 – Data

2.1 – Description of Data

The data used for this study will be obtained from various sources. First, the geographic data for neighborhoods in Eastern Ontario was scraped from Wikipedia [3], and the neighborhoods belonging to Ottawa were be obtained. The geographical coordinates for each neighborhood were determined using GeoPy. Shape and map data for the wards in Ottawa were obtained from publicly available data on Open Ottawa and will be used to project the ward territories onto a Folium map [4]. The Foursquare Places API was used to obtain venue categories within a defined radius of each neighborhood's geographic center [5]. Finally, census data was obtained from on Open Ottawa, derived from the Statistics Canada 2016 Census for the wards of the City of Ottawa [6]. This data includes counts for commuting destination, main mode of commuting, and commuting duration for each ward. This data was integrated to perform clustering (K-means, density-based clustering) to determine groups of neighborhoods based on venue availability and commuter data. From this, we were able to draw inferences about the different community groups, with implications for future transit and city planning projects.

3 – Methodology

To be filled in.

4 – Results

To be filled in.

5 – Discussion

To be filled in.

6 – Conclusions and Future Work

6.1 – Conclusions

To be filled in

6.2 – Future Work

To be filled in.

7 - References

[1] K. Savage, "Results from the 2016 Census: Long commutes to work by car," *Insights Can. Soc.*, no. 75, pp. 1–12, 2019.

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[3] Wikipedia, "List of postal codes of Canada: K," *Wikipedia*, 2020. [Online]. Available: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_K. [Accessed: 01-Jun-2020].

[4] City of Ottawa, "Wards," *Open Ottawa*, 2019. [Online]. Available: https://open.ottawa.ca/datasets/wards?geometry=-78.414%2C44.911%2C-

73.188%2C45.587. [Accessed: 01-Jun-2020].

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[6] City of Ottawa, “2016 Census Ward Data,” *Open Ottawa*, 2020. [Online]. Available: https://open.ottawa.ca/datasets/2016-census-ward-data-1. [Accessed: 01-Jun-2020].