

# The Restaurant Capital of Toronto

## Introduction

With great excitement I would like to share that I have been assigned an arduous task by the mayor of Toronto himself, John Tory. He has asked me to name a neighbourhood as the Restaurant Capital of Toronto. He will be using my results to create a marketing plan and social media campaign for the city, specifically focusing on attracting foodies and potential restaurateurs.

John Tory included some very specific criteria with this assignment. He would like a Restaurant Capital to be awarded for the neighbourhood with the highest variety of restaurants. Additionally, he would like me to create and name five distinct neighbourhood groups, with each group sharing common restaurant varieties.

To accomplish this task I will need to use the location data for each Toronto neighbourhood to pull venue details from Foursquare.

## Data

For this project, I will be leveraging the location data used in my Segmenting and Clustering Neighbourhoods in Toronto assignment. In that assignment, I scraped postal code, borough and neighbourhood information from a Wikipedia table. I then merged that data with a CSV file containing coordinates for each Toronto postal code and then used those coordinates to pull data from Foursquare.

This time I will be pulling data from Foursquare only where the venue category is food. I will use this data to calculate the neighbourhood with the highest number of restaurant types to award the Restaurant Capital title. I will then use machine learning to group neighbourhoods by the types of restaurants that are common within them.

## Methodology

Now that we have used our location data to generate a dataframe showing recommended restaurants in a 1 km radius, we will use the data to complete two analyses.

Firstly, we will look for unique restaurant categories within each neighbourhood. The neighbourhood with the most unique restaurant categories will be crowned the Restaurant Capital of Toronto. It is important to note that Foursquare only allows us to retrieve 100 venues per neighbourhood. We will be assuming that the top 100 recommended restaurants are representative of all restaurants in each neighbourhood.

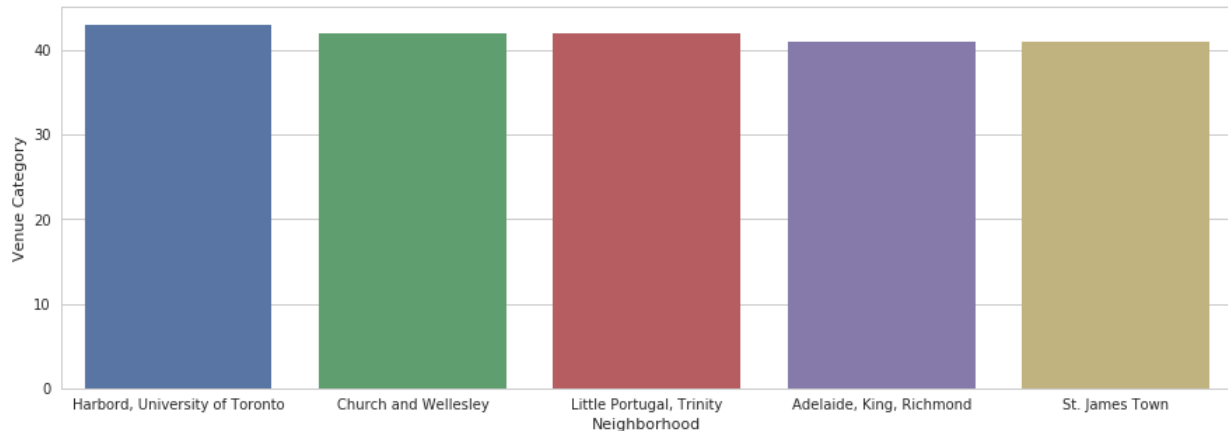
Secondly, we will use machine learning to group neighbourhoods together by the types of restaurants that are common within them. We will use the Kmeans algorithm to cluster the neighbourhoods into five groups, since that is the number that John Tory has requested.

Lastly, we will plot the clustered neighbourhoods on a map of Toronto, color-coded by cluster. We will also review the most common restaurants in each cluster, and use this information to assign each group a name.

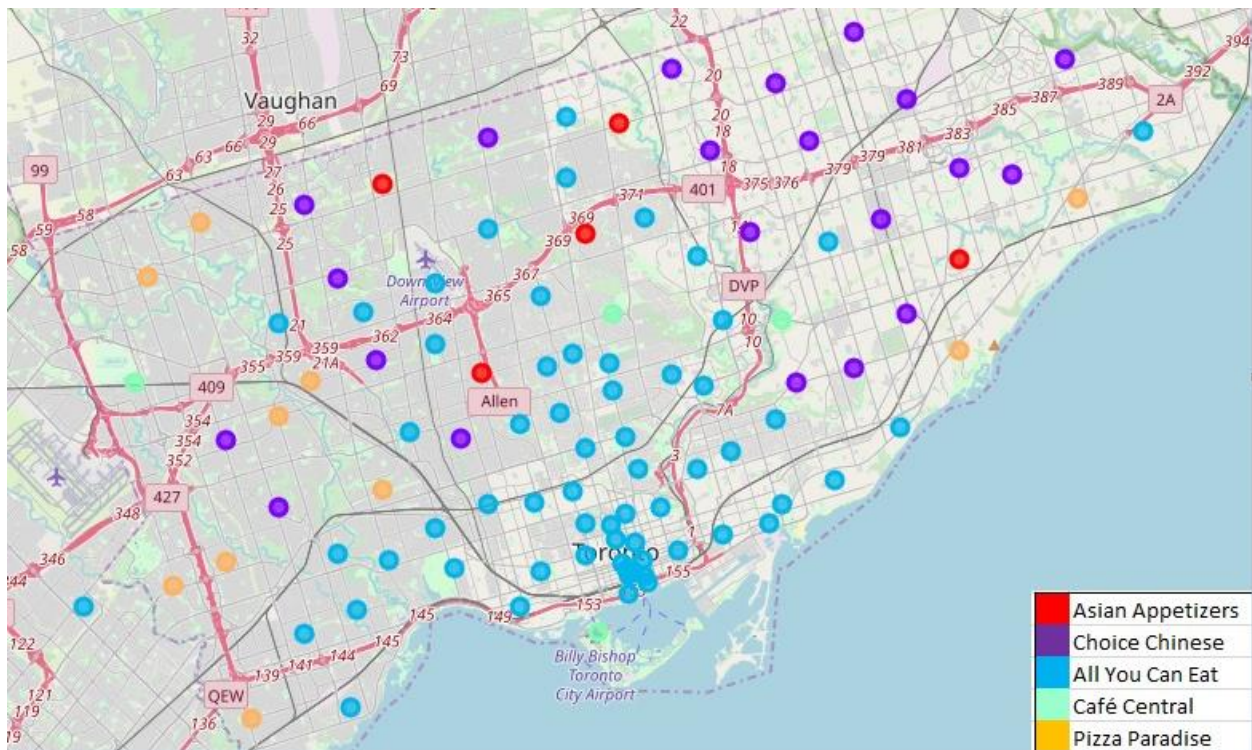
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## Results

My analysis shows that the Toronto neighbourhood with the most unique restaurant categories is the Harbord, University of Toronto neighbourhood. This neighbourhood will be declared the restaurant capital of Toronto, and highlighted in John Tory's marketing/social media campaign.



The machine learning analysis of Toronto neighbourhoods generated five clusters of neighbourhoods that were named based on the most common restaurants in each cluster. Cluster 0 has a wide variety of Asian restaurants, so it was named Asian Appetizers. Cluster 1 had a large number of Chinese restaurants so it was named Choice Chinese. Cluster 2 had a very wide variety of restaurant categories with each seemingly as prevalent as the next. This cluster was named All You Can Eat. Cluster 3 had a lot of cafés so it was called Café Central. Lastly, cluster 4 was quite saturated with pizza restaurants so it was named Pizza Paradise.



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## Discussion

Although the Harbord, University neighbourhood was crowned the Restaurant Capital of Toronto, it won by a very slim margin. There were quite a few neighbourhoods with only a few less unique categories of restaurants, which indicates that many areas of Toronto have diverse food options. This measurement was also limited by Foursquare's explore limit, which only allows you to pull in a maximum of 100 venues per neighbourhood. Having access to include all restaurants in all neighbourhoods may have yielded a different result.

Five groups of neighbourhoods were successfully clustered based on the types of restaurants that are common within them. However, this clustering may be improved in future iterations. Some influential items that could be reviewed are the number of clusters, the radius searched for each neighbourhood, and the limit on the number of restaurants retrieved for each neighbourhood. With the available credentials, the maximum number for this limit was used, but increasing or decreasing it would likely yield different results.

Cluster 2 may also be a good item for review in future iterations. It was the largest cluster by far and did not seem to have a unique trend in terms of what restaurants were common within it. It may be enlightening to perform further machine learning algorithms on this cluster alone.

Since the cluster data from our analysis will be used to drive a marketing campaign geared towards foodies and restaurateurs, the city can advertise each neighbourhood for specific types of restaurants. This data could be used to recommend neighbourhoods to foodies looking for particular types of dining. It could also be used to recommend neighbourhoods to restaurateurs looking to open a specific type of restaurant.

## Conclusion

The purpose of this project was to name the neighbourhood with the highest variety of restaurants as the Restaurant Capital of Toronto, and to create and name five distinct neighbourhood groups, with each group sharing common restaurant varieties. The Harbord, University of Toronto neighbourhood was crowned Restaurant Capital of Toronto. The neighbourhoods of Toronto were clustered into five distinct groups: Asian Appetizers, Choice Chinese, All You Can Eat, Café Central and Pizza Paradise. With this data, John Tory and his team can create a marketing campaign highlighting the diverse restaurants options available in Toronto, and where specific types of restaurants are located.