IBM Data Science Capstone Project- New Apartment

Andre Saito Guerreiro

July 2021

1 Introduction

1.1 Background

The pandemic has caused several changes to our society. One of the effects in the city of São Paulo was a sharp increase in the demand for rental properties. According to [1] during the third trimester of 2020, there was an 18% increase in the number of searches in a popular real state website compared to the same period in 2019. Article [2] states that the number of officialized real state transactions was 336.968, a 37% increase compared to 10 years prior.

One of the many people that moved during that period is my girlfriend. The sudden change to remote work and of her daily habits, along with a loss of income in her family influenced her choice of moving back to her parent household. However, now that the pandemic is (hopefully) nearing its end and the prospect of her job requiring her to return to her office, she is looking for a new place to live.

1.2 Problem

In this project, we intend to use the skills acquired in data scrapping, data wrangling, and machine learning to aid us in the search for a new apartment.

2 Data sources

In this project, we will use data from three different sources.

2.1 Quinto andar

Quinto Andar is one of the most famous real state websites in São Paulo. To obtain the real state information, we access Quinto Andar's API and perform

inquiries. We search for real state in a square area with the two of the edges diagonal to each other located in the following coordinates: (-23.478476683596345,-46.76044092347318)(-23.692276596008664,-46.59753427723765). This square covers most of the city of São Paulo. The result is then filtered considered the following criteria.

- Total rental price (Rent + condominium fee + taxes) larger than 1000,00 BRL and lower than 2800,00 BRL.
- Total number of bedrooms larger than 2.
- Number of parking spots larger than 1.
- Close to train or metro stations.
- Accepts pets.
- Currently available.

2.2 Foursquare

Foursquare is an app, which is purpose is to clients discover and share information about businesses and attractions around designated locations. From Foursquare we obtained data on the venues surrounding each of the remaining apartments after filtering. For each inquiry, it was considered an area with a radius of 800 meters. Although a myriad of information for each venue is provided, only the venue's category was stored. The frequency of the venue's categories is used to aid us in clustering similar locations into clusters. We also add data concerning venues that surround two places that the client has lived before and liked. We call these locations **test locations**. They are being used to choose one cluster after clustering is performed.

2.3 Google Maps

Similar to other large cities in the world, São Paulo has problems with traffic. Therefore transit times from and to work greatly impact the quality of life of their citizens. Using Google Maps "Distance Matrix" API, we calculate the transit time using public transportation from each of the apartments to the client's workplace. This transit time is calculated considering the arrival time at 9 am of the next Monday, counting from the time the code was run.

2.4 Methodology

After obtaining the real state data from Quinto Andar, we filter it according to her preferences. Secondly we calculate the transit time from each of the apartments to her workplace. This information is used to filter the apartments in which the transit time would be longer than 55 minutes. Finally, using Foursquare we analyse the venues surrounding each of the apartments. The

goal here is to select the apartments in locations that are similar to places she has lived before and liked.

References

[1] M. Schlindwein, "Efeito covid: aumenta a procura por aluguel de imóveis no país: Radar," Nov 2020. [Online]. Available: https://veja.abril.com.br/blog/radar/demanda-por-alugueis-em-alta-no-terceiro-trimestre/

[2] E. Veiga, "'da cidade para praia': os paulistanos que aproveitaram pandemia de covid para mudar de casa," Jun 2021. [Online]. Available: https://www.bbc.com/portuguese/brasil-57590323