The Battle of Neighborhoods – Report

1. Introduction and Business Problem
    - Restaurants in Birmingham serve cuisine from every corner of the globe.
    - Regeneration, renewal and grand-scale construction continue apace in Britain's second-largest city.
    - Birmingham is Britain’s second-largest city that offers a refreshing break from the busy towns that surround it.
    - From being a small town to becoming a front runner for its advancements in science, technology, and commerce that gave it names like ‘The City of a 1001 Trades’ and the ‘Workshop of the World.'
    - With a network of canals and parks, the roots of Birmingham go back to the Middle Ages, but now, it is renowned for its multi-cultural residents and a way of life that beautifully blends the past with the present.
    - Birmingham is a major city in England’s West Midlands region, with multiple Industrial Revolution-era landmarks that speak to its 18th-century history as a manufacturing powerhouse.

    Business Problem

    - In this project we will try to find an optimal location for an Indian restaurant. Specifically, this report will be targeted to stakeholders interested in opening an **Indian Restaurant** in **Birmingham**, England, United Kingdom.
    - Since there are lots of restaurants in Birmingham, we will try to detect **locations that are not already crowded with restaurants**. We are also particularly interested in **areas with no Indian restaurants in vicinity**. We would also prefer locations as close to city center as possible.
    - We will use our data science powers to generate a few most promising neighborhoods based on these criteria. Advantages of each area will then be clearly expressed so that best possible final location can be chosen by stakeholders.
2. Data

Data 1: Neighborhood has a total of 16 Boroughs and 73 Neighborhoods. In order to segment the neighborhoods and explore them , we will essentially need a dataset that contains the 16 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood. This dataset exists for free on the web. Link to the dataset is : https://en.wikipedia.org/wiki/B_postcode_area

	PostalCode	Borough	Neighborhood
0	B1	Birmingham	Birmingham City Centre, Broad Street (east)
1	B2	Birmingham	Birmingham City Centre, New Street
2	B3	Birmingham	Birmingham City Centre, Newhall Street
3	B4	Birmingham	Birmingham City Centre, Corporation Street (no...
4	B5	Birmingham	Digbeth, Highgate, Lee Bank

Data 2: Birmingham City geographical coordinates data will be utilized as input for the Foursquare API, that will be leveraged to provision venues information for each

neighborhood. We will use the Foursquare API to explore neighborhoods in Birmingham city.

Indian Restaurant category ID **4bf58dd8d48988d10f941735** is used for retrieving data from Foursquare API.

The coordinates are:
https://github.com/tanaya86/Coursera_Capstone/blob/main/postcode-outcodes.csv

3. Methodology

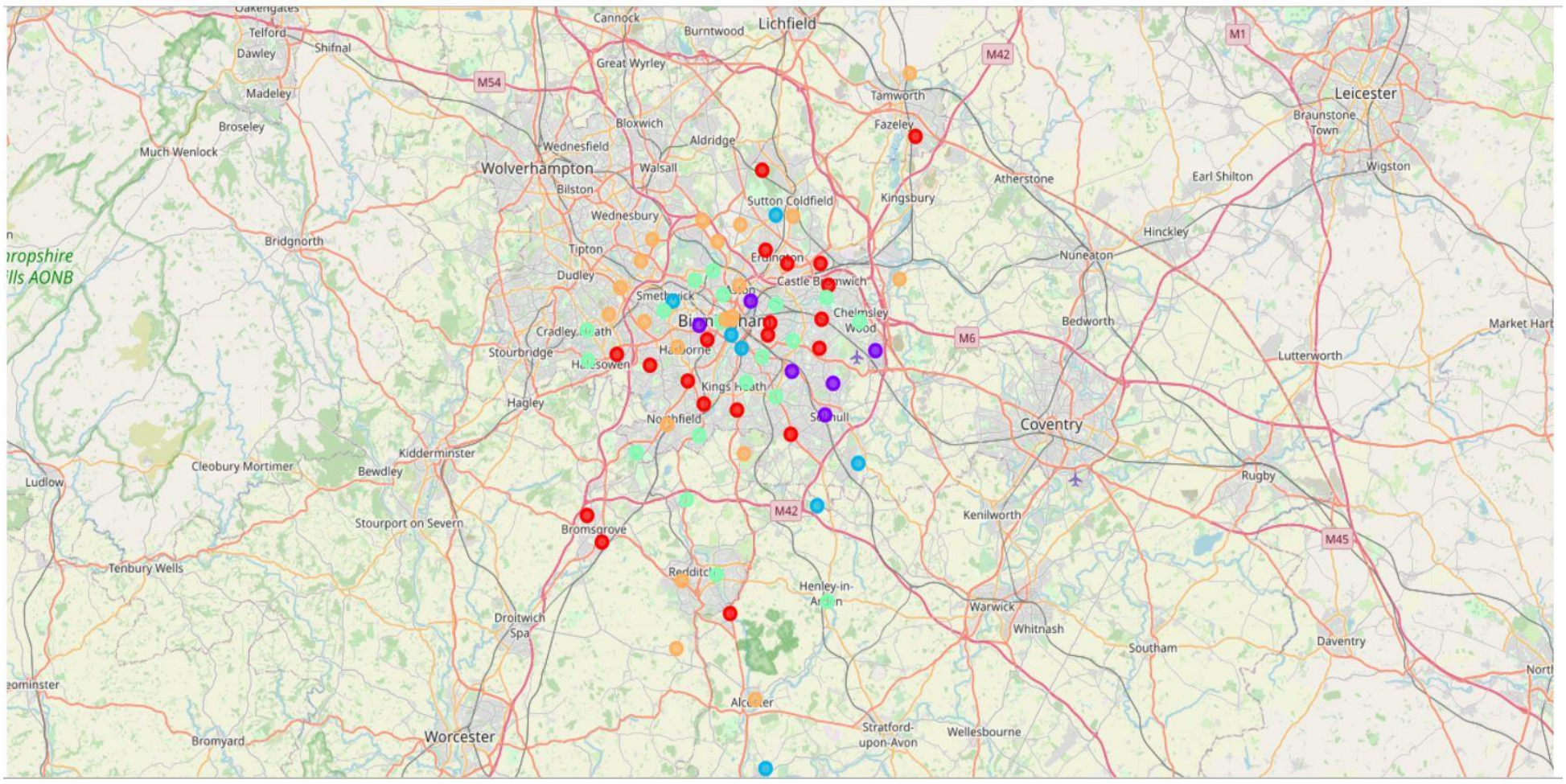
In this project, I will use the basic methodology.

	PostalCode	Borough	Neighborhood	latitude	longitude
0	B1	Birmingham	Birmingham City Centre, Broad Street (east)	52.47872	-1.90723
1	B2	Birmingham	Birmingham City Centre, New Street	52.47871	-1.89692
2	B3	Birmingham	Birmingham City Centre, Newhall Street	52.48051	-1.90134
3	B4	Birmingham	Birmingham City Centre, Corporation Street (no...	52.48231	-1.89397
4	B5	Birmingham	Digbeth, Highgate, Lee Bank	52.46972	-1.89547
5	B6	Birmingham	Aston, Birchfield, Birmingham , Witton	52.50388	-1.88508
6	B7	Birmingham	Nechells, Vauxhall	52.49307	-1.87185
7	B8	Birmingham	Washwood Heath, Ward End, Saltley	52.49034	-1.84092
8	B9	Birmingham	Bordesley Green, Bordesley	52.47776	-1.84833
9	B10	Birmingham	Small Heath	52.46967	-1.85130
10	B11	Birmingham	Sparkhill, Sparkbrook, Tyseley	52.45440	-1.85871
11	B12	Birmingham	Balsall Heath, Sparkbrook, Highgate	52.45982	-1.88225

After That, we will explore function to get Indian Restaurant categories in each neighborhood.

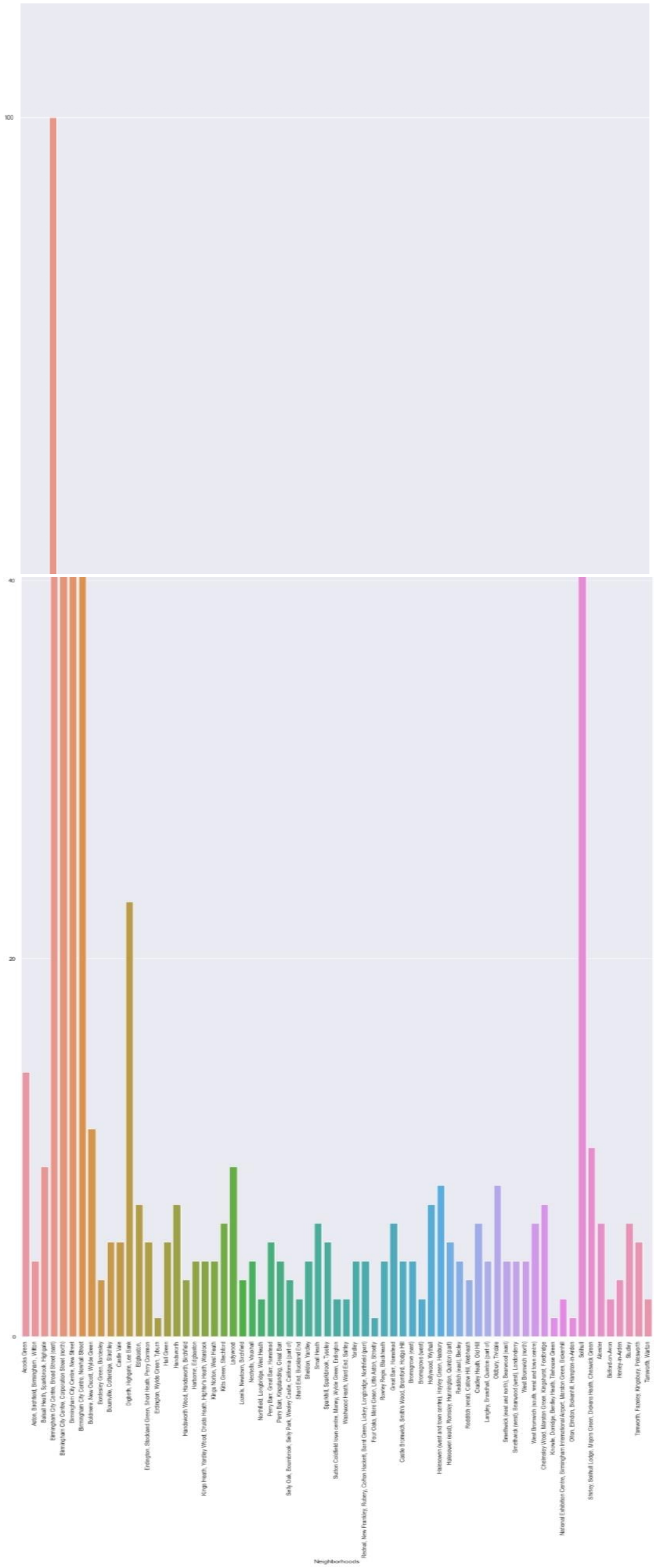
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Northfield, Longbridge, West Heath	52.40772	-1.97207	King Khan	52.407100	-1.972820	Indian Restaurant
1	Northfield, Longbridge, West Heath	52.40772	-1.97207	Simla	52.401978	-1.982330	Indian Restaurant
2	Northfield, Longbridge, West Heath	52.40772	-1.97207	Royal Spice	52.411327	-1.973516	Indian Restaurant
3	Northfield, Longbridge, West Heath	52.40772	-1.97207	Spicey	52.405797	-1.978549	Indian Restaurant
4	Northfield, Longbridge, West Heath	52.40772	-1.97207	Balti Bar	52.407472	-1.966069	Indian Restaurant

Then to group the neighborhoods into clusters K-means clustering algorithm will be used. And to visualize the neighborhoods in Birmingham and its emerging clusters.



4. Result

- Bar Plot of number of venues per neighborhood


100
40
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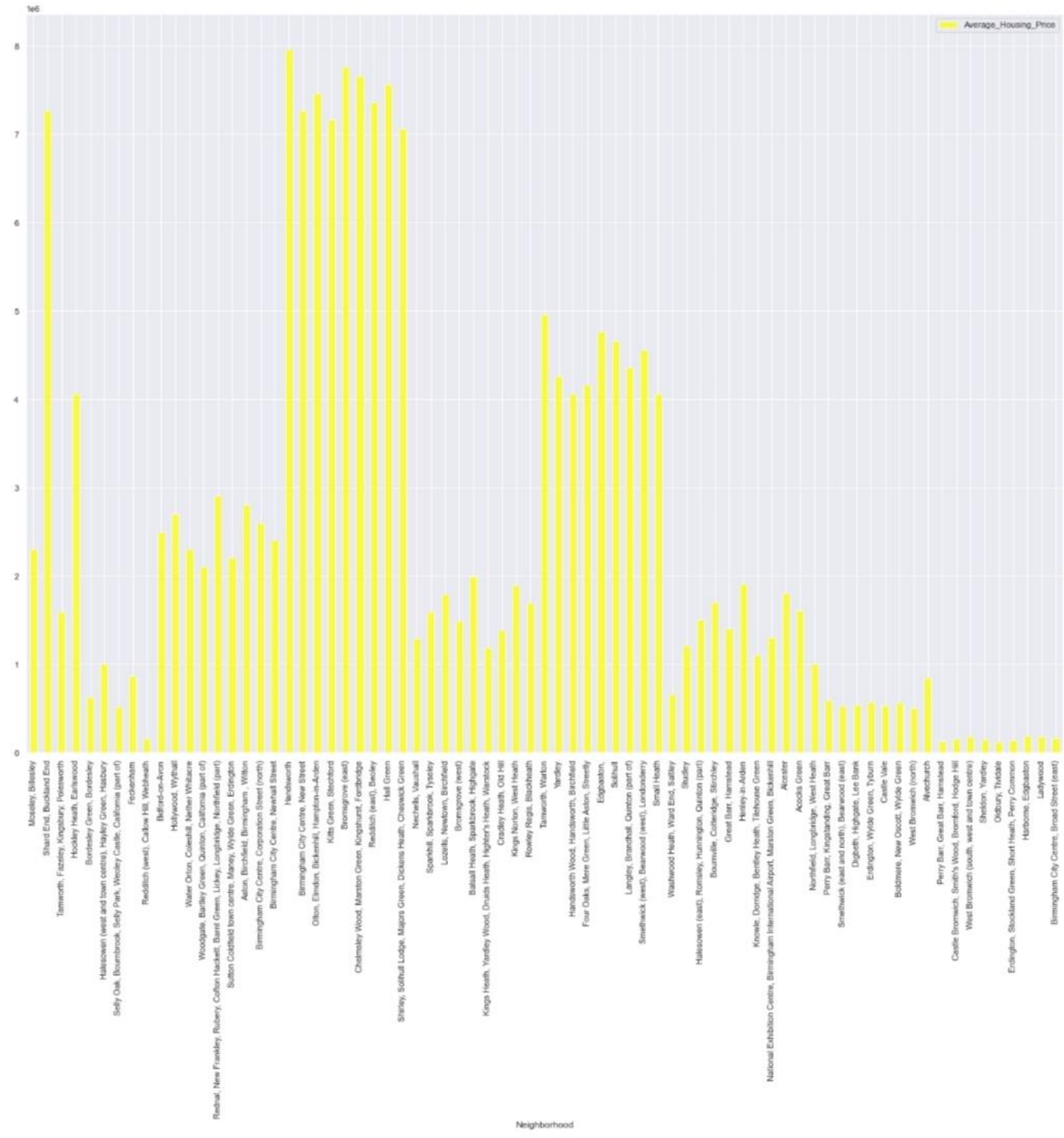
0
Neighborhoods

- Average Housing Prices In Birmingham to look the cheapest price for Buying a place for a restaurant



- Based on dataframe of Indian restaurants, except the places in a dataframe we can decide about the remaining places to open a new Indian restaurant.

5. Discussion

   The major purpose of this project, is to suggest a better neighborhood in a new city for the person who wants to open a new Indian restaurant. Social presence in society in terms of like minded people. Connectivity to the airport, bus stand, city center, markets and other daily needs things nearby.

- Sorted list of house in terms of housing prices in a ascending or descending order
- Sorted list of places having Indian Restaurant

6. Conclusion

Purpose of this project was to identify Birmingham areas with low number of Indian restaurants in order to aid stakeholders in narrowing down the search for optimal location for an Indian restaurant. Clustering of those locations was then performed in order to create major zones of interest (containing greatest number of potential locations) and addresses of those zone centers were created to be used as starting points for final exploration by stakeholders.

Final decision on optimal Indian restaurant location will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone, taking into consideration additional factors like attractiveness of each location (proximity to park or water), levels of noise / proximity to major roads, real estate availability, prices, social and economic dynamics of every neighborhood etc.