BATTLE OF NEIGHBORHOOD

– Selecting Neighbourhood of Pune

1. Introduction:

Someone who loves to research on places before visiting them, the idea of finding best of Pune is exciting. As a new visitor it is difficult to find out best places to visit in the restricted time period and also to find something which really suits their liking. Someone might just be happy looking at a sunset, while someone else might seek adventure. There are people who find calm in books while others want to see castles from their fairy tales. Foodies to drinkers, meditators to explorers everyone is a stakeholder to this problem. Every person who visits a new location faces this problem to find suitable top rated locations of their liking.

Most of the websites provide a list of top 10 or top 20 places to visit in a specific city, which is difficult to conclude if these lists would fulfil a user's need to find places which the locals like the most and would also suit his/her taste. Hence as part of this Capstone project I tried solving this problem by finding various venue options available to a tourist based on his or her liking. And further, suggested which neighbourhood is best for them to stay, rent or buy property.

Using this Project I tried to segregate different neighbourhoods to find different types of locations based on the surrounding.

2. Data

To solve the problem, I have used a sample data from a website with neighbourhood details of Pune. This data contains neighbourhoods in Pune and added all this data to a data frame using Pandas.

List of Peths in Pune[1]

Peth Naam	Developed by	Established in	Named for
Kasba Peth	Chalukya kings	0746-53	"Qasba" (Arabic: urban cluster)
Guruwar Peth	Shahaji	1625	Guruwar (Marathi: Thursday)
Somwar Peth	Dadoji Konddev	1636	Somwar (Marathi: Monday)
Mangalwar Peth	Dadoji Konddev	1637	Mangalwar (Marathi: Tuesday)
Shukrawar Peth	Nilopant Mujumdar	1670	Shukrawar (Marathi: Friday)
Raviwar Peth	Nilopant Mujumdar	1670	Raviwar (Marathi: Sunday)
Shaniwar Peth	Moropant Pingale	1675	Shaniwar (Marathi: Saturday)
Bhavani Peth	Sambhaji	1682	Named after a temple dedicated to the Hindu goddess, Bhavani located here.

3. Methodology:

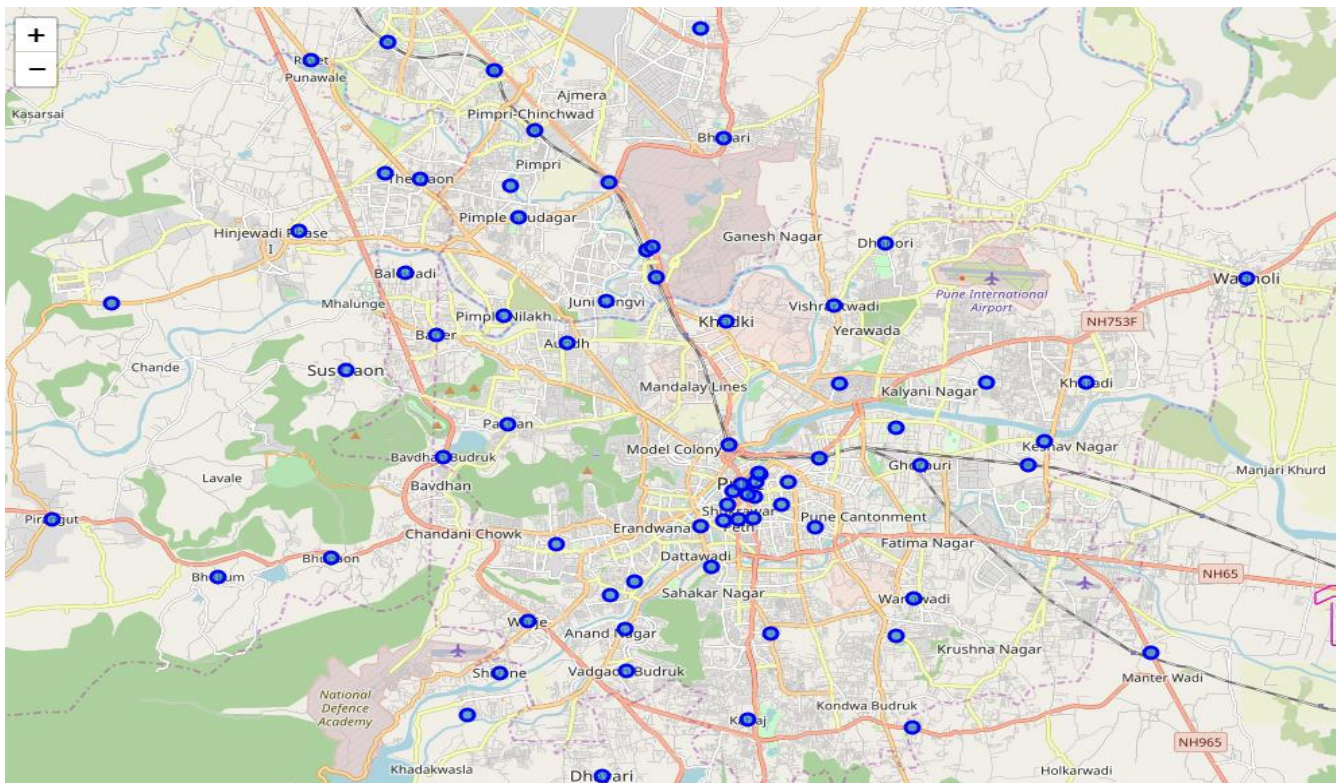After creating data frame, I gathered the Latitude and Longitude details of the neighbourhood.

	Neighbourhood	City	Latitude	Longitude
0	Kasba Peth	Pune	18.521905	73.858290
1	Guruwar Peth	Pune	18.511359	73.857620
2	Somwar Peth	Pune	18.528877	73.874415
3	Mangalwar Peth	Pune	18.524339	73.859208
4	Shukrawar Peth	Pune	18.511354	73.854011

Further, I have used foursquare API to find out the popular venues around Pune within 500m of the neighbourhoods. The list of venues and categories of these venues are mapped in each category.

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pune_venues.head()
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	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Kasba Peth	18.521905	73.85829	Lal Mahal	18.518720	73.856556	Historic Site
1	Kasba Peth	18.521905	73.85829	Shaniwar Wada	18.520151	73.855187	Historic Site
2	Guruwar Peth	18.511359	73.85762	Raja Dinkar Kelkar museum	18.510744	73.854389	History Museum
3	Guruwar Peth	18.511359	73.85762	Shrikrishna Bhuvan	18.513494	73.855074	Snack Place
4	Guruwar Peth	18.511359	73.85762	Shree Wadeshwar Bhuvan	18.510753	73.853748	Vegetarian / Vegan Restaurant

Then Using python folium library to visualize geographic details, I plotted all Neighbourhoods on map of Pune.
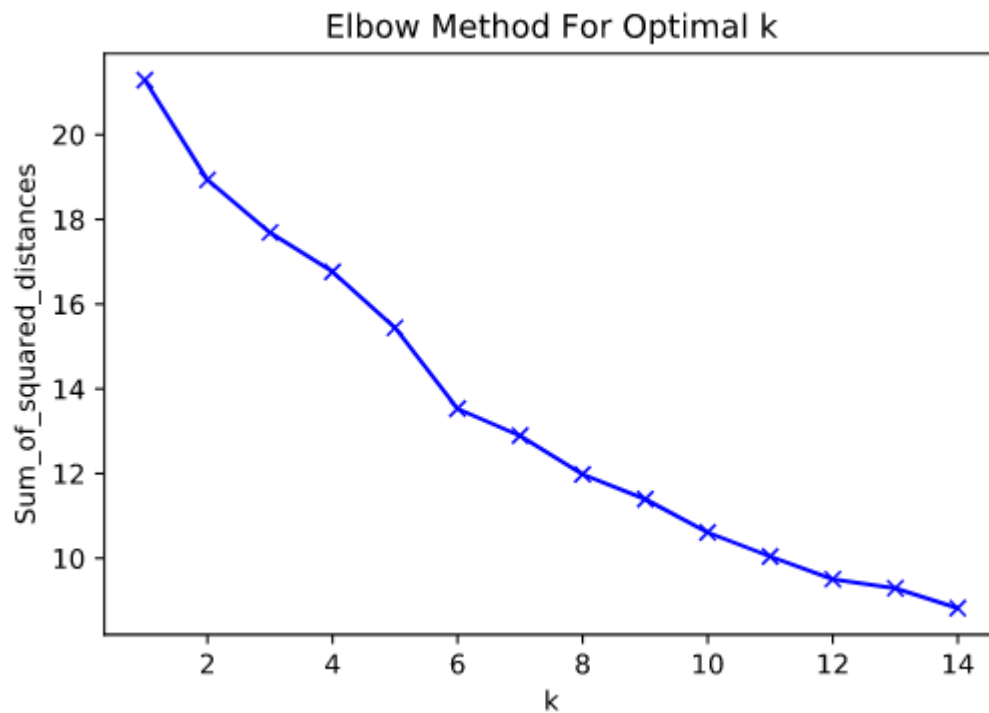
I utilized the Foursquare API to explore the neighbourhood and segment them. I designed the limit as 100 venues and the radius 500 meter for each neighbourhood from their given latitude and longitude information. Here is a head of the list Venues name, category, latitude and longitude information from Foursquare API.

After that I created a table which shows list of top 10 venue category for each borough in below table.

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
0	Akurdi	Indian Restaurant	Fast Food Restaurant	Café	Train	Asian Restaurant	Tea Room	Bakery	Platform	Snack Place
1	Aundh	Indian Restaurant	Fast Food Restaurant	Sporting Goods Shop	Snack Place	Shopping Mall	Breakfast Spot	Korean Restaurant	Plaza	Coffee Shop
2	Balewadi	IT Services	Garden	Electronics Store	Falafel Restaurant	Farmers Market	Fast Food Restaurant	Flea Market	Food	Food Court
3	Baner	Indian Restaurant	Fast Food Restaurant	Café	Ice Cream Shop	Health & Beauty Service	Convenience Store	Grocery Store	Motorcycle Shop	Snack Place
4	Bavdhan Budruk	Indian Restaurant	Fast Food Restaurant	Lake	Zoo	Garden	Falafel Restaurant	Farmers Market	Flea Market	Food

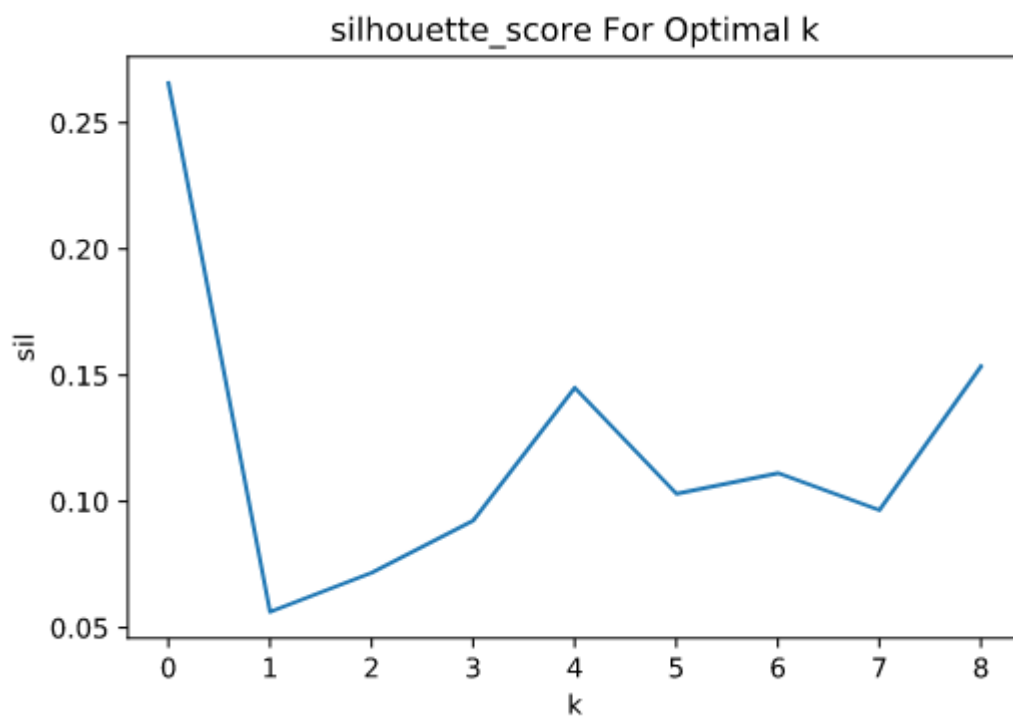Next to cluster data first I tried to find out the best value of k by 2 methods

1. Elbow Method
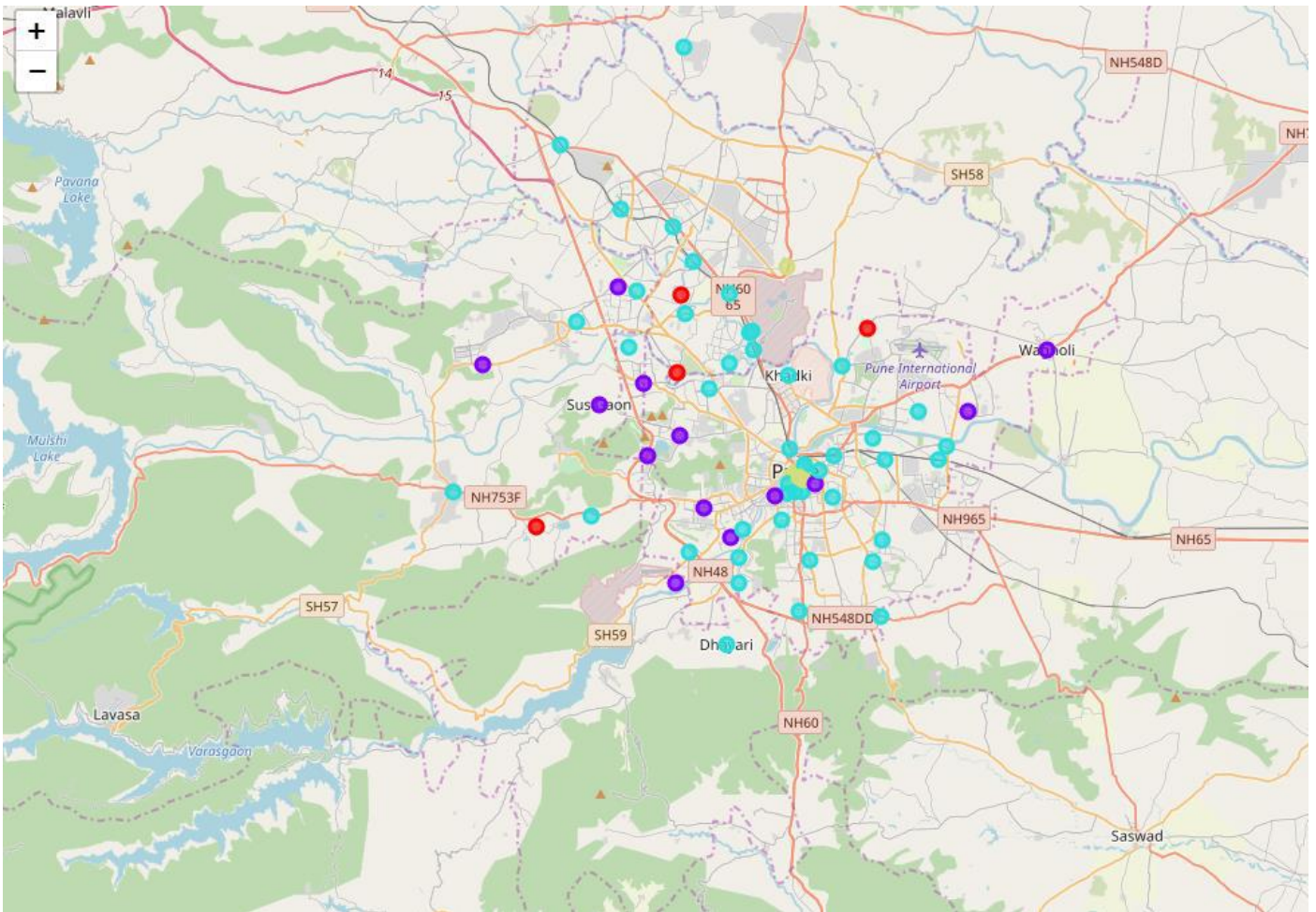

Elbow Method For Optimal k

Elbow method could not give the proper result in finding best k as elbows at 3 and 4 but not clear hence we try one more method

2. Silhouette score

silhouette_score For Optimal k

Highest peak at 4, so selecting K = 4

Finally, I used K-Means Clustering to get the top 10 most common venues by each neighbourhood. This clusters when plotted on the graph we can easily see the different Neighbourhoods divided into clusters.

4. Result:

As result I got 4 clusters of Pune based on different venue categories

After analysis clusters are named as below:

Cluster 1: Village Places

Cluster 2: Traditional places

Cluster 3: Modern places

Cluster 4: Historic places

5. Discussion:

Based on Result people can select their choice of location to stay, rent or purchase any property in Pune.

1. People who like traditional food (Mainly Indian), parks and flea market in nearby areas can choose areas in Traditional cluster
2. People who like modern living with pubs, cafes and mall nearby can choose areas in Modern cluster
3. People who are workers or students of History who like historical places and major markets around them can choose Historical cluster
4. People who want to stay away from the city life can select village cluster

6. Conclusion:

I was able to form 4 clusters which suggest user specific neighbourhood to stay when they are in Pune.

Cluster 1: Village Places

Cluster 2: Traditional places

Cluster 3: Modern places

Cluster 4: Historic places

7. References:

1. https://en.wikipedia.org/wiki/List_of_neighbourhoods_in_Pune#Old_city
2. https://en.wikipedia.org/wiki/List_of_neighbourhoods_in_Pune
3. Foursquare API
4. VS code