

IBM DATA SCIENCE APPLIED DATA SCIENCE CAPSTONE

Bengaluru Real Estate Data Analysis

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Problem

- The Real Estate of Bengaluru is developing rapidly and it is quite expensive to buy a plot of land.
- Thus, it is very important to know the information regarding any neighborhood while investing in any real estate.
- Data Science analysis can help us obtain meaningful insights for any investor who is planning to invest in real estate.

Factors Influencing the Analysis

- Neighborhood Site Price Data in Rupees per Square Feet for prices estimation.
- Kaveri River Water Availability based on the supply of water in number of days in a week in each neighborhood.

Note: River Kaveri is the major river which supplies water to Bengaluru. Other supplies of water would be small lakes and groundwater. Here Kaveri water availability is used in the analysis.

- The question of how close are important venues like metro, hospital, grocery store, clothing store, bank etc. to the neighborhood, is a very important factor which comes in play while buying any plot of land.

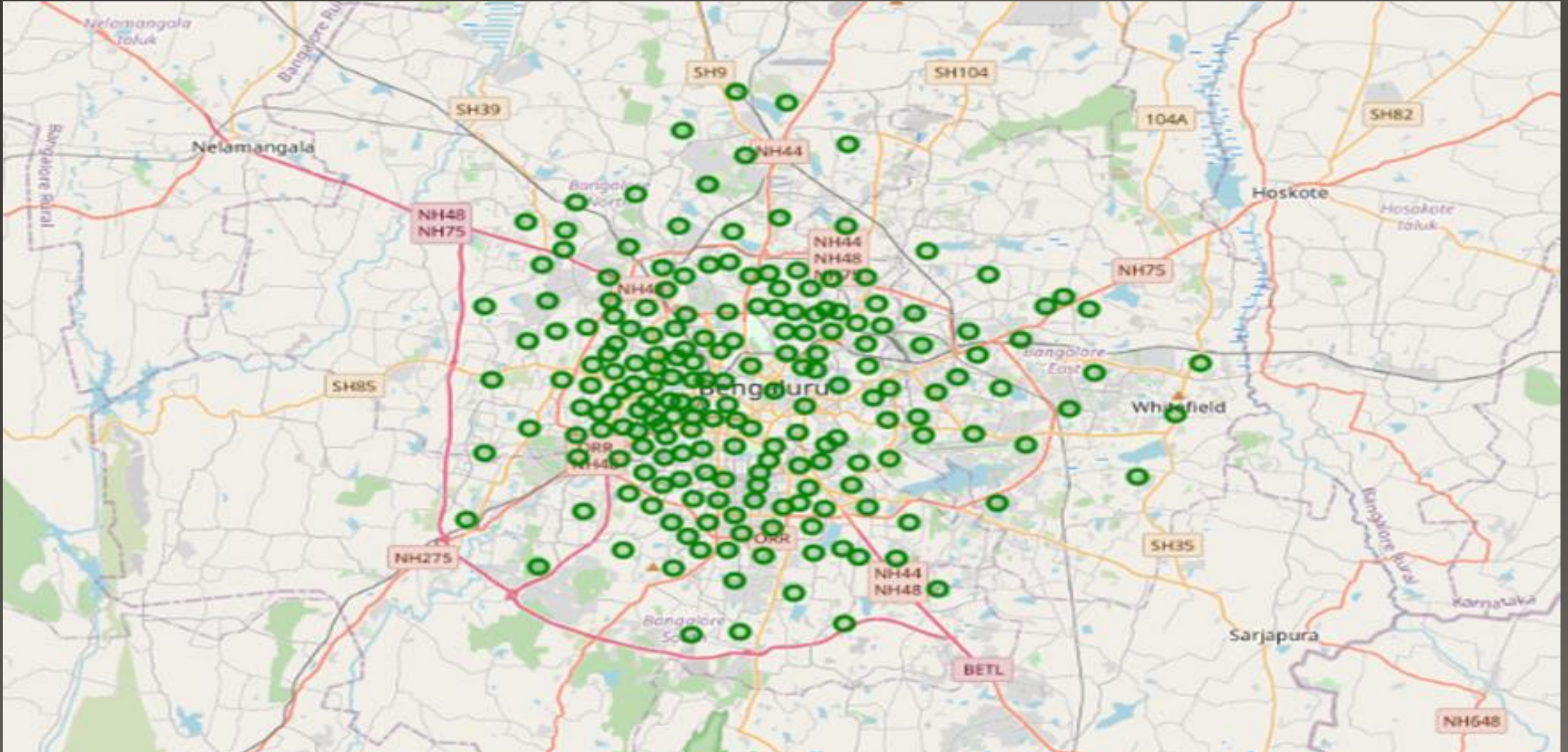
Data Cleaning and Preparation

- The 198 wards are matched with the Site prices manually in Excel Sheet.
- The 198 wards all have their latitude, longitude and population.
- The data of Kaveri data has timings related to the availability of water in a week.

	Borough	Neighborhood	Latitude	Longitude	Population	Price	Kaveri
0	Yelahanka	Chowdeswari Ward	13.121710	77.580420	19626	3644	2
1	Yelahanka	Atturu	13.102805	77.560036	24020	3295	2
2	Yelahanka	Yelahanka Satellite Town	13.090986	77.583920	25782	3900	2
3	K.R. Puram	Vijnanapura	13.006063	77.669560	35087	5840	0
4	K.R. Puram	Basavanapura	13.016847	77.715454	22012	4000	0

Map of Bengaluru

- Using the neighborhood coordinates, Folium Map is used to Visualize the Map of Bengaluru.



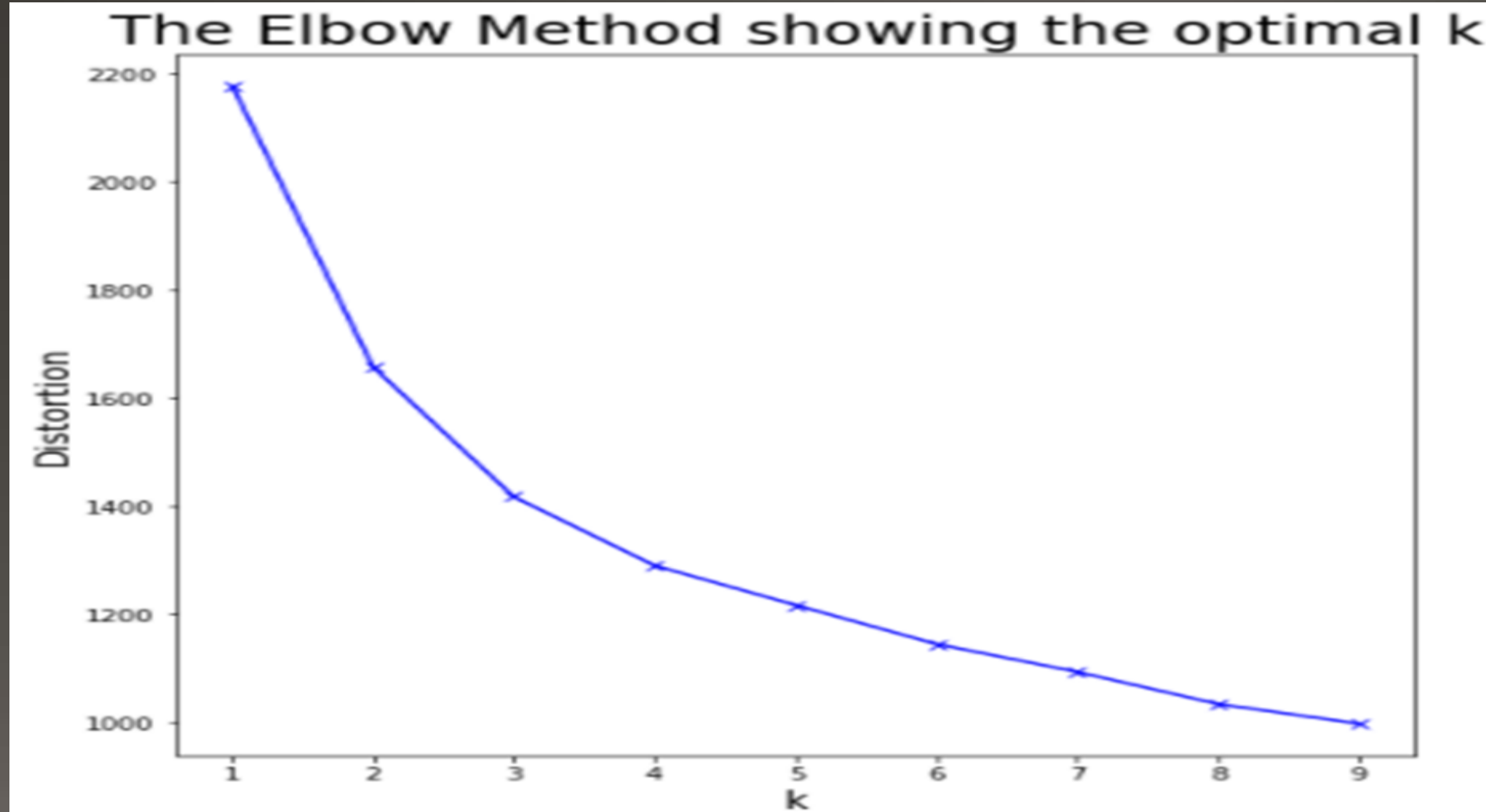
Foursquare API

- Foursquare API is called for getting the minimum distance of venues like Metro, Hospitals, Banks etc. from a given coordinates for data analysis.

Unnamed: 0		Neighborhood	Latitude	Longitude	Price	Metro	Hospital	Grocery	School	University	Movie	Clothing	Sports	Bank	Kaveri
0	0	Chowdeswari Ward	13.121710	77.580420	3844.0	5000	1842	3133	525	1007	3427	2817	2408	1272	2
1	1	Atturu	13.102805	77.580038	3295.0	5000	1380	1441	1501	1942	2853	1788	2110	1879	2
2	2	Yelahanka Satellite Town	13.090988	77.583920	3900.0	5000	758	1250	975	807	1271	337	794	524	2
3	3	Vijnanapura	13.006083	77.689580	5840.0	1855	823	744	910	930	1588	727	854	929	0
4	4	Basavanapura	13.018847	77.715454	4000.0	5000	949	882	1085	1132	3028	2189	780	789	0

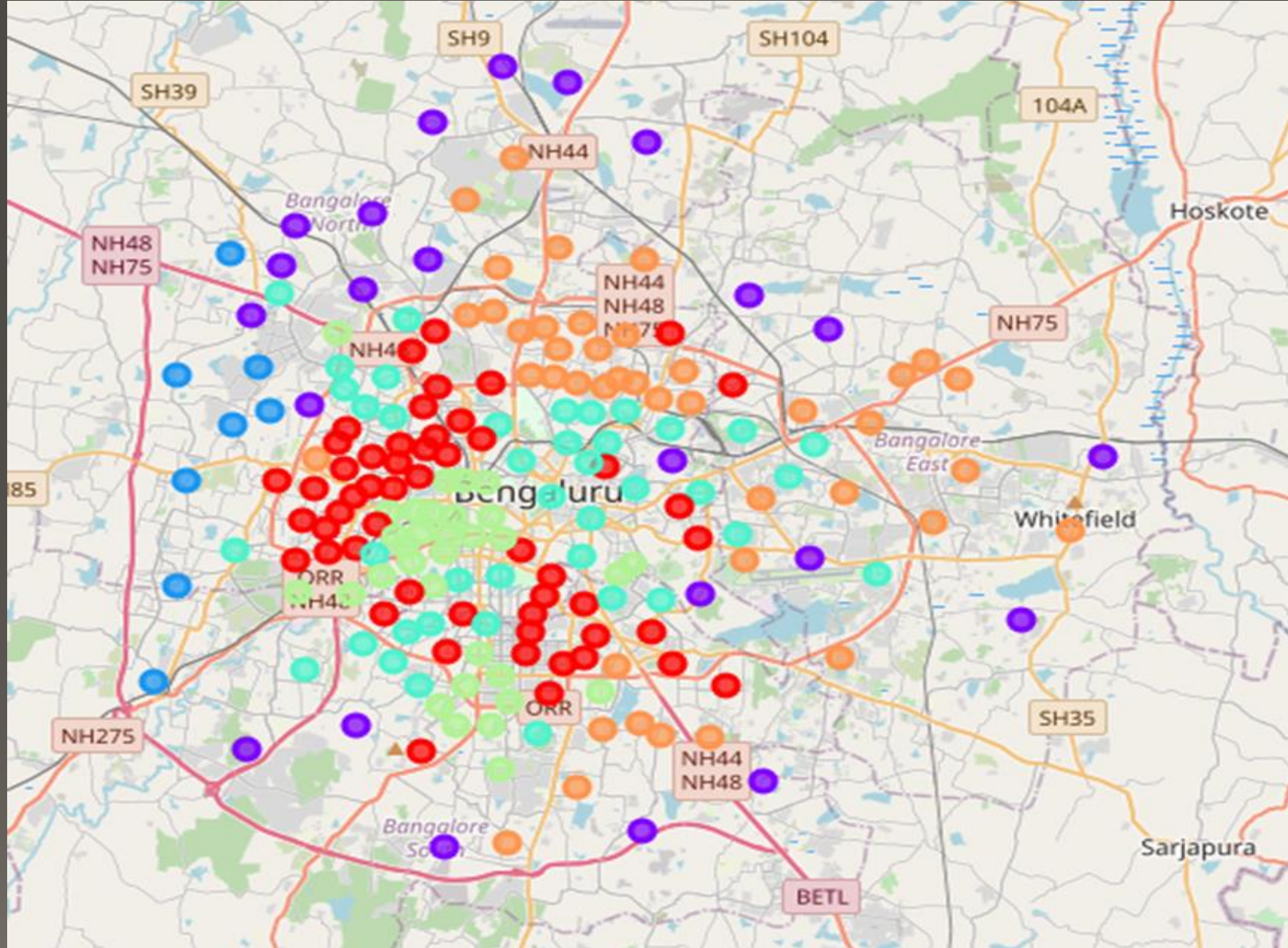
Elbow Method

- Elbow method is used to find the optimal value of k-value for clustering. Here 6 is selected as the K-value.



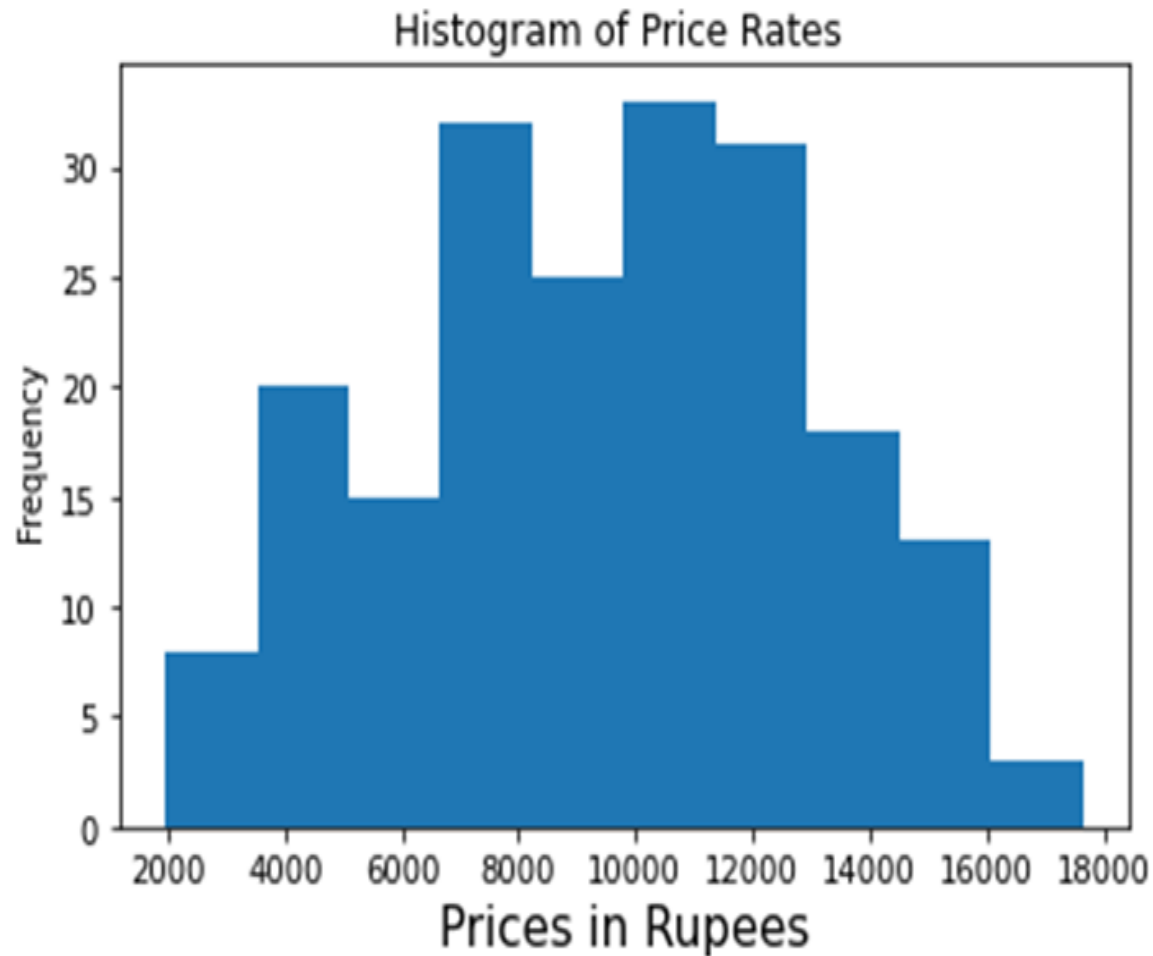
K-Means Clustering

- K-means clustering is done to cluster the 198 wards.
- A value of 6 was given to the algorithm.
- All clusters are mapped using Folium library for good visualization.

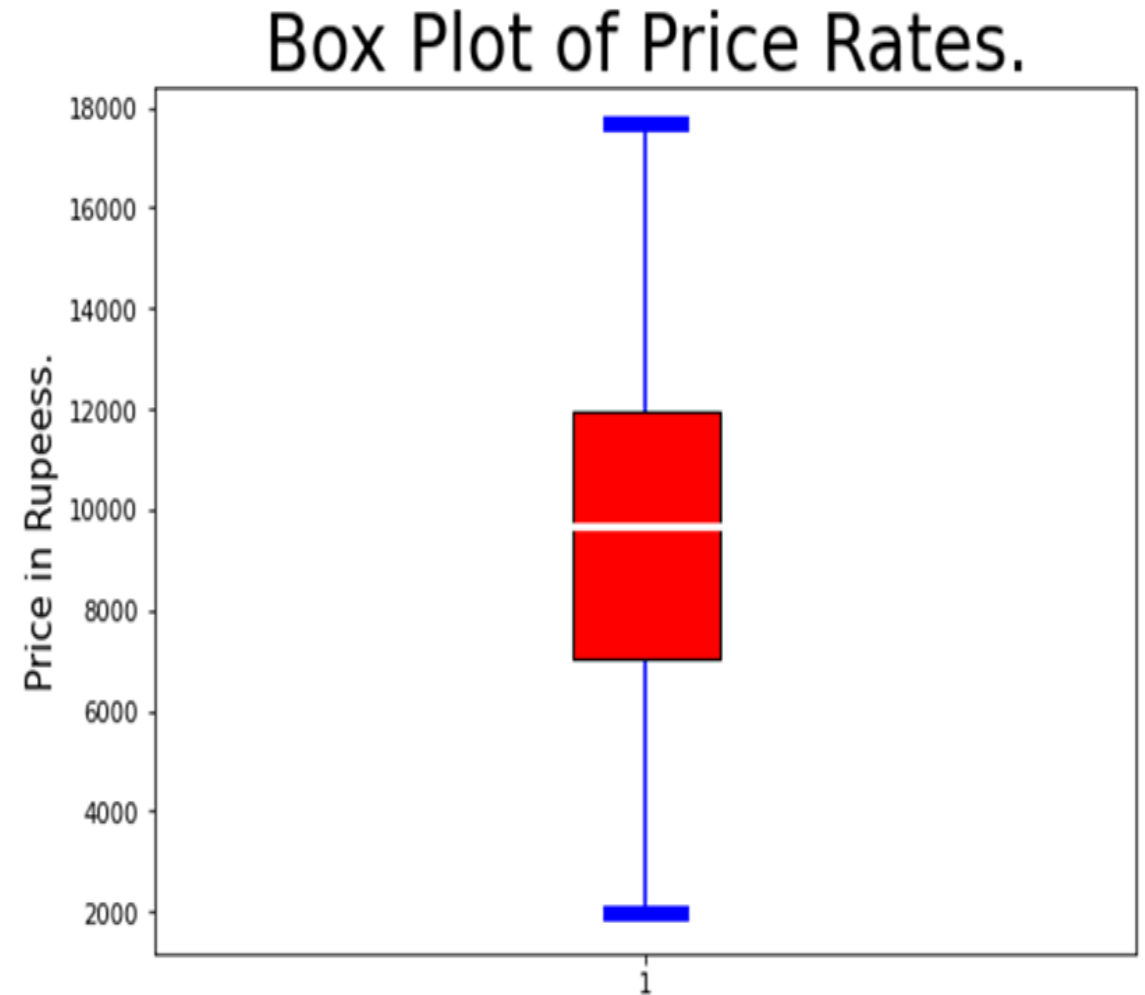


Results

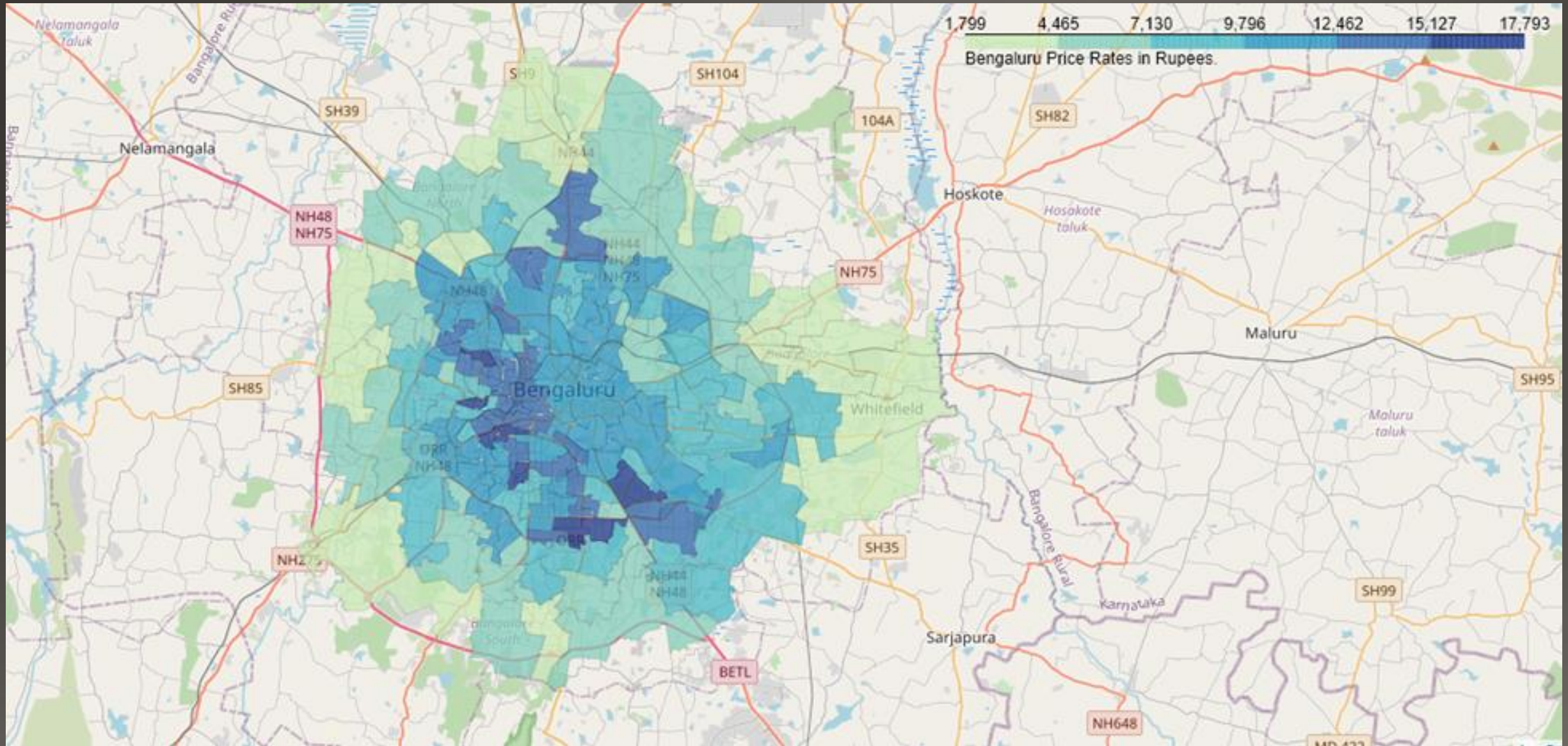
- Histogram of Price distribution:



- Box Plot for Mean Price determination:



Choropleth Map of Price Distribution



A map of Bengaluru and its surrounding regions, including Hosakote taluk, Maluru taluk, and parts of Karnataka. The map is color-coded to show water distribution based on the day of the week. A legend at the top right indicates the color scale: 0 (lightest yellow), 1, 2, 4, 5, 6, and 7 (darkest brown). The map shows various roads (NH48, NH75, SH39, SH104, SH82, SH85, SH95, SH99, SH35, NH648, NH44, NH46, NH75, NH48, NH2, BETL) and locations (Nelamangala, Hoskote, Maluru, Whitefield, Sarjapura, Bengaluru North, Bengaluru South, Bengaluru Rural, Hosakote taluk, Maluru taluk, Karnataka). The distribution is highest (darkest brown) in the central urban area of Bengaluru and lowest (lightest yellow) in the surrounding rural areas.

Dashboard

Dash

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Bengaluru Real Estate Information

Choose Neighborhood:

Select a Neighborhood

Chowdeswari Ward

Atturu

Yelahanka Satellite Town

Vijnanapura

Basavanapura

Hudi

Bengaluru Real Estate Price

Bengaluru Kaveri Water Cl

Bengaluru Clustered Map I

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Bengaluru Real Estate Information

Choose Neighborhood:

Katriguppe

Neighborhood	Price in Rs per SQ.FT.	Metro Closeby	Hospital Closeby	Grocery Closeby	Schools Closeby	Movie Theaters Closeby	Clothing Store Closeby	University Closeby	Sports Center Closeby	Bank Closeby	Kaveri Water Availability (No of days in a week)	Population
Katriguppe	11233.65	Deepanjali Nagar Metro Station (Metro Station) Proximity: 2825 mts	Diavista Multi Speciality Hospital (Hospital) Proximity: 647 mts	Nilgiri's (Supermarket) Proximity: 3599 mts	Jumbo Kids (Nursery School) Proximity: 701 mts	Screen 2, Gopalan cinemas (Multiplex) Proximity: 1112 mts	INMARK (Clothing Store) Proximity: 506 mts	Indian Institute Of Foreign Languages (University) Proximity: 1031 mts	Revive Fitness Hub (Gym / Fitness Center) Proximity: 526 mts	Andra Bank ATM (Bank) Proximity: 195 mts	4	35736

Cluster Analysis

1. Cluster 1:

- Average Price: Rs. 11000 Rate: 4.0/5
- Kaveri Water in a week: 4 days Rate: 4.0/5
- Excellent Facilities Nearby. Rate: 4.5/5
- Far from Metro Rate: 3.5/5

2. Cluster 2:

- Average Price: Rs. 5400 Rate: 2.5/5
- Kaveri Water in a week: 2-1 days Rate: 2.0/5
- Facilities are quite far. Rate: 3.0/5
- Very Far from Metro. Rate: 1.0/5

3. Cluster 3:

- Average Price: Rs. 4600 Rate: 2.0/5
- Kaveri Water in a week: 2-0 days Rate: 2.0/5
- Facilities are quite far away Rate: 3.0/5
- Very Far from Metro. Rate: 1.0/5

4. Cluster 4:

- Average Price: Rs. 9700 Rate: 3.75/5
- Kaveri Water in a week: 3-1 days Rate: 3.0/5
- Excellent Facilities Nearby. Rate: 2.5/5
- Metro is quite far. Rate: 3.0/5

5. Cluster 5:

- Average Price: Rs. 12200 Rate: 4.0/5
- Kaveri Water in a week: 4 days Rate: 4.0/5
- Excellent Facilities Nearby. Rate: 4.5/5
- Very Near to Metro. Rate: 4.5/5

6. Cluster 6:

- Average Price: Rs. 7600 Rate: 3.5/5
- Kaveri Water in a week: 2-0 days Rate: 2.2/5
- Very Good Facilities Nearby. Rate: 4.0/5
- Very Far from Metro. Rate: 1.0/5

References

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5. Bengaluru Wards Geojson: https://raw.githubusercontent.com/datameet/Municipal_Spatial_Data/master/Bangalore/BBMP.GeoJSON
6. Bengaluru Kaveri Water Supply: https://www.bwssb.gov.in/watter_supply.php
7. Venues Data: Foursquare API
8. Bengaluru wards data: <https://opencity.in/cc2b165a-d44a-49d7-b077-4bc6123ca6ab>