Segmentation of Places

A cluster based machine learning approach to segment places and provide some valuable insights to the stakeholders

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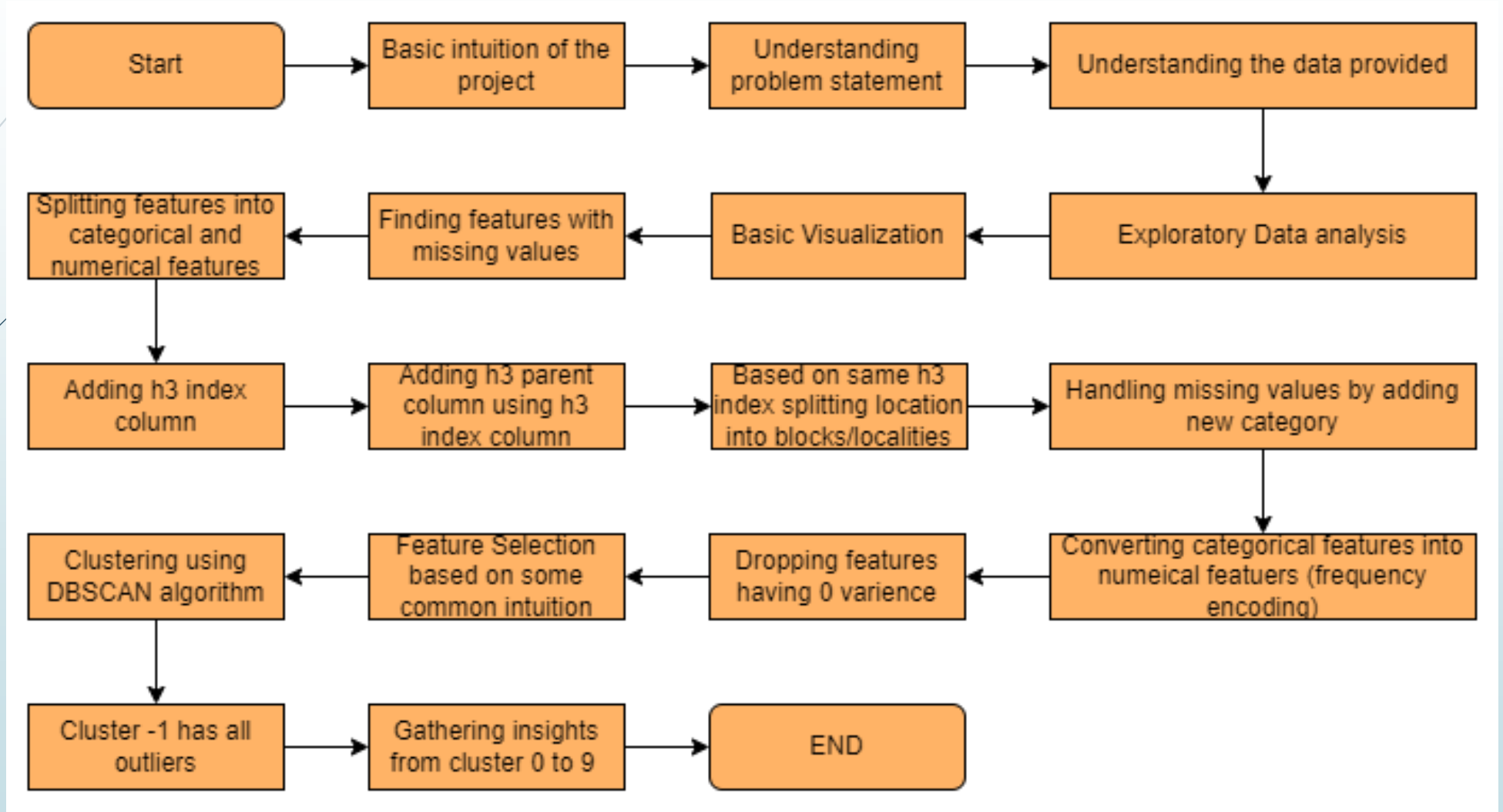
01-11-2022

Flowchart


Start
Basic intuition of the project
Understanding problem statement
Understanding the data provided
Exploratory Data analysis
Basic Visualization
Finding features with missing values
Splitting features into categorical and numerical features
Adding h3 index column
Adding h3 parent column using h3 index column
Based on same h3 index splitting location into blocks/localities
Handling missing values by adding new category
Converting categorical features into numeical featuers (frequency encoding)
Dropping features having 0 varience
Feature Selection based on some common intuition
Clustering using DBSCAN algorithm
Cluster -1 has all outliers
Gathering insights from cluster 0 to 9
END

Problem Statement

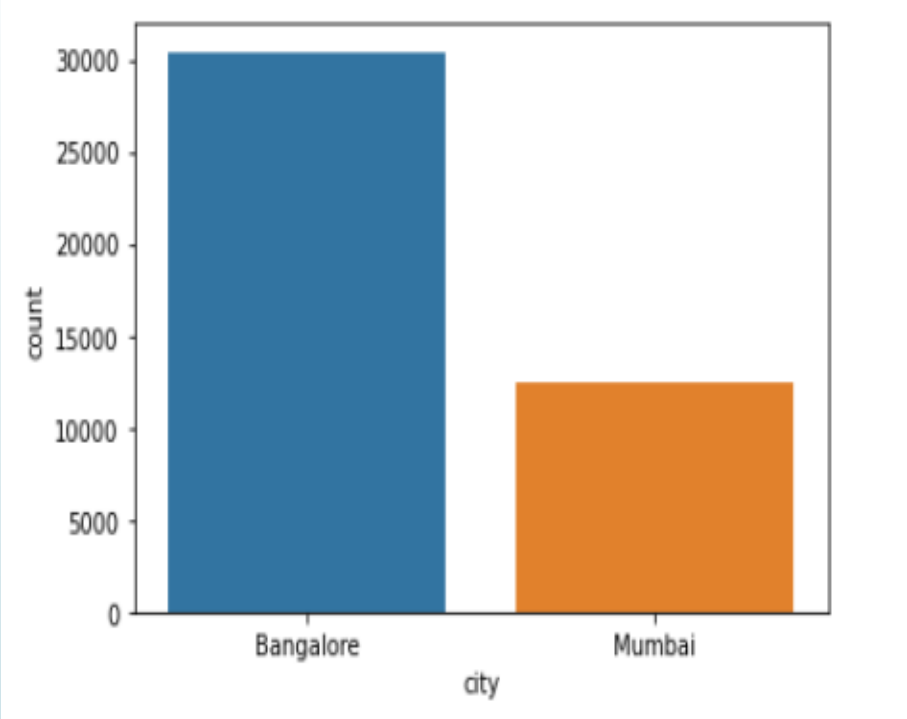
- You will be given POI (Point of Interest) data from OSM (openstreetmaps).
- These POIs will include locations ranging from grocery stores, shopping malls to car dealerships within the city.
- You may also enrich your POI (point of interest, meaning, what type of place- showroom/ building/ outlet/ shop etc.) data using any location data available on the web (that you can extract/scrape).
- Your goal is to divide the city geographically into various blocks/localities. Next you are supposed to create clusters of similar localities and characterize each cluster so that these clusters are human interpretable.

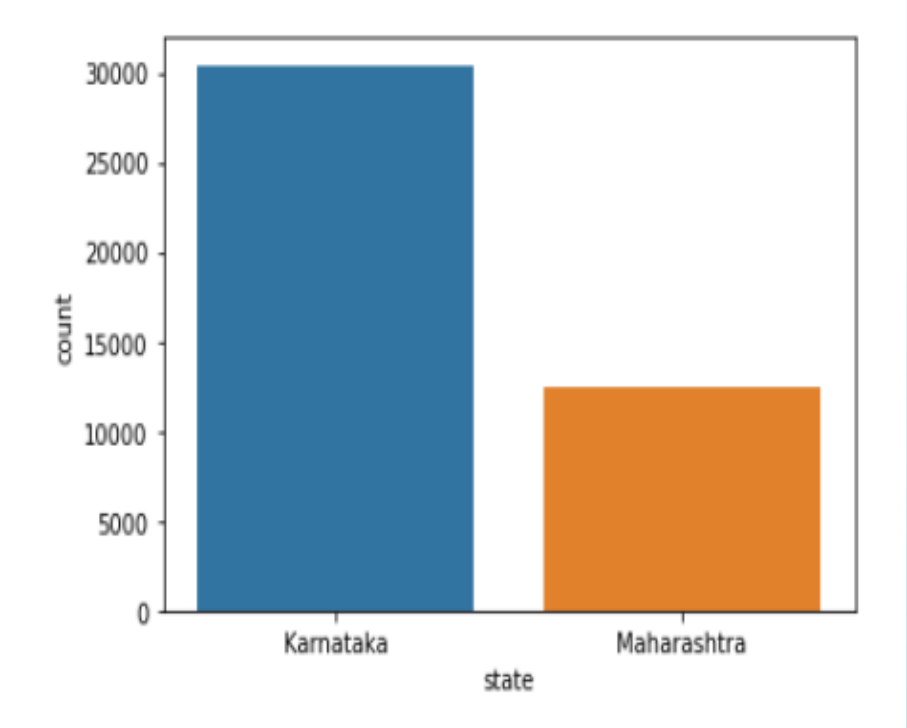
Data Description

The schema of OSM data is given below:

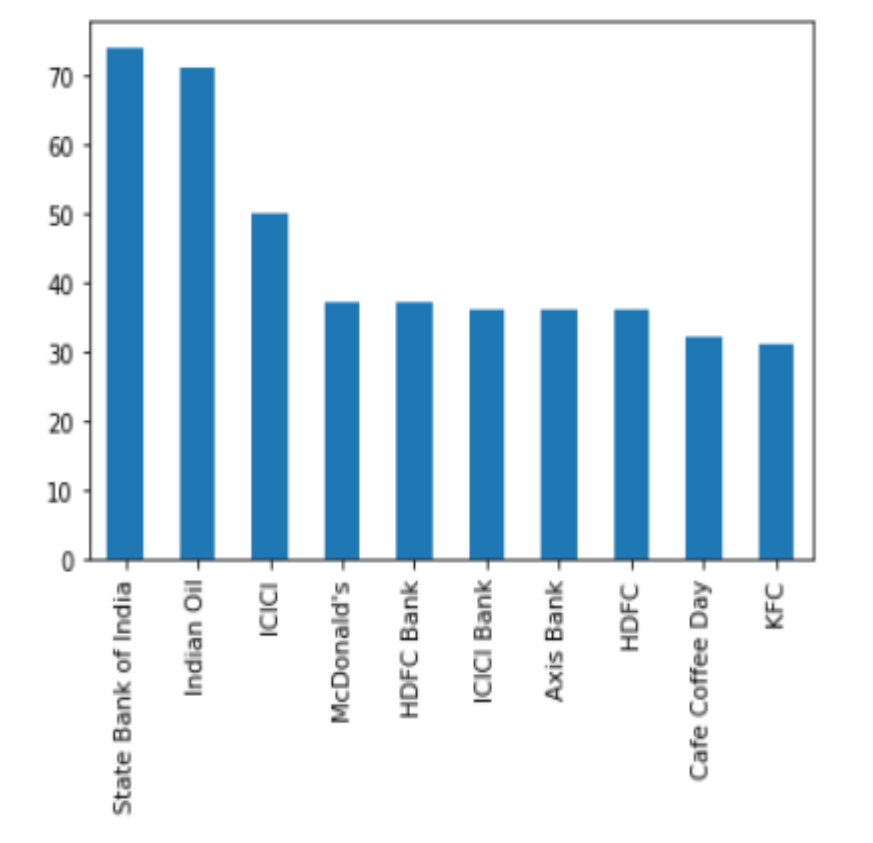
- 1. source: source from where the data was collected
- 2. poi_code: unique identifier of the POI
- 3. name: name of the POI
- 4. poi_type: type of POI (e.g car dealership, shopping mall, etc)
- 5. lat: latitude of the POI
- 6. long: longitude of the POI
- 7. address: address of POI
- 8. city: city of POI
- 9. state: state of POI
- 10. country: country of POI
- 11. pin_code: pincode of POI
- 12. brand: brand information of POI

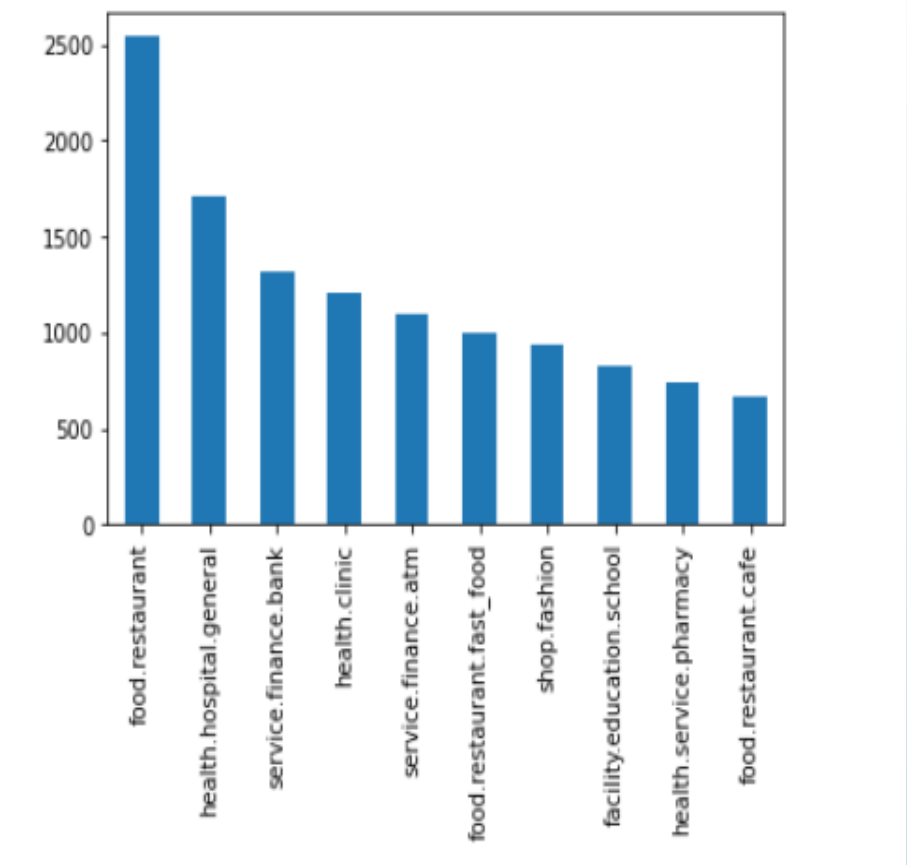
Distribution of data into different cities and states



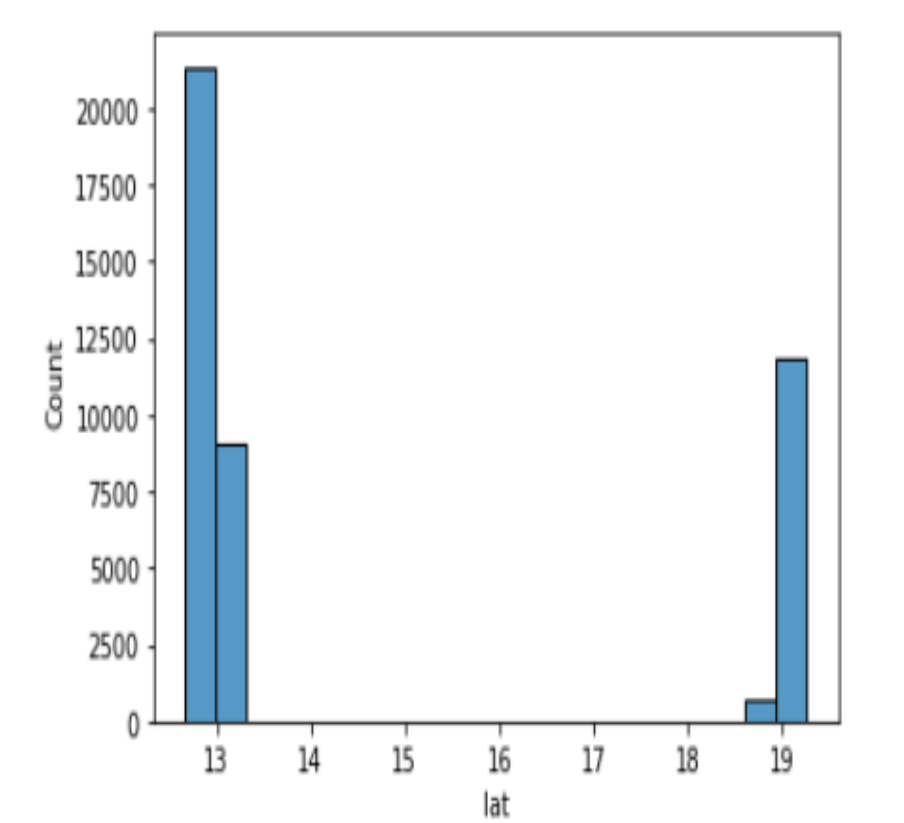


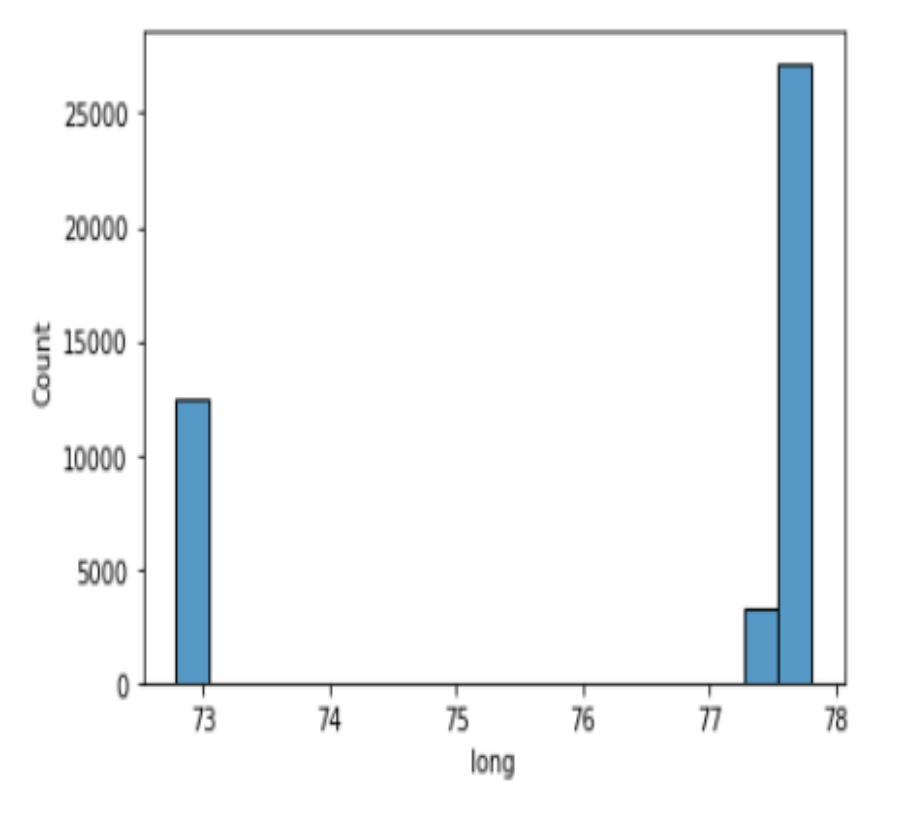
Distribution of top 10 brands and poi_type from dataset



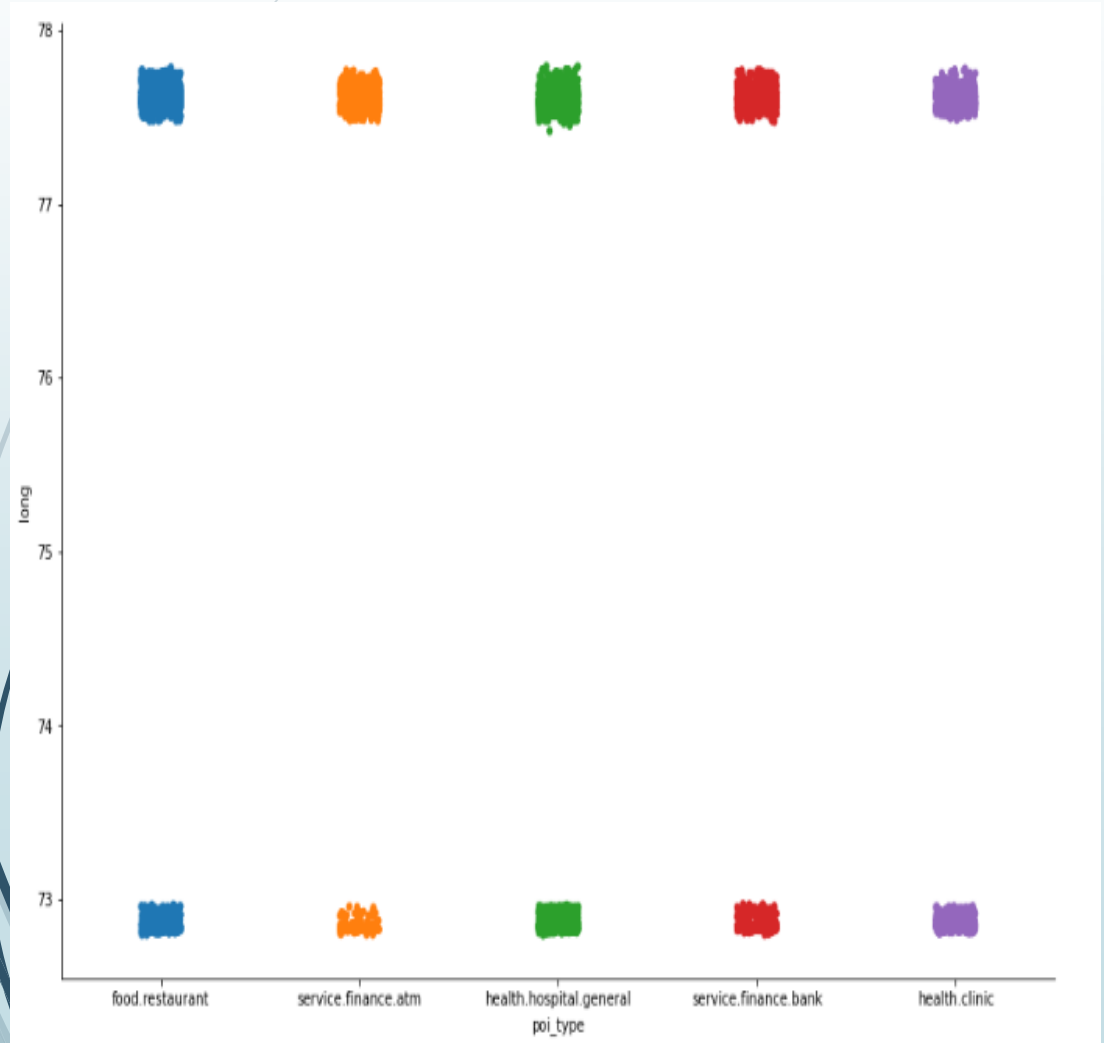


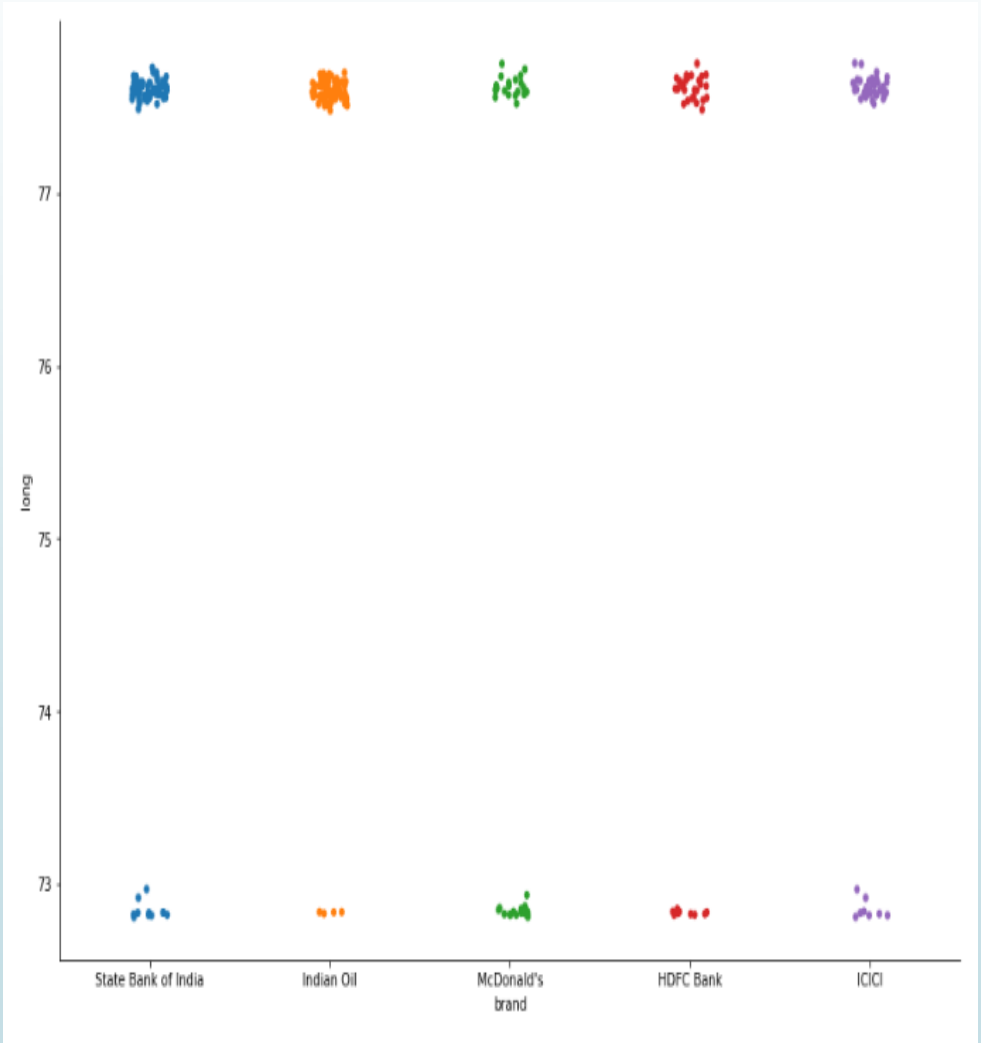
Distribution of latitude and longitude from the given dataset



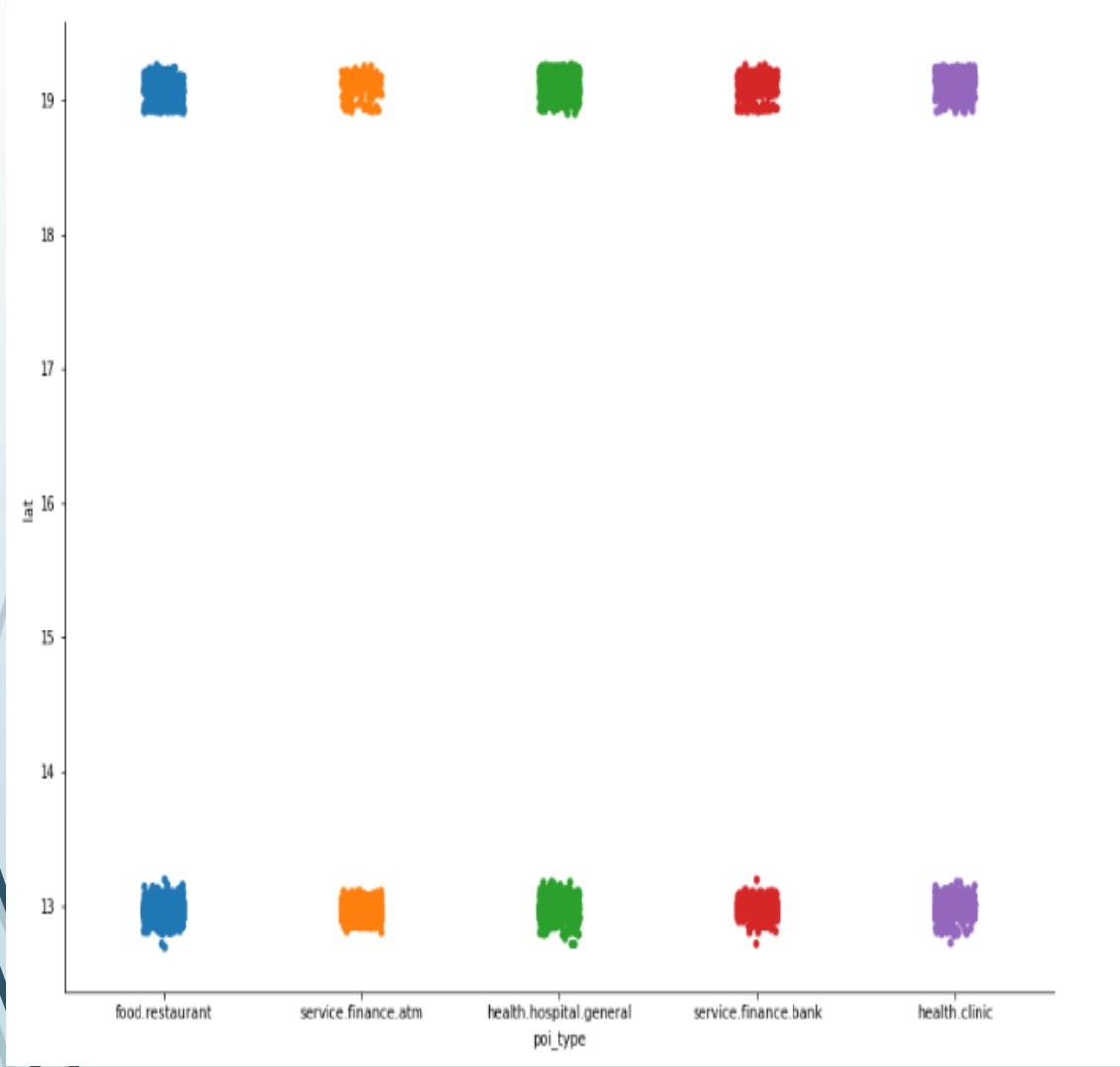


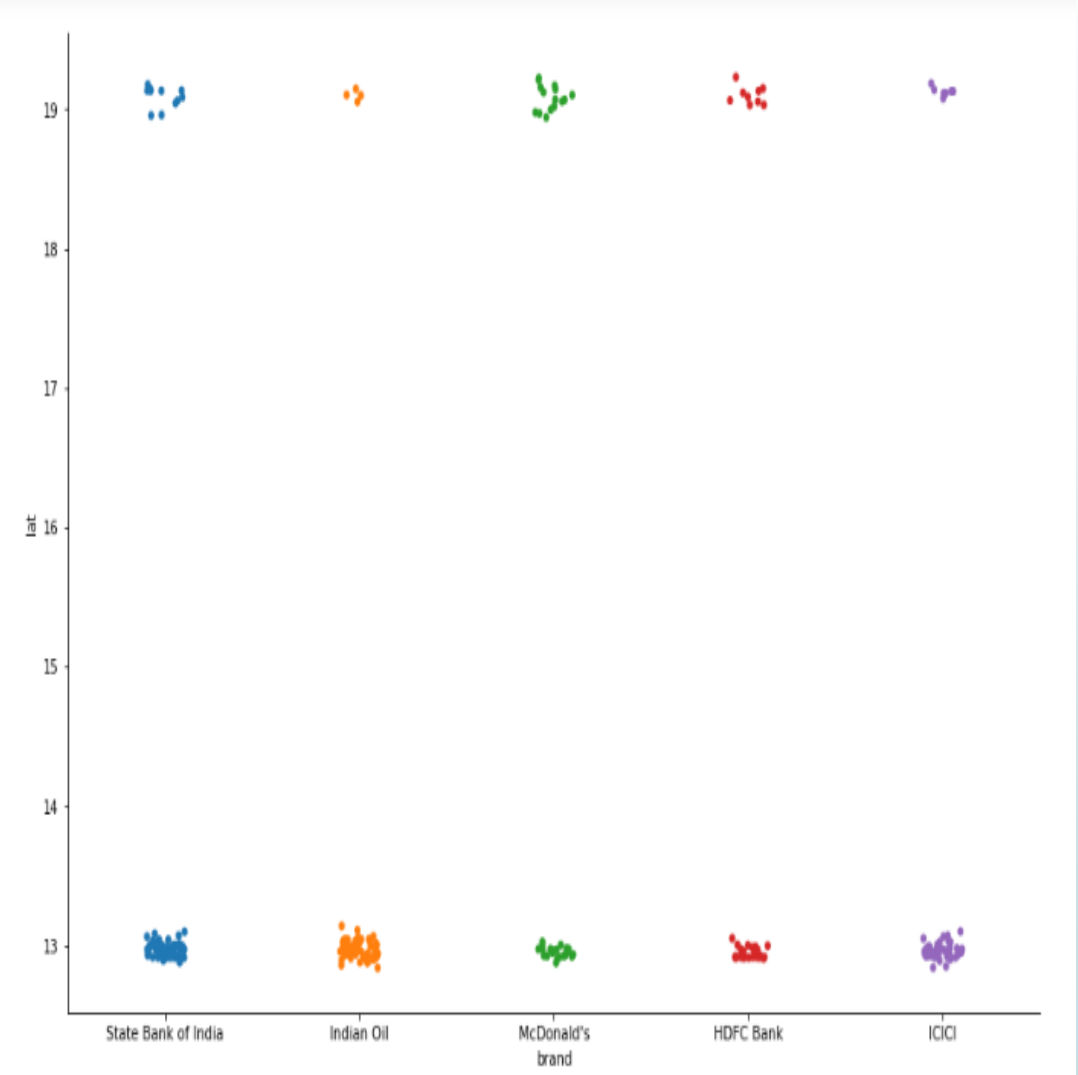
Top 5 poi_type and brands with respect to longitute



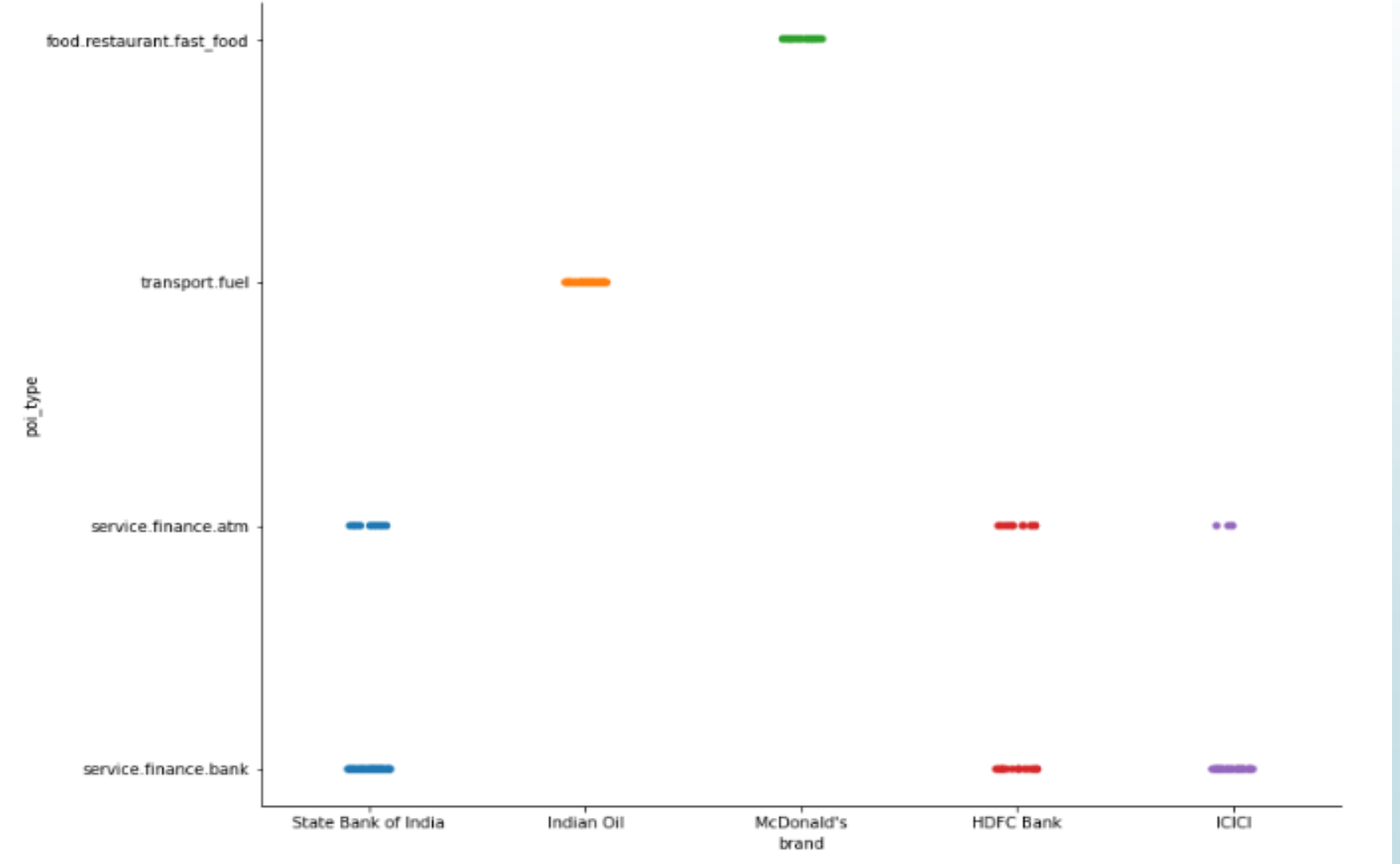


Top 5 poi_type and brands with respect to latitute

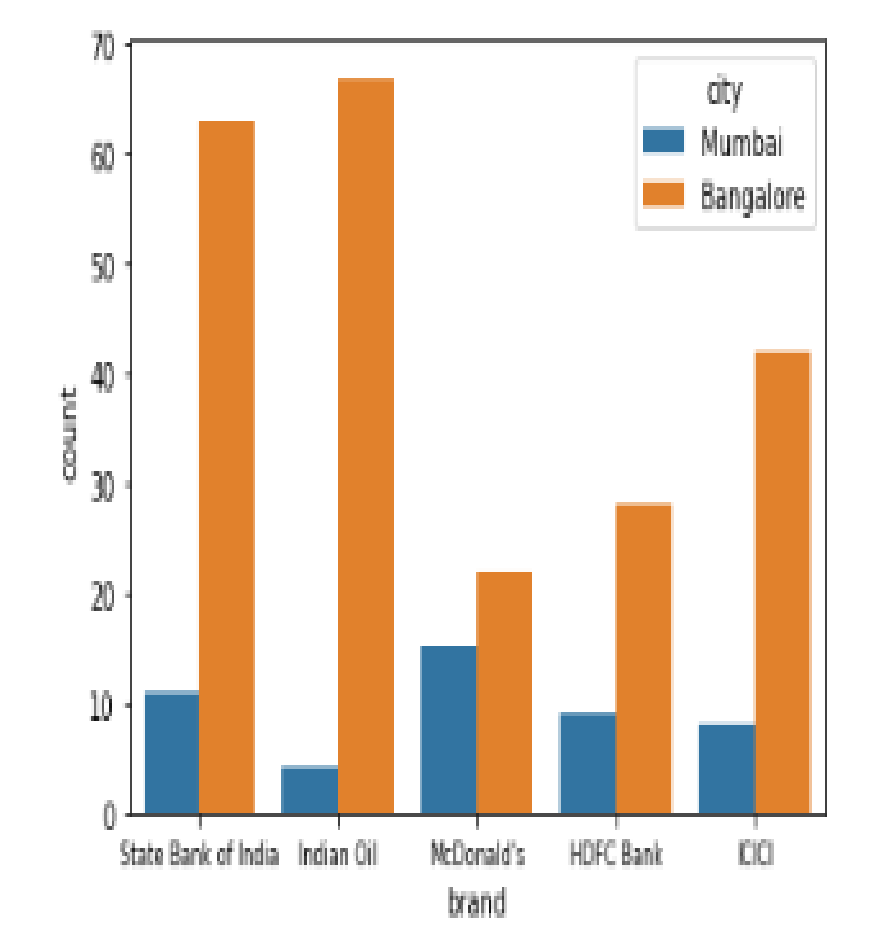


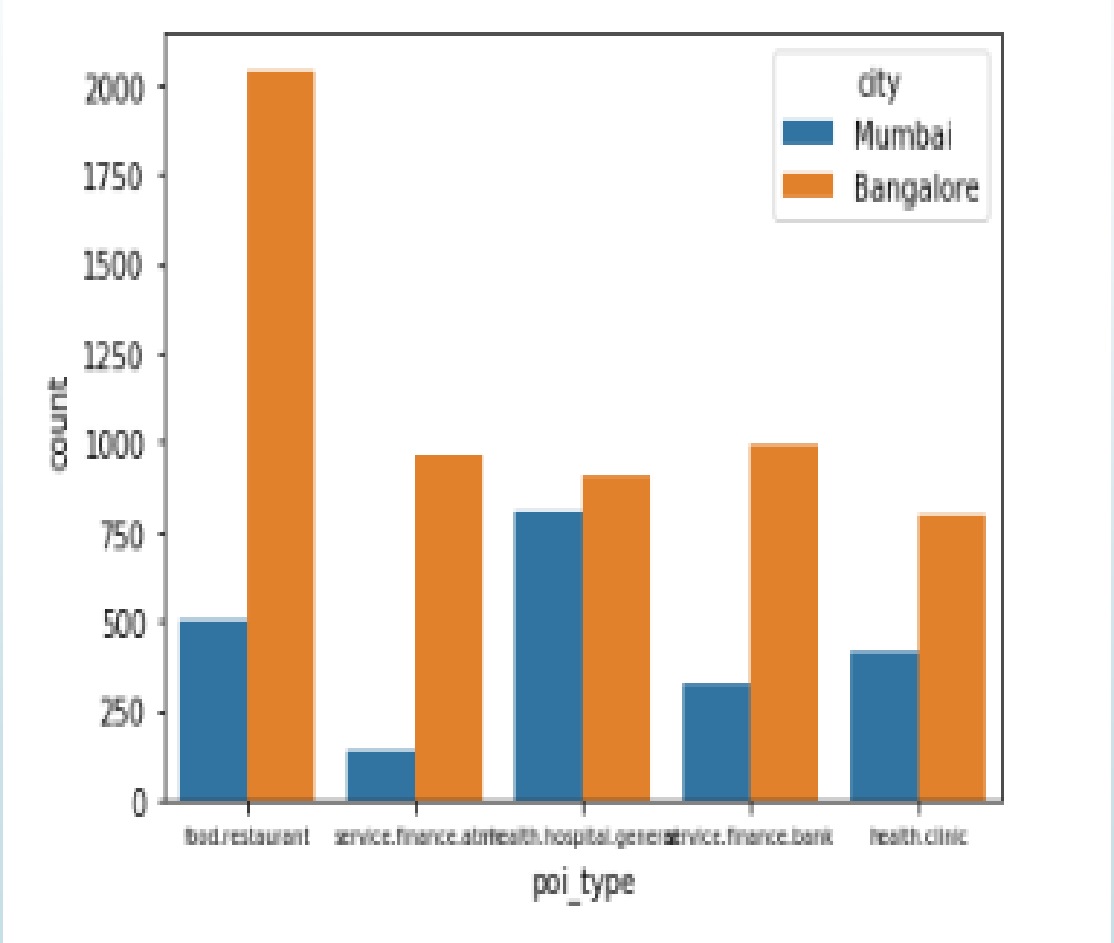


Which top 5 brands represents which poi_types?

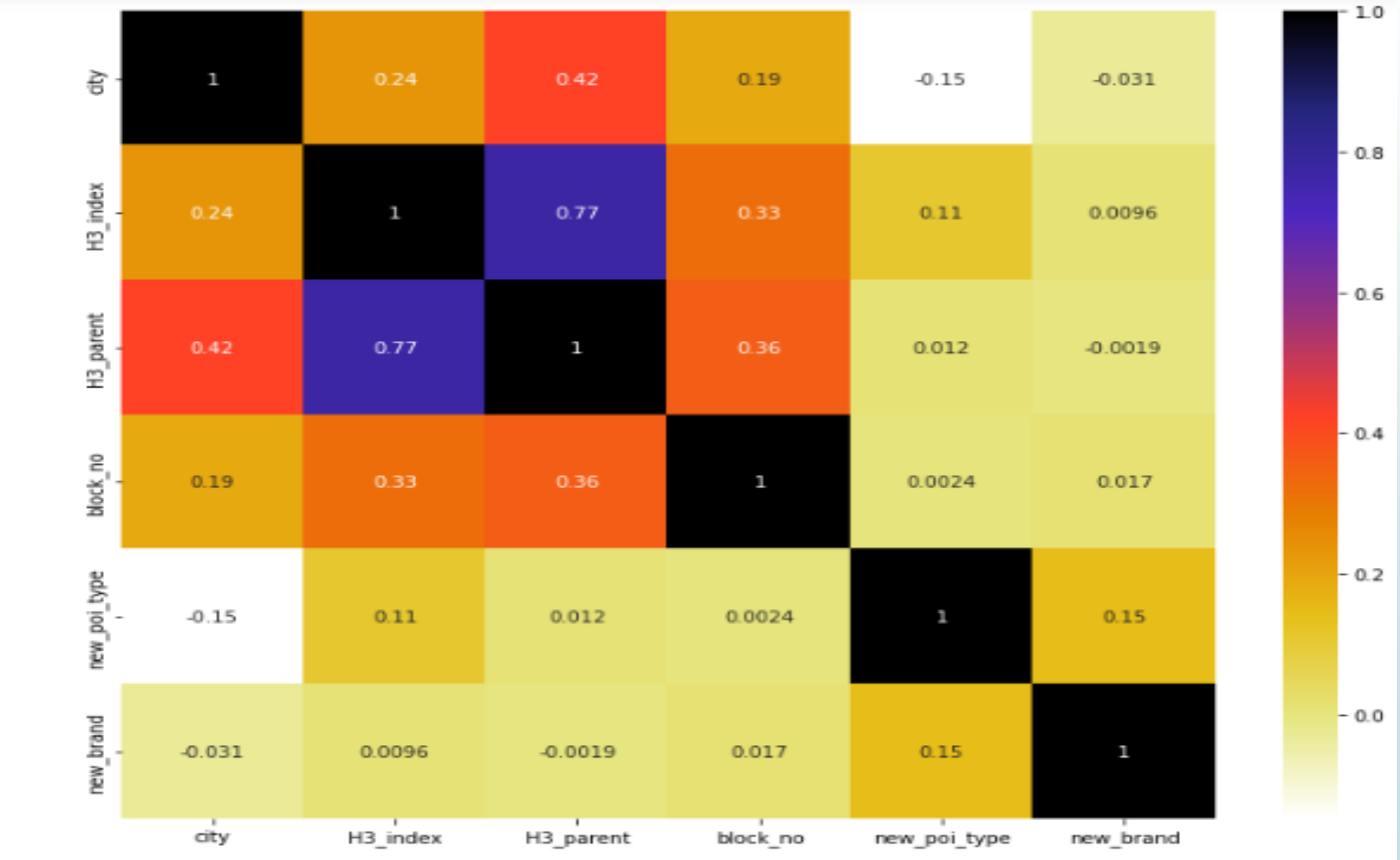


Distribution of top 5 brands and poi_type with respect to the cities

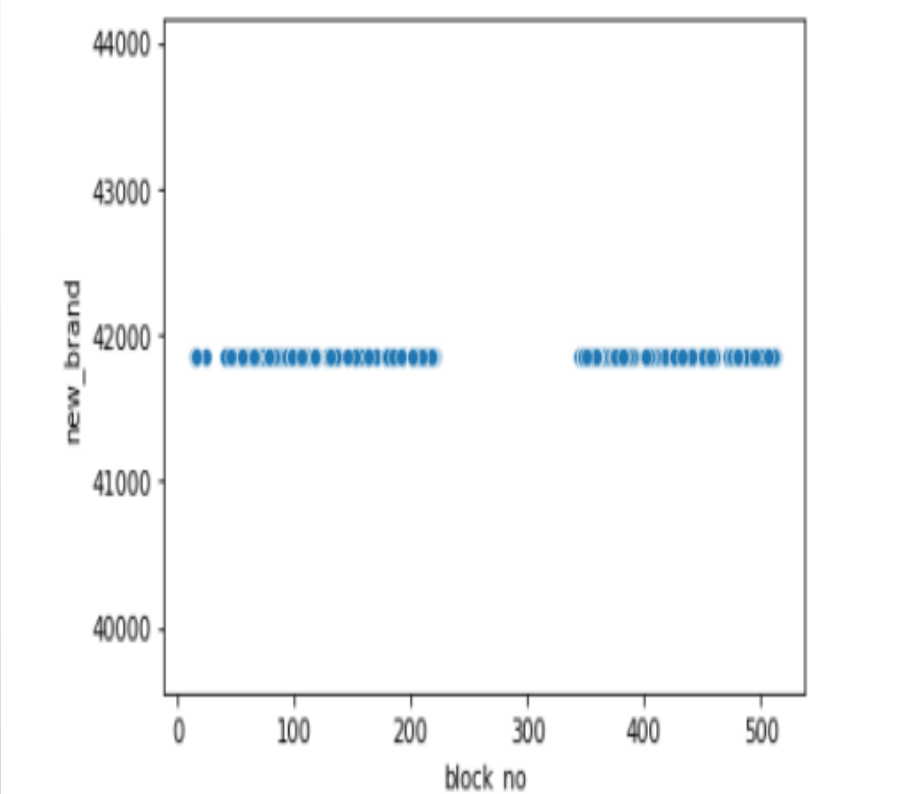




Correlation Matrix for all features used for clustering

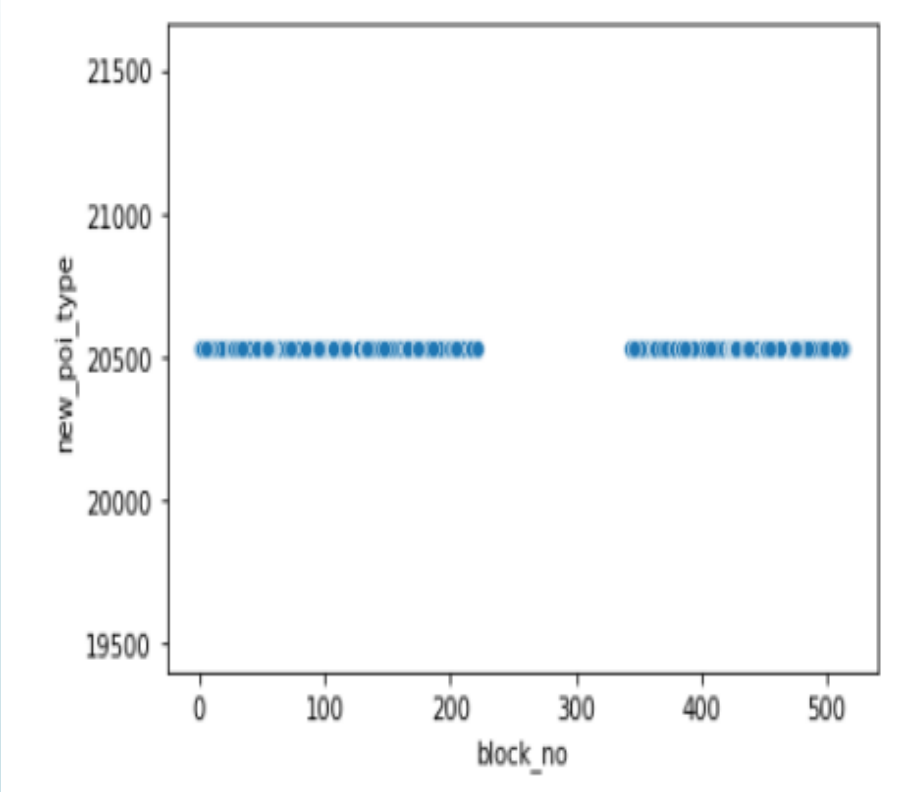


Cluster 0



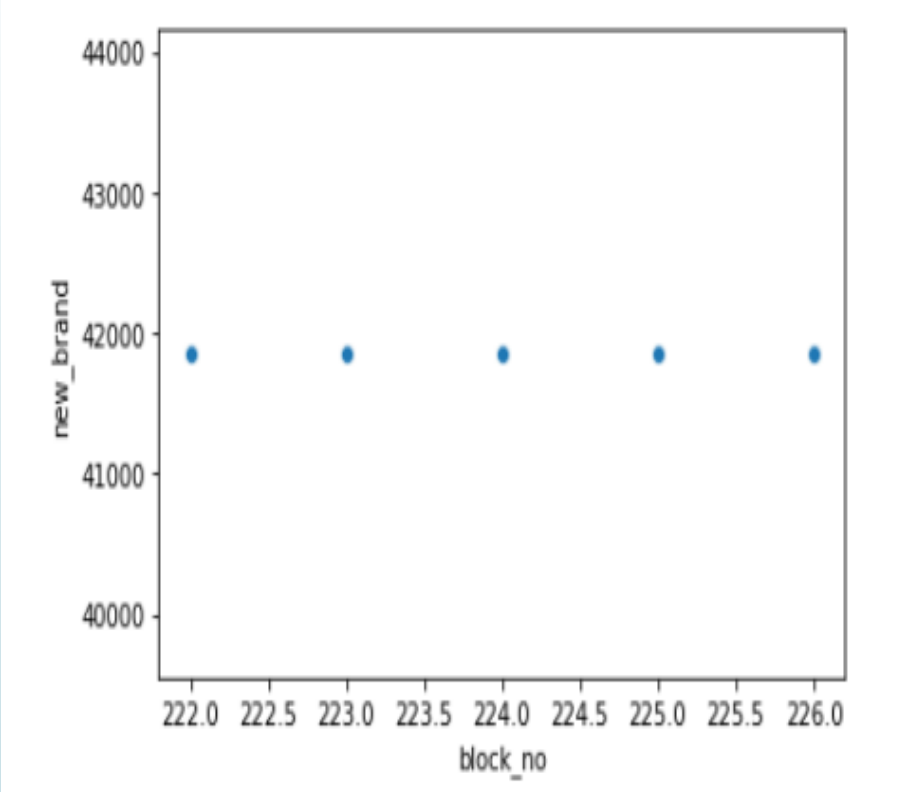
- From this plot we can conclude that block/locality of this cluster0 only contains one type of brand which is represented by 42000 in numerical format

Cluster 1



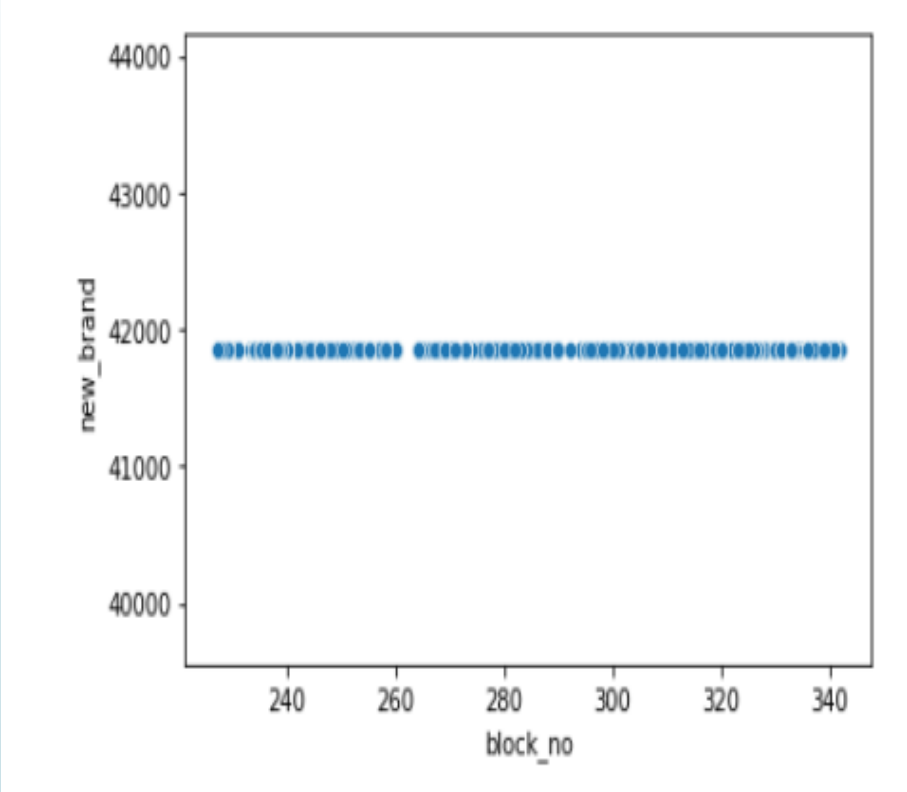
- From this plot we can conclude that block/locality of this cluster only contains one type of poi_type which is represented by 20500 in numerical format

Cluster 2



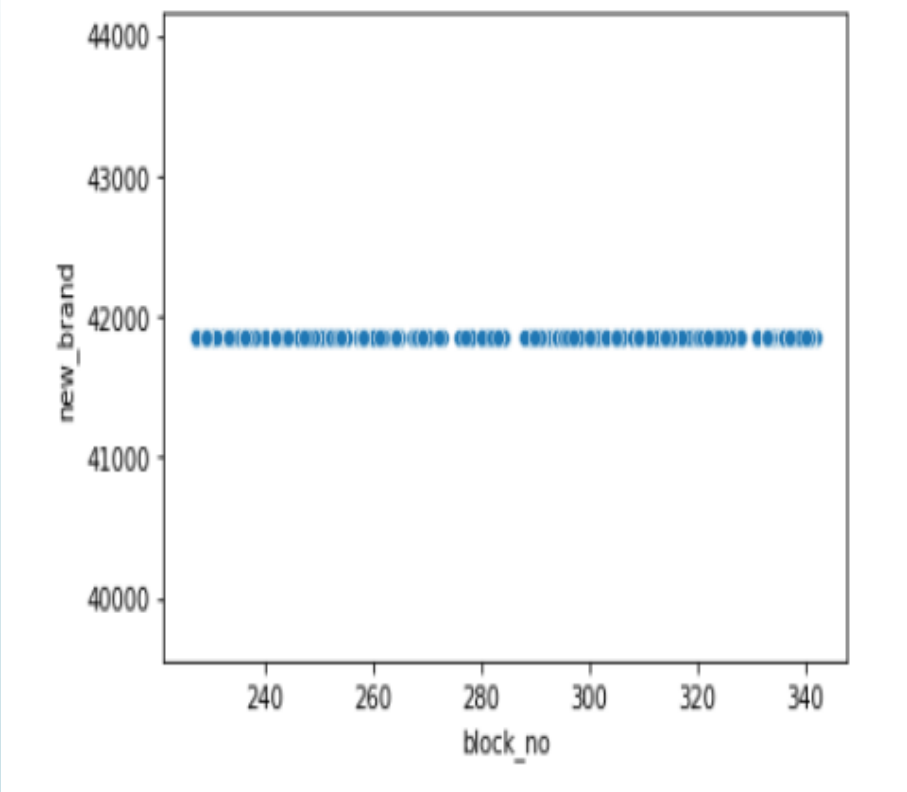
- From this plot we can conclude that block/locality of this cluster are ranging from 222 to 226 so it is a small region and it only contains one type of brand which is represented by 42000 in numerical format

Cluster 3



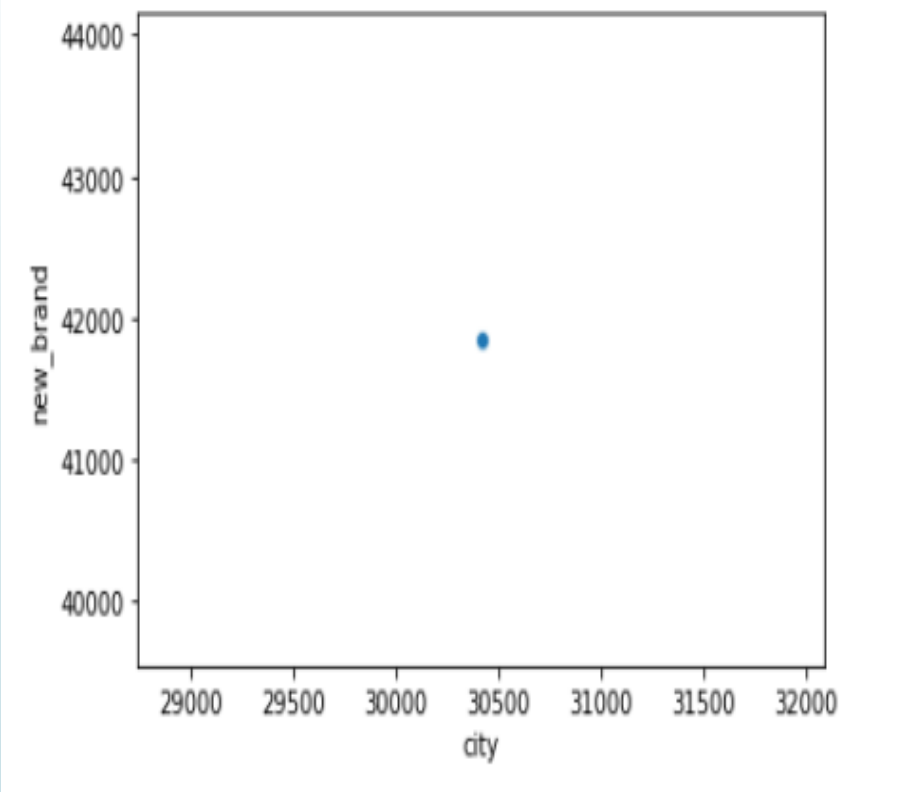
- From this plot we can conclude that block/locality of this cluster only contains one type of brand which is represented by 42000 in numerical format

Cluster 4



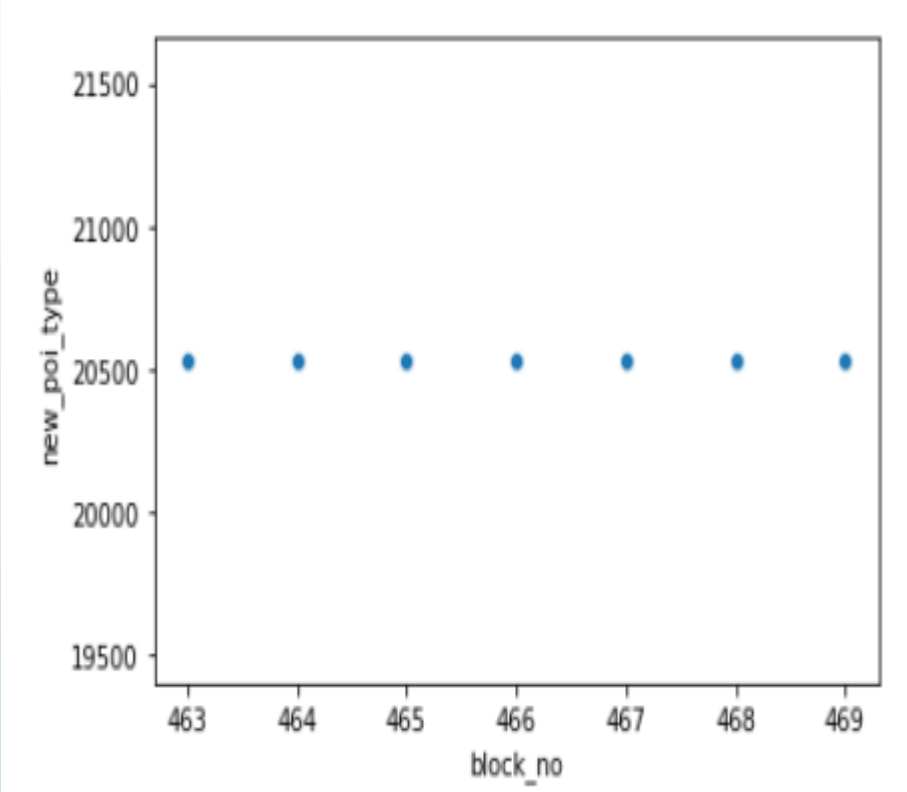
- From this plot we can conclude that block/locality of this cluster only contains one type of brand which is represented by 42000 in numerical format

Cluster 5



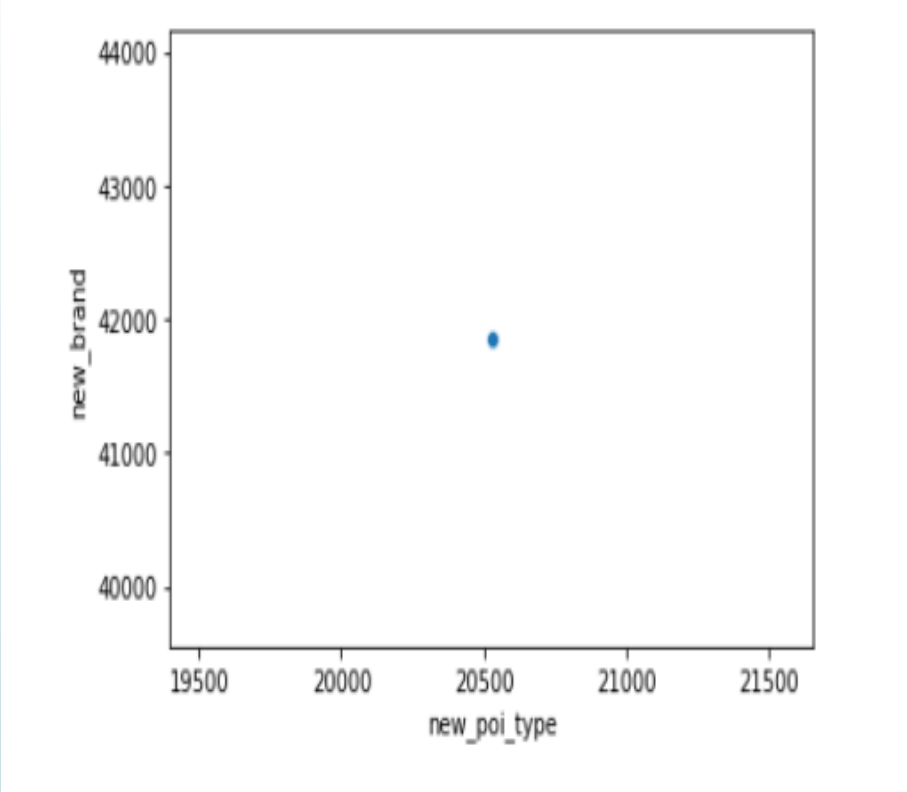
- From this plot we can conclude that block/locality of this cluster only contains one type of brand which is represented by 42000 in numerical format and this cluster belong to only 1 city represented by 30500

Cluster 6



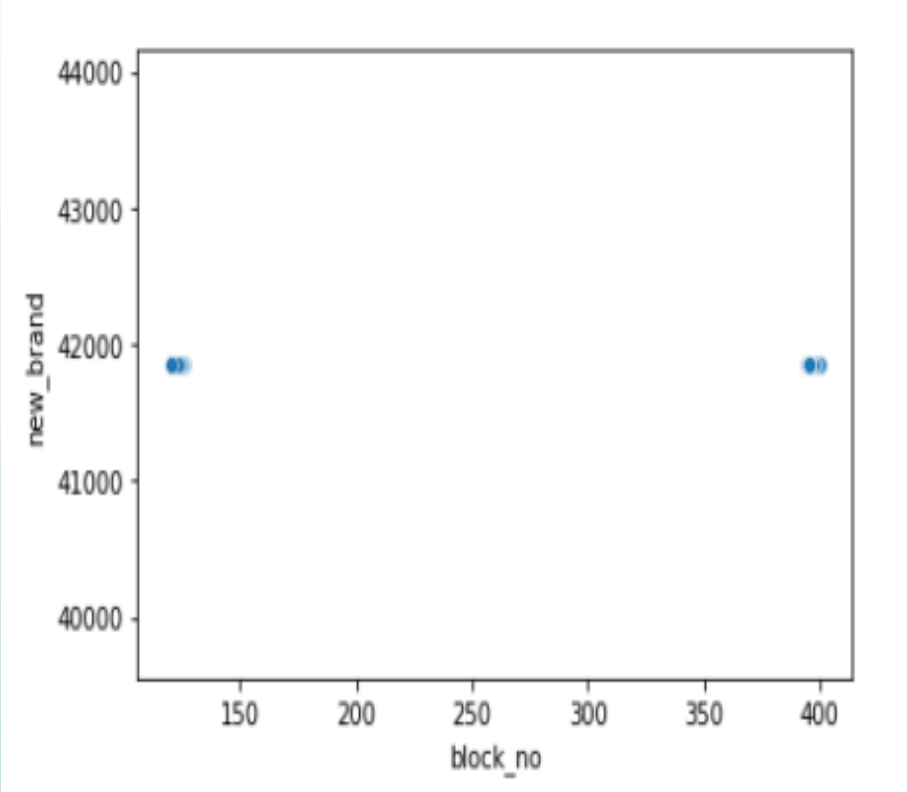
- From this plot we can conclude that block/locality of this cluster which is of small size ranging from 463 to 469 only contains one type of poi_type which is represented by 20500 in numerical format

Cluster 7



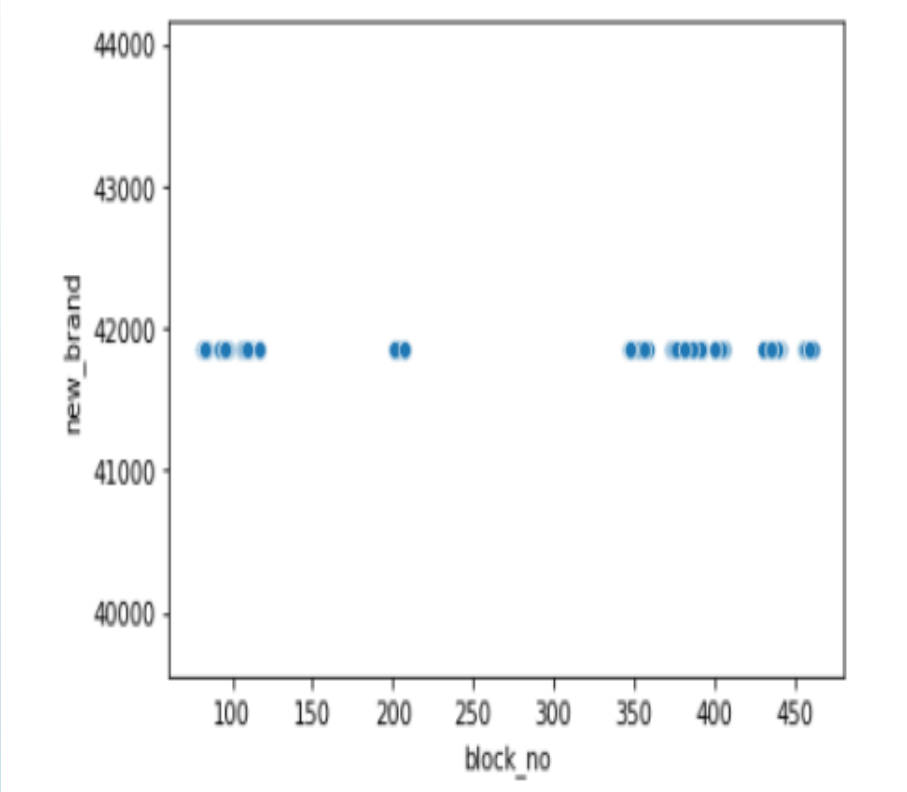
- From this plot we can conclude that this cluster has only 1 poi_type which is represented by 20500 and 1 type of brand represented by 42000

Cluster 8



- From this plot we can conclude that block/locality of this cluster does not contains any brand from range 150 to almost 400.

Cluster 9



- From this plot we can conclude that block/locality of this cluster does not contains any brand from range 150 to around 200 and 210 to 350. And locality that do contain brand has only 1 type of brand represented by 42000

Summary

- So after doing some basic exploratory data analysis and Feature Engineering along with Feature Selection then finally clustering we were able to segment places and provide insights
- This project can help various people if they intent to

1. Start a new business and want to get some idea
2. An established business trying to find out their competition
3. Probability of success of business
4. Missing business in the locality

Thank You!