The Battle of Houston Neighbourhoods

Capstone Project

Introduction: Business Problem

We would like to open stores in Houston, but we do not know which type of store is optimal and where to locate it. Therefore, we will solve the following tasks:

- Finding the best type of store for opening in Houston;

- Determining the location for the new store in the city of Houston.

Data

- Considered factors:
  - prevalence of certain types of shops in the city
  - the location of these stores
  - areas with wealthy residents
  - type of store to open
  - approximate store location

- APIs:
  - Google Maps API – finding centers of candidate areas and coordinate of Houston center
  - Foursquare API – reversing geocoding number of venues and their type and location in every neighborhood

Methodology

- Collecting data to describe the city at the neighoburhood level, and data on venues located in this city in order to determine where the density of venues is higher and there is a demand and an opportunity to discover a new one.

- Working with data for all stores to determine the density of stores in the city and find a niche.

- Finding common patterns between areas in order to determine the approximate contingent of our clients with the use of clustering: KMeans and Agglomerative Clustering algorithms.

- Narrowing down the category of stores that can be opened in one of the districts of these clusters.

- Using the data for the wealthiest neighborhoods in the city to find neighborhoods where customers can afford to shop in our store.

- Getting the approximate location of the store and the type of store that have development prospects.
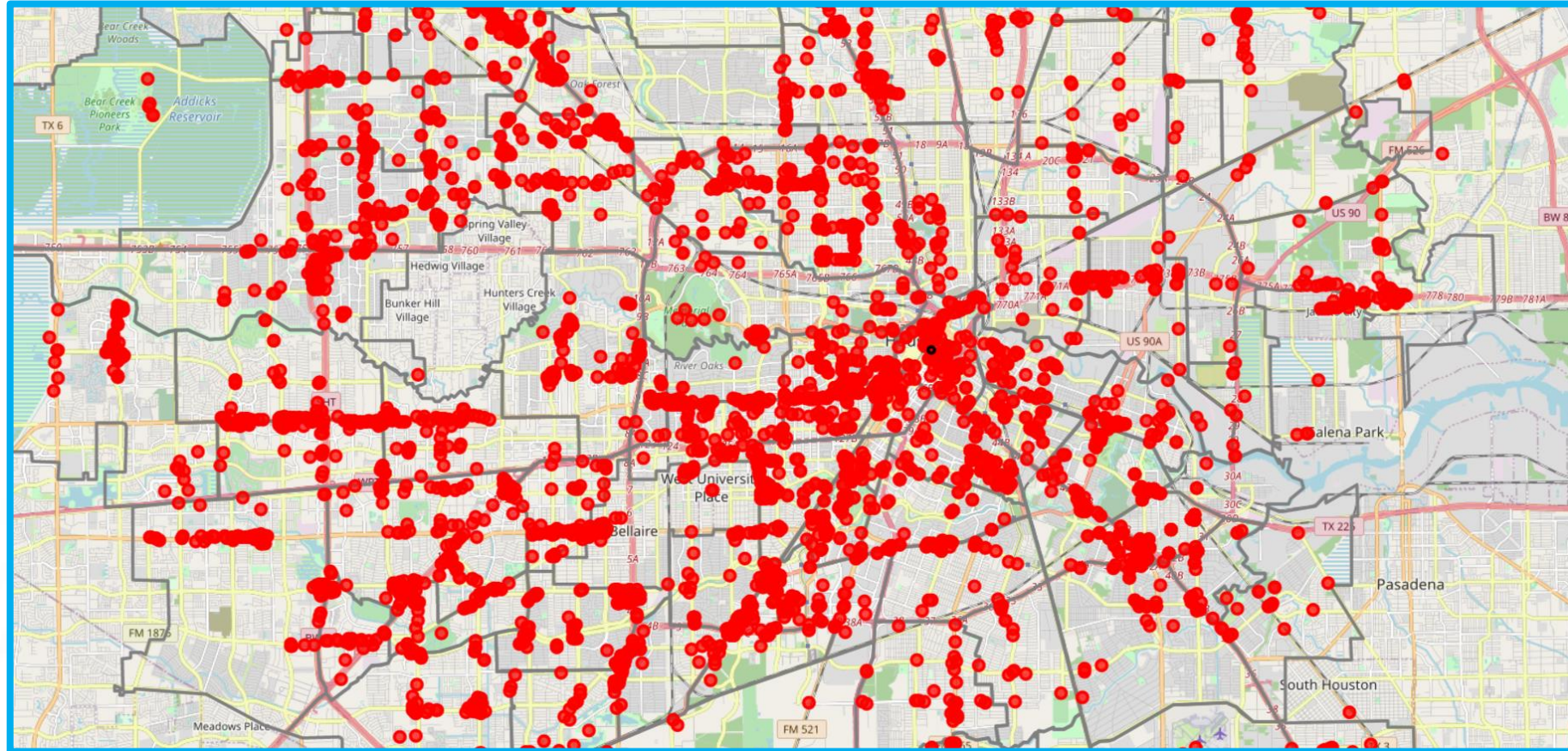
Displaying city neighbourhoods: Map
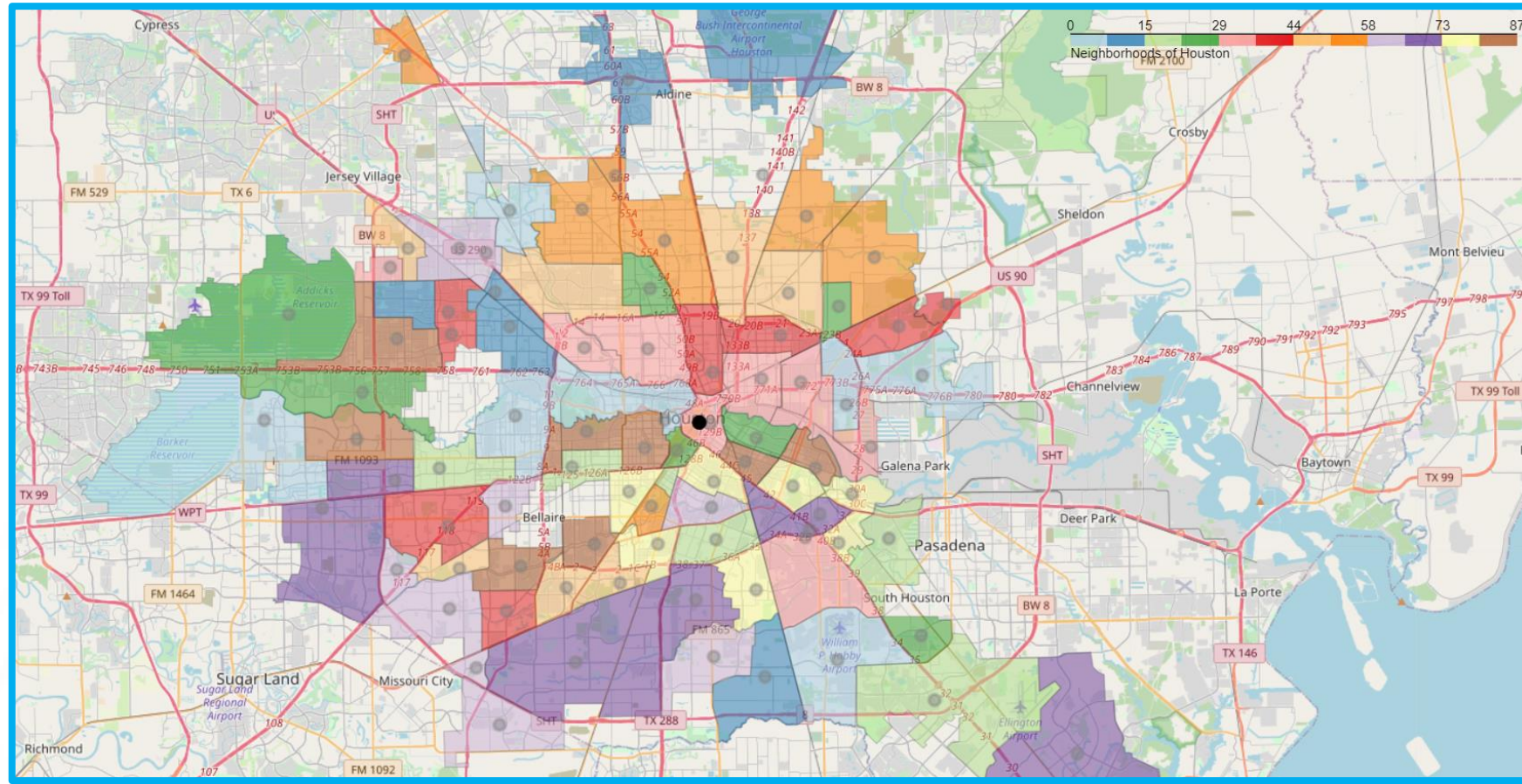
Displaying city neighbourhoods: Results

- It can be seen that the city center is slightly shifted relative to the tinted area of the neighburhoods.

- The city has a large number of neighbourhoods, so it is necessary to determine which venues are located in them and where.
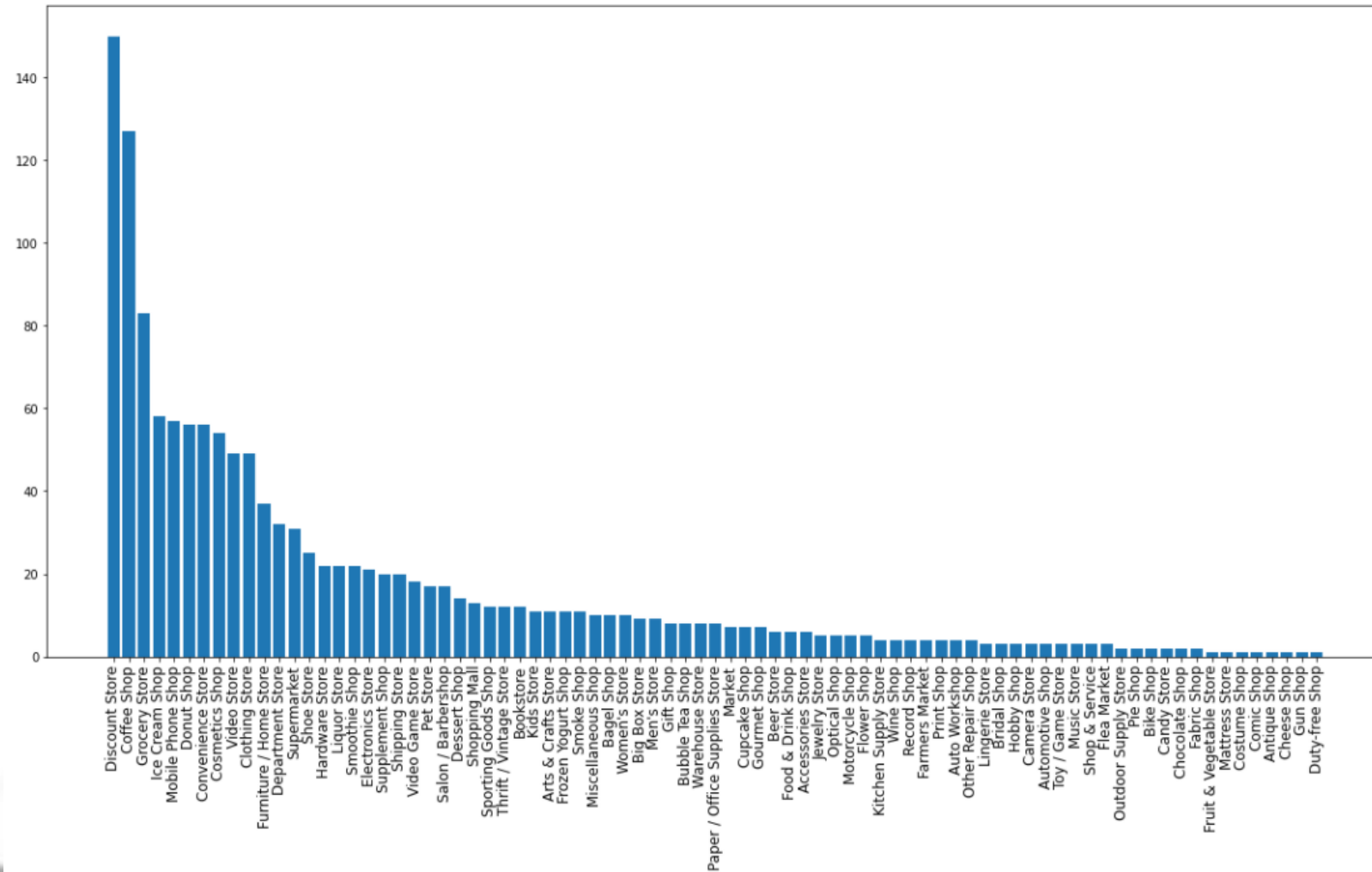
# Loading nearby venues: Map

Loading nearby venues: Results

- We observed more than 5000 venues in the city.

- It can be seen that the venues are unevenly distributed in the city.

- Most of them are concentrated in the center and southwest.

- It can be seen that some streets are very densely filled, while others are empty.

Analysis of prevalence stores: Histogram

Analysis of prevalence stores: Results

- According to the histogram, the most common shops in the city are:
  - Discount Store,
  - Coffee Shop,
  - Grocery Store,
  - Ice Cream Shop,
  - Mobile Phone Shop,
  - Donut Shop.

- Therefore, opening one of these stores can be successful.

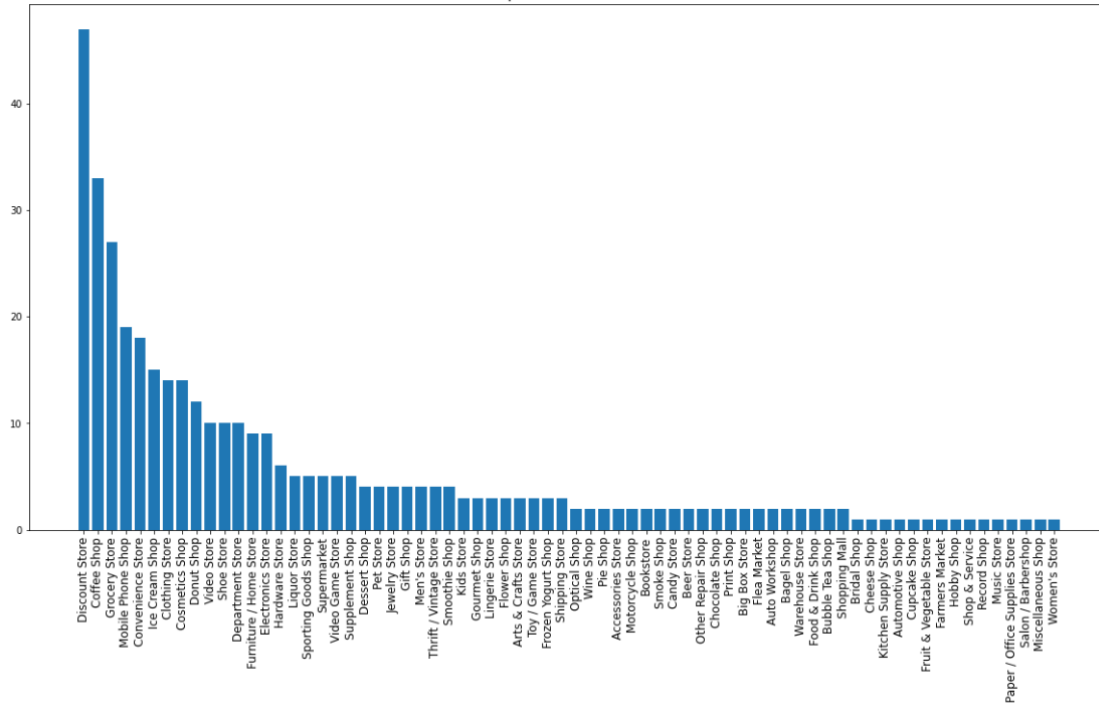# Identifying patterns in similar areas: Map
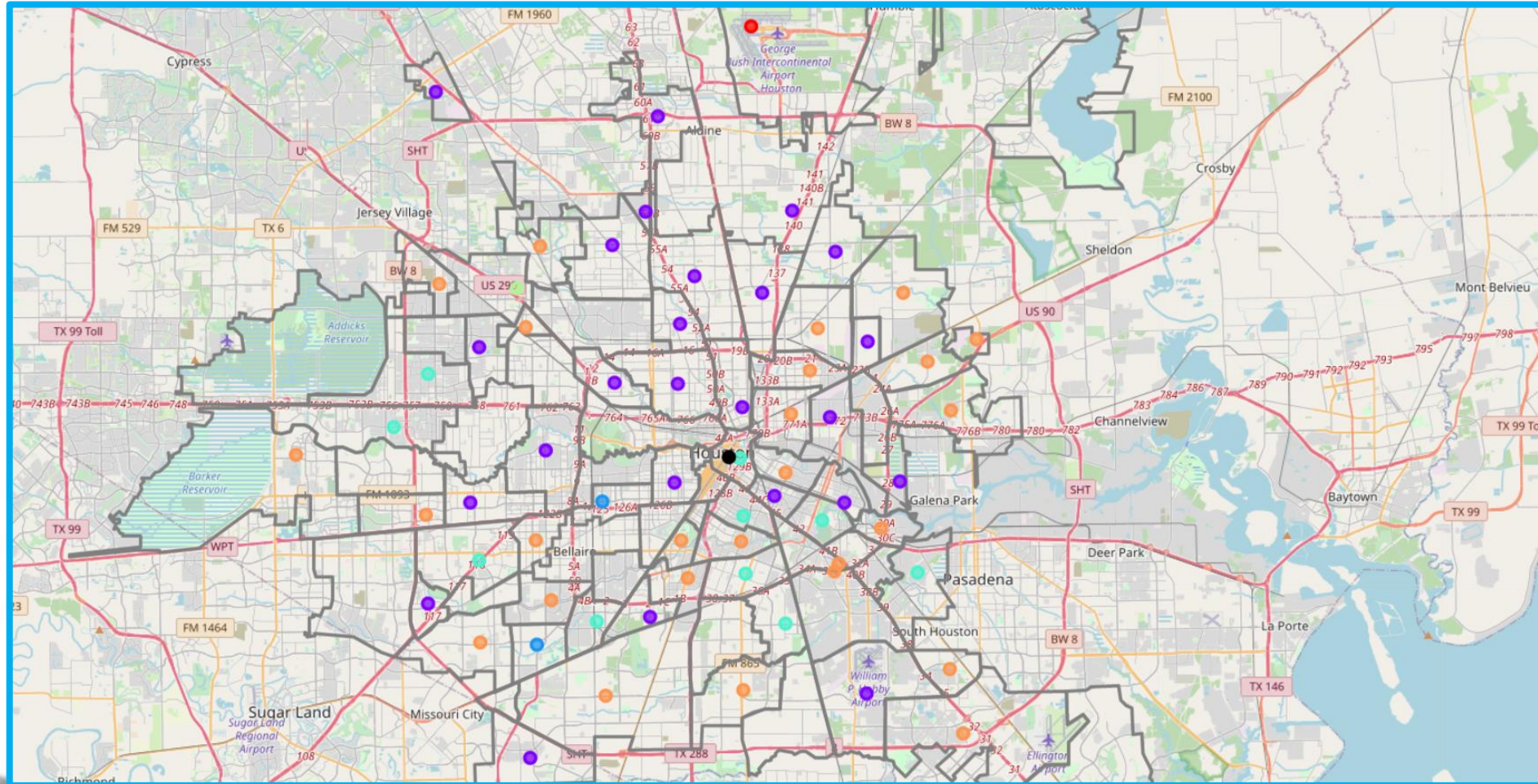
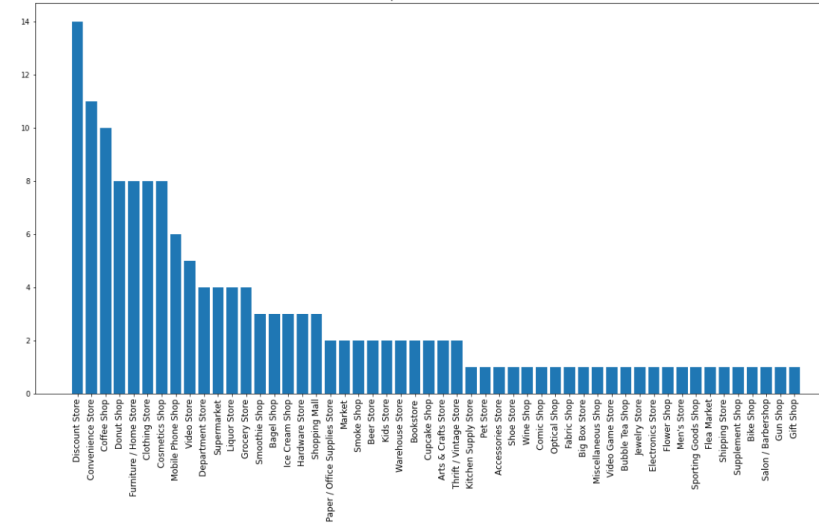# Identifying patterns in similar areas: Results

- We used two types of clustering: KMeans and Agglomerative Clustering.

- We obtained that the optimal number of clasters is 6.

- We investigated 3 most common clusters with the biggest amount of venues types.

Identifying patterns in similar areas: Histograms of distribution for each cluster
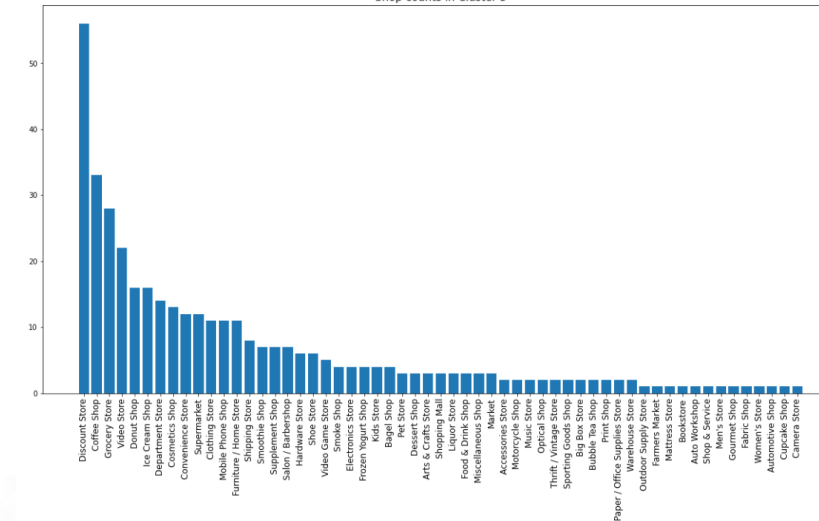
Identifying patterns in similar areas: Results

- Stores in all clusters are exponentially distributed.

- Clusters 1 and 5 are very similar to each other. There is approximately the same number of discounters, coffee shops and groceries.

- Mobile phone shops are widespread in the 1st cluster, in other clusters they are less widespread.

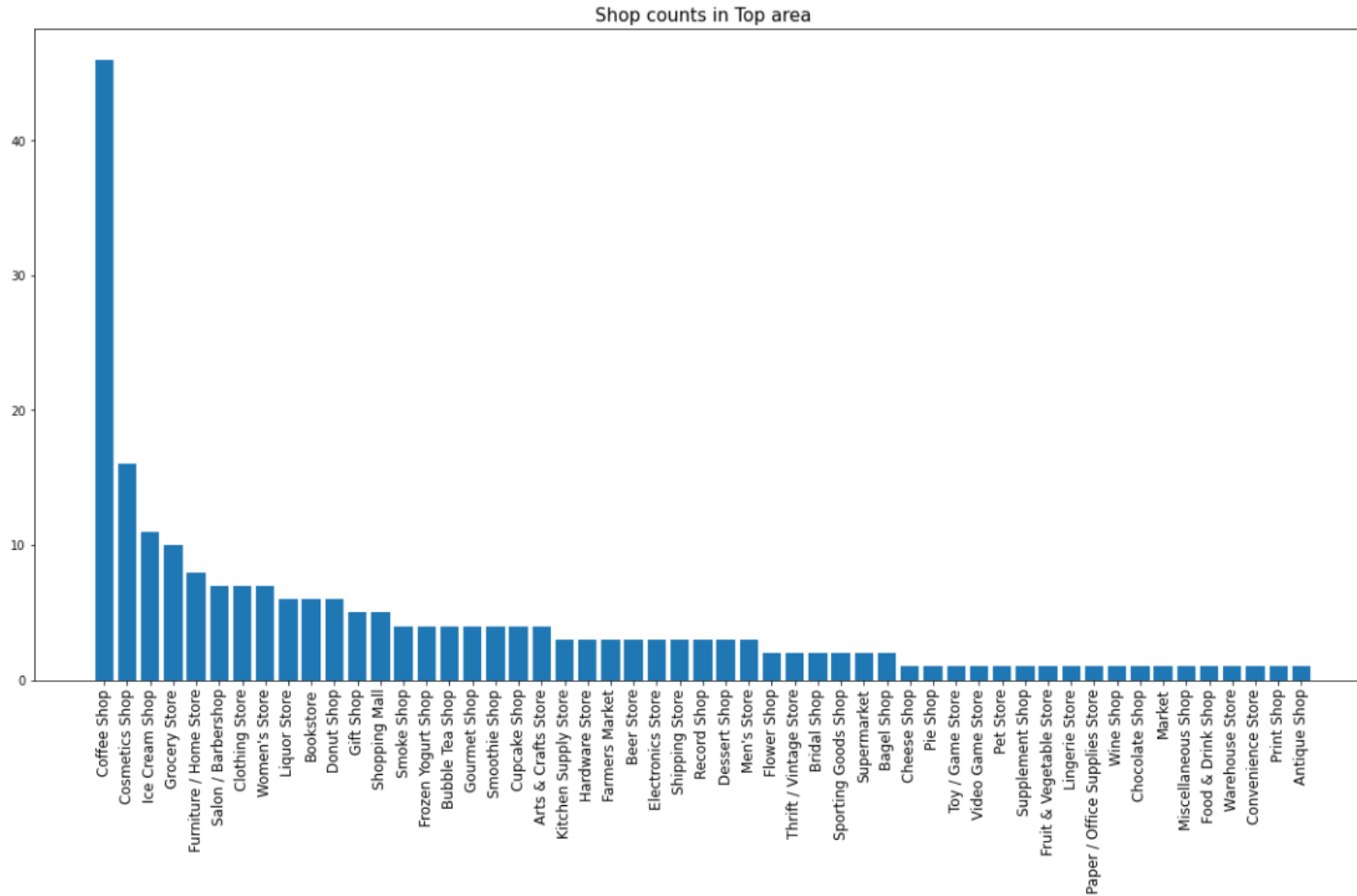- The lack of mobile phone stores in cluster 5 may be an existing niche.

Determining the type and location for opening a store: Top 10 neighbourhoods
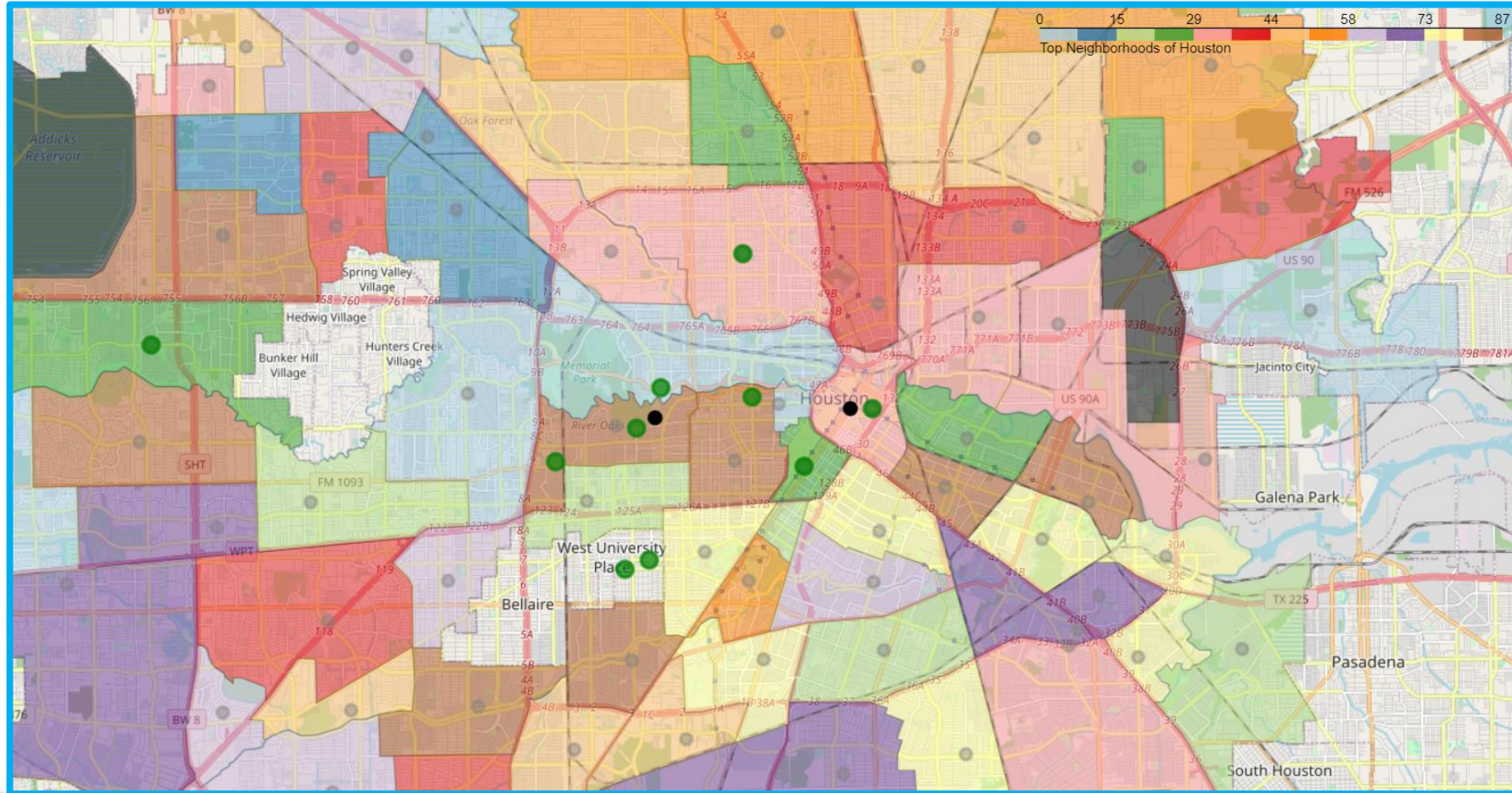
Determining the type and location for opening a store: The best neighbourhoods results

- We considered 2020 Top 10 Neighbourhoods in Houston.

- The best neighbourhoods are located to the west of the city center, with their median center located at River Oaks.

- It is logical to assume that residents will tend to live closer to good areas, so they will occupy nearby areas of the city.

- We suggest that opening the store in the west from the city center is preferably.
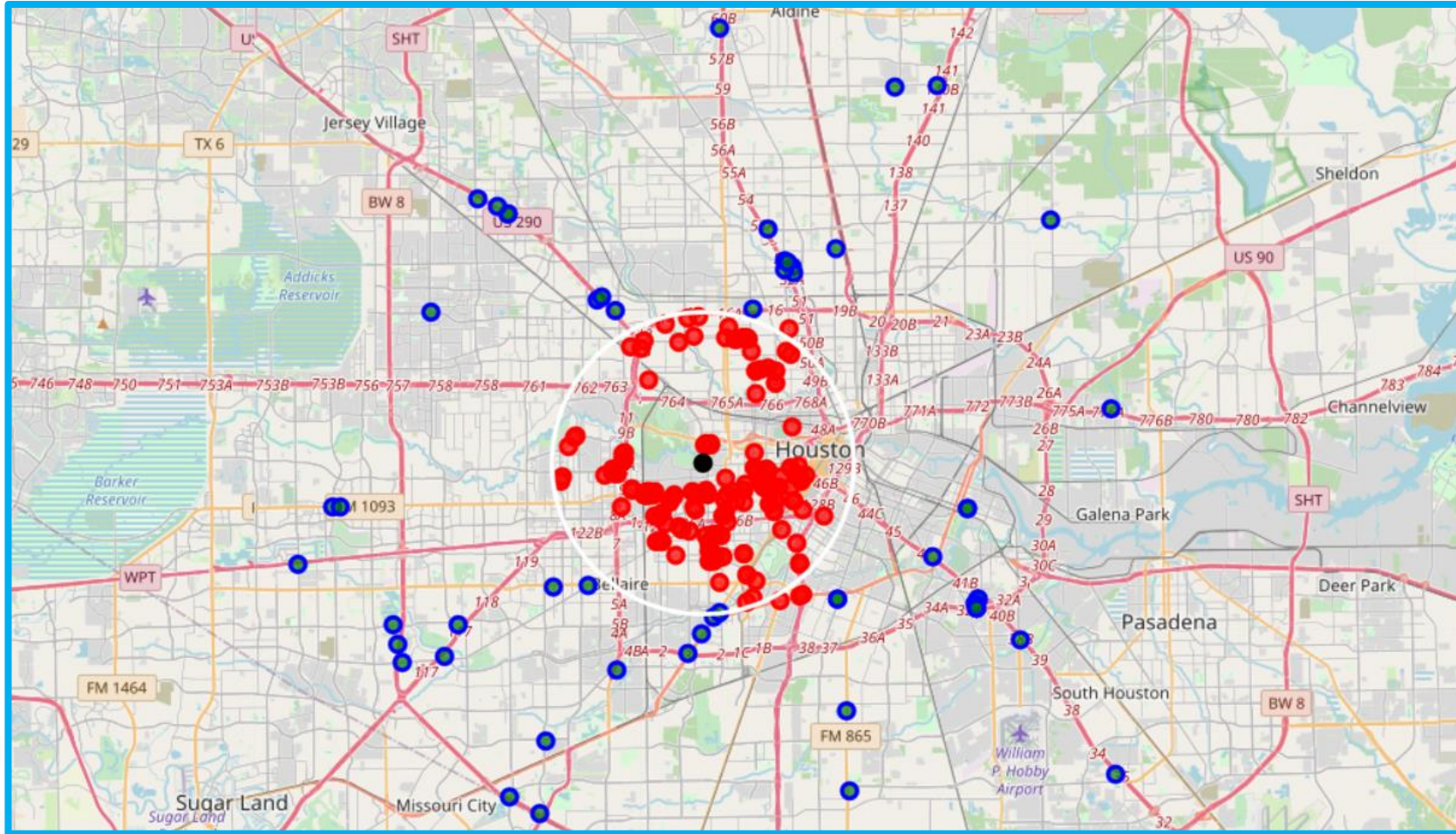
Determining the type and location for opening a store: Most common shops in Top neighbourhoods

Shop counts in Top area

Determining the type and location for opening a store: Results for Top neighbourhoods

- Coffee shops are very common in the top neighbourhoods.

- It can be seen that mobile phone shops are not widespread in the western part of the city.

- We believe that the best location for the new mobile phone shop is near these areas.

Determining the type and location for opening a store: Area for opening Mobile phone shop

Determining the type and location for opening a store: Results for new shop area location

- There is a large number of shops in the desired area.

- We can assume that there is an opportunity to build stores in the area and it is profitable.

- Therefore a new mobile phone shop can be opened in the highlighted area.

Results and Discussion

- The most common stores in Houston are Discount Shop, Coffee Shop, Grocery Shop.

- Top areas are located to the west of the city center and according clustering, the consumer interests of citizens are approximately similar. That is, citizens from areas where there are no mobile phone stores may be inclined to shop in such stores as citizens in areas similar to this.

- One of the promising stores to open are Mobile phone shops. In several developed areas there are no such shops, opening a shop in one of the areas close to prosperous is a promising business start.

- We identified a possible store location to the west of the city center and decided that it would be optimal to open a mobile phone store there.