Comparison Between Two Metropolitan Cities, Istanbul and New York City-A Deeper Look Into Demographics and Cultural Facilities

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The main focus of this project is to identify the similarities and dissimilarities from two different aspects between the two metropolitan cities, Istanbul and New York City.

The aspects that will be stressed in this project are variety of cultural facilities, how they are scattered across each city and the distribution of the population.

INTRODUCTION

The idea behind the preparation of this project is to emphasize the strong and weak points of these two metropolitan cities as to the variety of cultural facilities in relation with the distribution of population.

After setting the goal, we set out to collect data from various sources.

INTRODUCTION

The types of data that have been dealt with for this project are as follows:

*Amount and type of cultural facilities in each neighborhood, and their distribution across boroughs.
*Population data

DATA COLLECTION AND WRANGLING

The data have been obtained from several sources as follows:
1.http://www.tuik.gov.tr/ :Demographics of İstanbul .
2. https://data.cityofnewyork.us/ :Demographics of New York City.
3.Foursquare API: Cultural facilities and Educational institutions
Google API: Longitude and Latitude İnformation
4.http://postakodu.ptt.gov.tr/ :the information here to be used to assign address for each borough in Istanbul to attain latitude and longitude values using google API, as the data are not readily available for İstanbul.
5.https://cocl.us/new_york_dataset &
6.https://geo.nyu.edu/catalog/nyu_2451_34572: New York City json data

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DATA COLLECTION AND WRANGLING

	id	category name	name	latitude	longitude	neighbourhood	borough	catnum
0	507c8c4091d498d9fc8c67a9	Public Art	Kuaför Ali Ufuk Çimen	40.880440	29.068968	BURGAZADA MAH	ADALAR	0
1	4bf58dd8d48988d1e5931735	Music Venue	ASSK Disco	40.879128	29.072280	BURGAZADA MAH	ADALAR	1
2	4bf58dd8d48988d1e2931735	Art Gallery	İpek Burgazada	40.880896	29.069002	BURGAZADA MAH	ADALAR	2
3	4deefb944765f83613cdba6e	Historic Site	Gönül Bağım	40.880823	29.069742	BURGAZADA MAH	ADALAR	3
4	4bf58dd8d48988d1e5931735	Music Venue	Büyükada Lunapark Restaurant	40.857445	29.120468	MADEN MAH	ADALAR	1
...	...	...	...	...	...	...	...	...
9915	4bf58dd8d48988d17f941735	Movie Theater	Tek Stüdyoları	41.025979	28.919835	MALTEPE MAH	ZEYTİNBURNU	5
9916	4deefb944765f83613cdba6e	Historic Site	Bayrampasa Merkez Camii	41.035254	28.911442	MALTEPE MAH	ZEYTİNBURNU	3
9917	4bf58dd8d48988d1e2931735	Art Gallery	Www.iamistanbul.tv	41.027397	28.911913	MALTEPE MAH	ZEYTİNBURNU	2
9918	4bf58dd8d48988d1e2931735	Art Gallery	Enes Ofset Ajans Reklam	41.023961	28.919067	MALTEPE MAH	ZEYTİNBURNU	2
9919	4bf58dd8d48988d17f941735	Movie Theater	Jimmy Jib Başında	41.026245	28.919827	MALTEPE MAH	ZEYTİNBURNU	5

	Borough	NTA Code	NTA Name	Population	latitude	longitude
0	Bronx	BX01	Claremont-Bathgate	31078	40.849893	-73.895474
1	Bronx	BX03	Eastchester-Edenwald-Baychester	34517	40.864322	-73.843382
2	Bronx	BX05	Bedford Park-Fordham North	54415	40.870100	-73.885691
3	Bronx	BX06	Belmont	27378	40.853451	-73.889368
4	Bronx	BX07	Bronxdale	35538	40.850656	-73.866524

TABLE 2.7-POPULATION BREAKDOWN BY NEIGHBORHOOD FOR NEW YORK CITY

After conducting several operations population and cultural venues data frame was generated. The figures above are representative of the data that were collected during the course of the study.

DATA COLLECTION AND WRANGLING

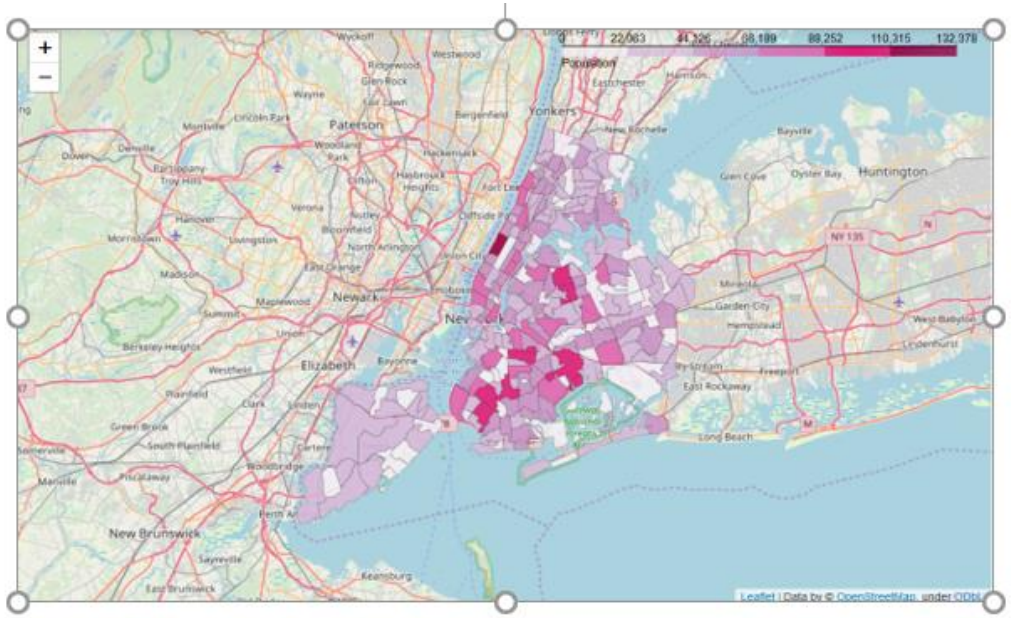
The methodology dictates the procedure. According to the project specific methodology, analysis was performed in three parts as follows:

-Choropleth map generation for each venue and distribution of population

-K-means clustering method application

-Comparison between Istanbul and New York City

METHODOLOGY



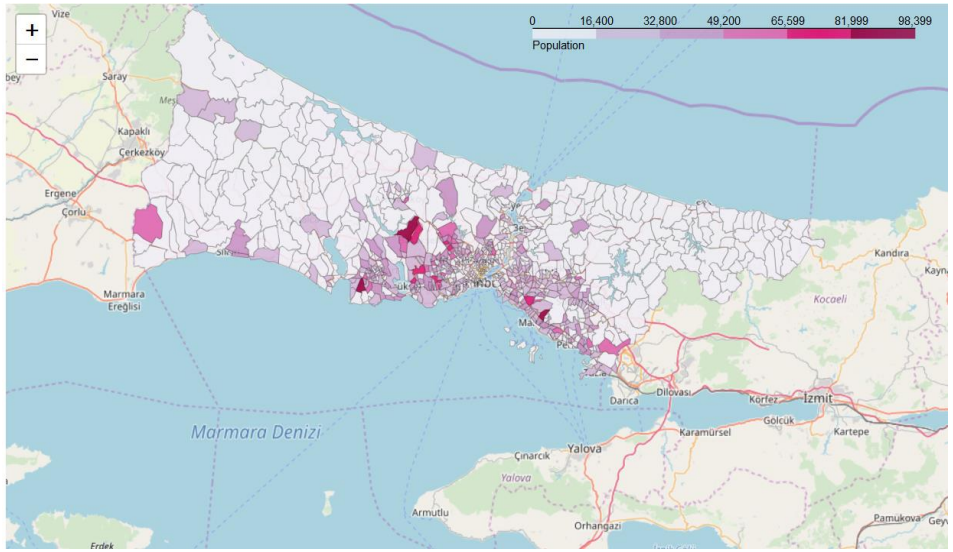
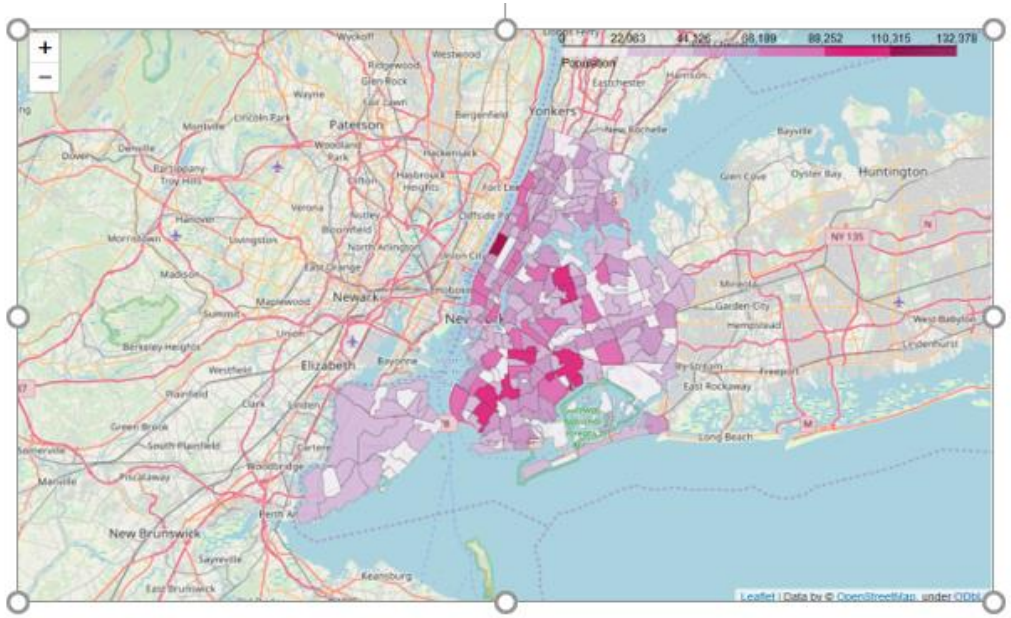


FIGURE 4.1-POPULATION DISTRIBUTION IN NEW YORK CITY

At first, Choropleth map was created fot the distribution of population across the city.

ANALYSIS-CHOROPLETH MAPS



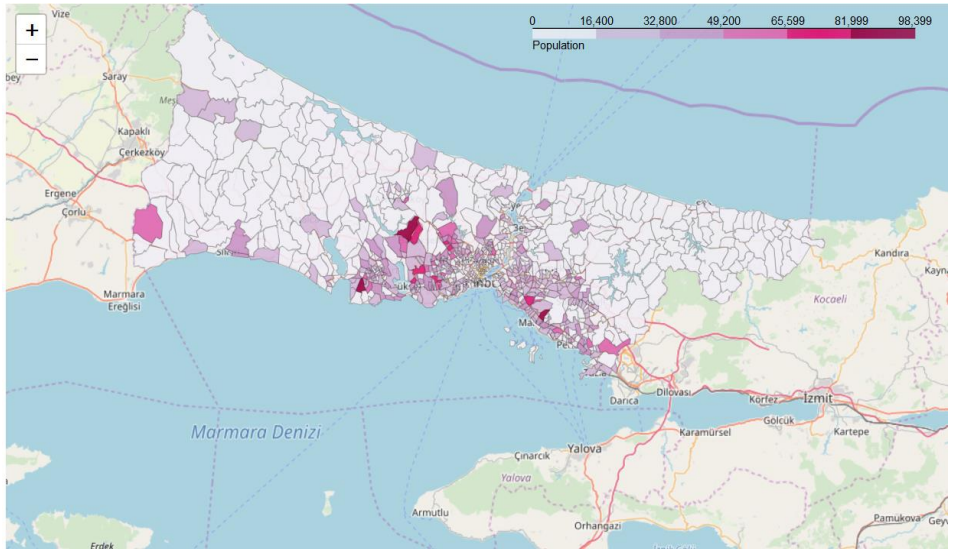
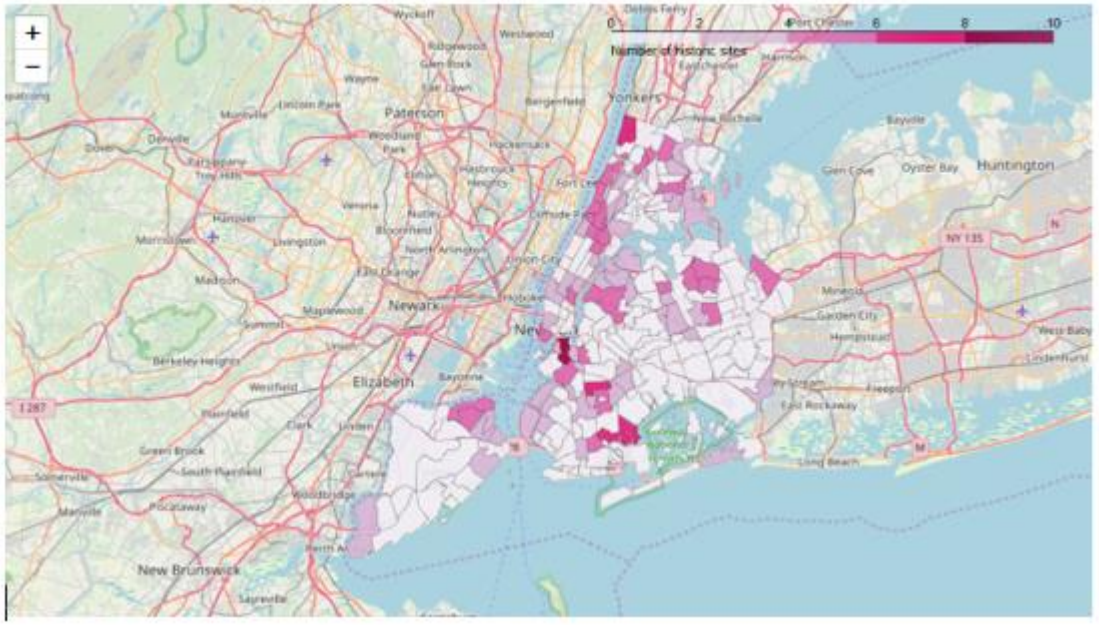


FIGURE 4.1-POPULATION DISTRIBUTION IN NEW YORK CITY

As can be seen in the figures above, New York City is populated more homogenously.

ANALYSIS-CHOROPLETH MAPS



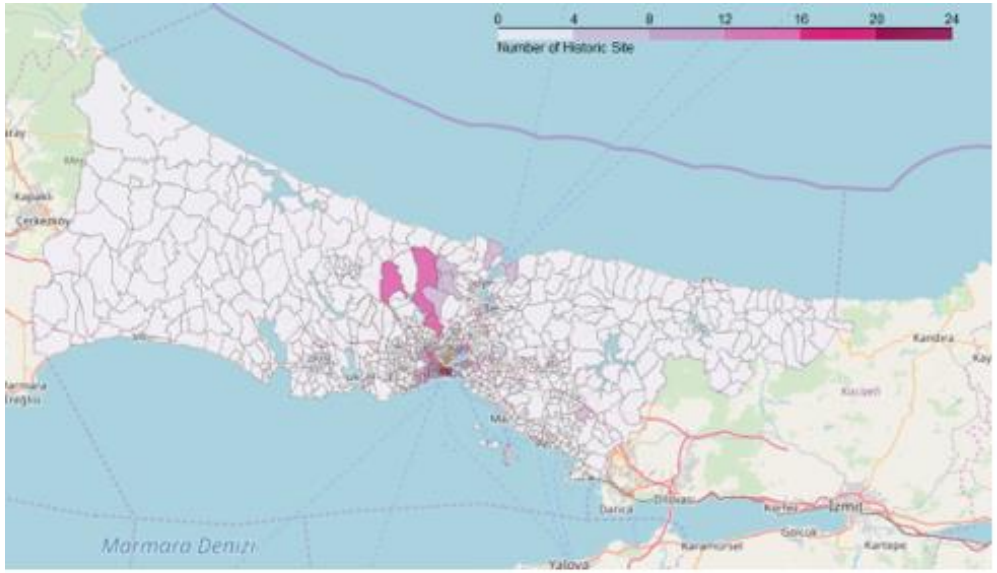
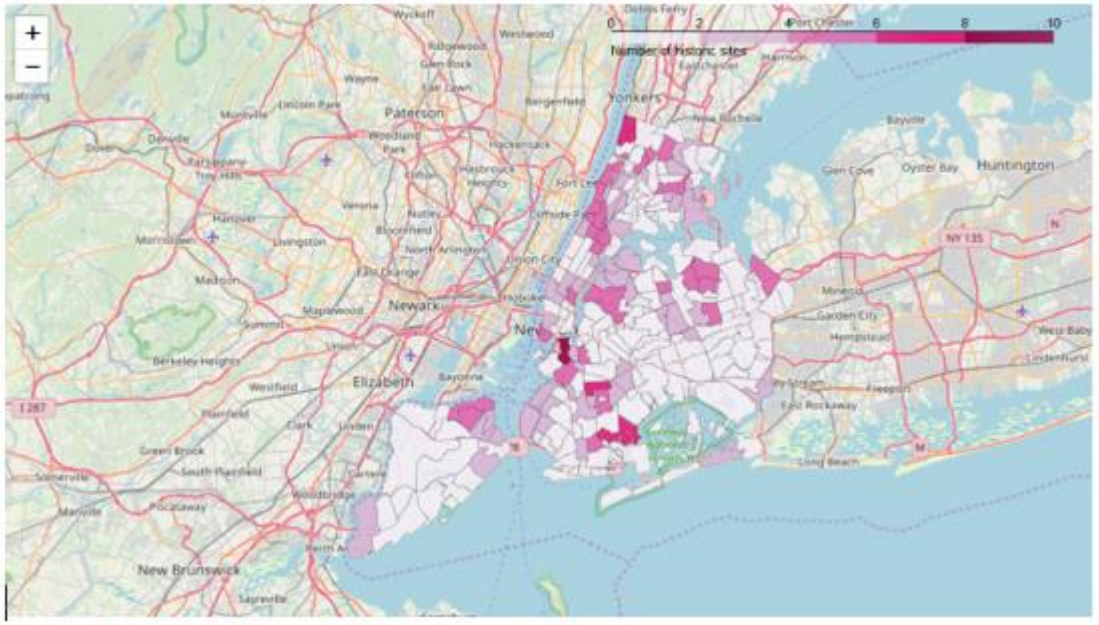


FIGURE 4.5-HISTORIC SITE DISTRIBUTION

Choropleth Maps were also generated to visualize the distribution of each cultural venues. You can see an example above.

ANALYSIS-CHOROPLETH MAPS



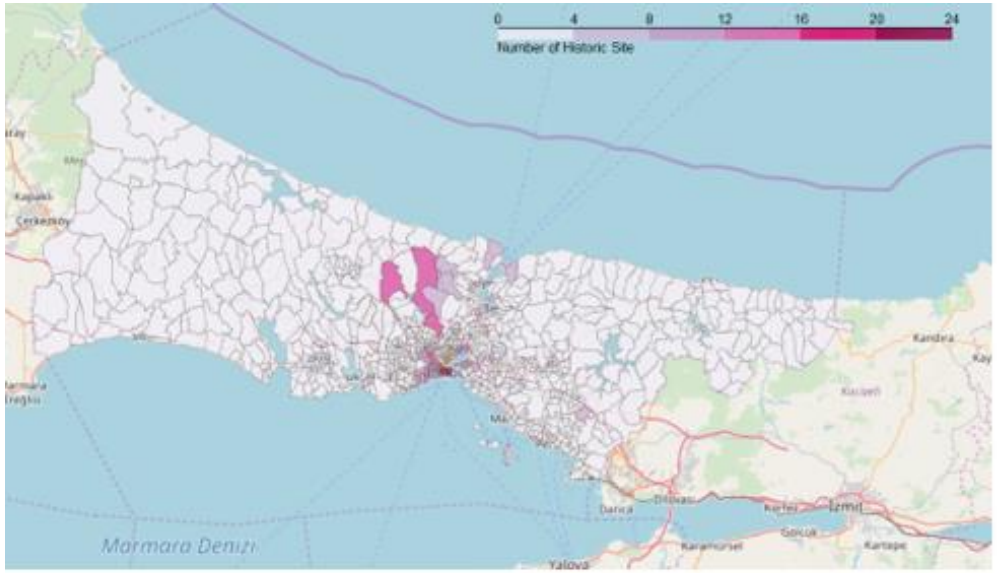


FIGURE 4.5-HISTORIC SITE DISTRIBUTION

Here, you can see the distribution of historic sites accross each city. Istanbul has an ancient history but the historic sites are concentrated only in the center zone.

ANALYSIS-CHOROPLETH MAPS

The chorpleth maps were generated for all cultural venues. The weak points and the observations are given in the report in full detail

ANALYSIS-CHOROPLETH MAPS

In this phase of the analysis, K-means clustering method was invoked to work with unsupervised data sets. The aim was to find out how neighborhoods are grouped according to their population and cultural facility distribution.

K-MEANS CLUSTERING

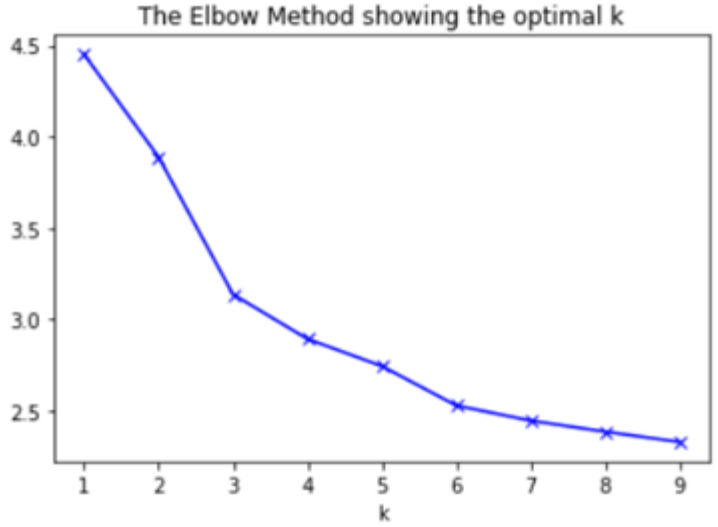


FIGURE 4.13-THE ELBOW METHOD(ISTANBUL)

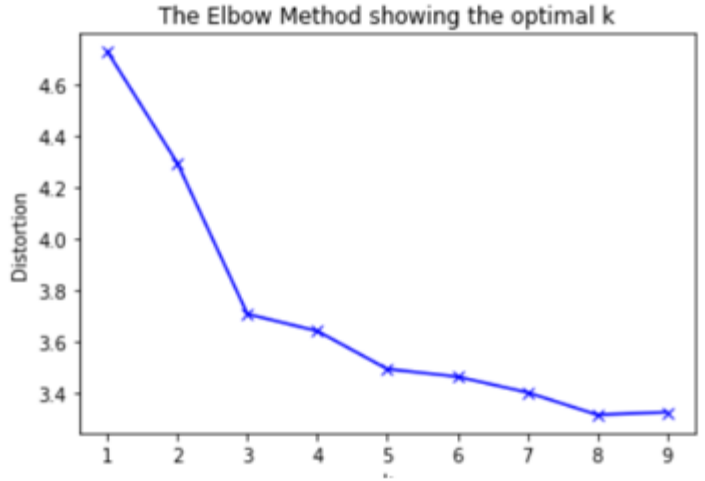


FIGURE 4.17-THE ELBOW METHOD(NY CITY)

Elbow method was utilized to find best k to proceed further. k was chosen as 6 and 8 for Istanbul and New York City respectively. Please see the figures above.

K-MEANS CLUSTERING

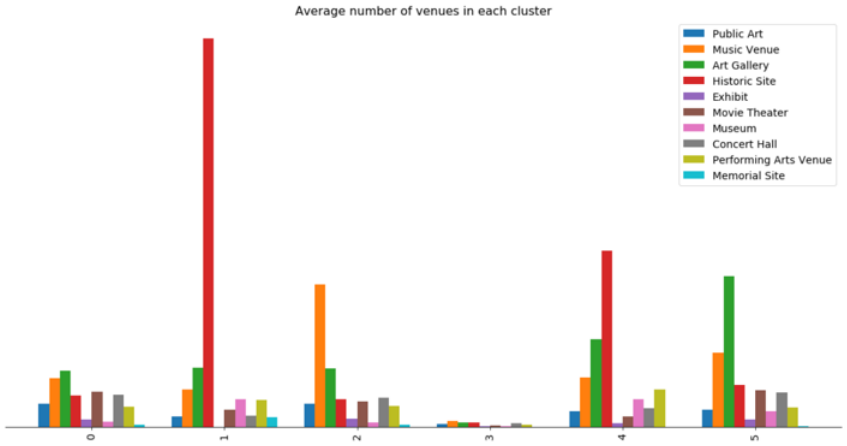


FIGURE 4.14-AVERAGE NUMBER OF VENUES(ISTANBUL)

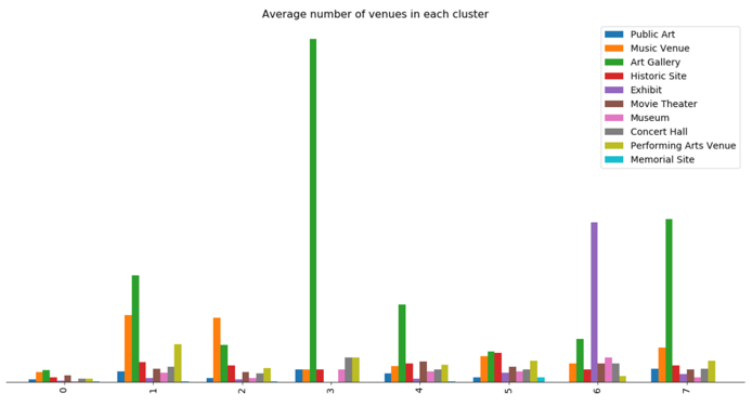


FIGURE 4.18-AVERAGE NUMBER OF VENUES(NY CITY)

Histograms were utlized to visualize the pattern of clustering so that clusters were properly labeled.

K-MEANS CLUSTERING

cluster 0: First clusters seems to involve all kind of venues but there is no distinguished one, so this cluster can be called as "Balanced number of cultural venues"

cluster 1: Historic venues by far distinguish themselves in this group, so the name "Historic venues" is given to this cluster.

cluster 2: Museums outnumbers other venues in this group so this group is called "Museum"

cluster 3: All 10 venues are small in number, so this group is called "Least number of cultural venues"

cluster 4: Historic sites and memorial sites are the top 2 cultural facilities in this group. The name "Historic and Memorial Sites" are given to this group.

cluster 5: Memorial sites and music venues are on the first and second rank respectively, so "Memorial and music venues" would be a good name to define this group.

Istanbul Cultural Venue Clusters

Cluster 0: “Least number of venues”

Cluster 1: “Moderate number of Art Galleries, Music Venues and Performing Art Venues”

Cluster 2: ”Moderate number of Music Venues and Art galleries ”

Cluster 3: “Largest number of Art Galleries”

Cluster 4: “Several Cultural Venues with relatively large number of venues”

Cluster 5: “Balanced number of venues”

Cluster 6: ”Largest number of Exhibition areas”

Cluster 7:”Second largest amount of art galleries”

New York City Cultural Venue Clusters

Clusters were labeled as shown above.

K-MEANS CLUSTERING

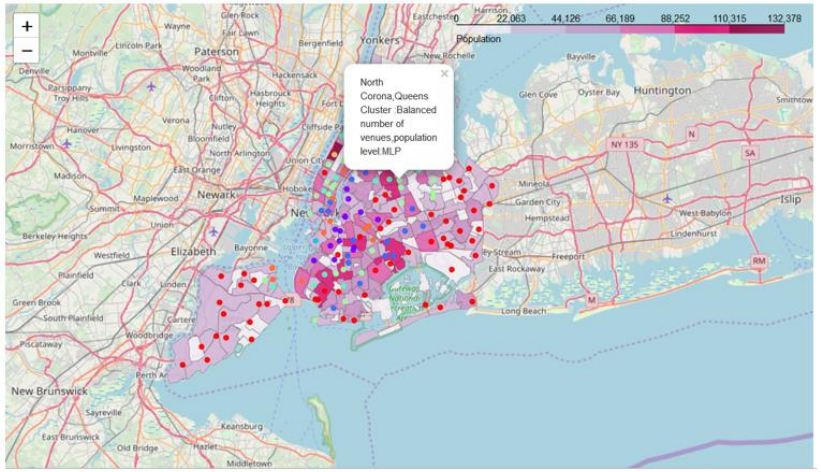


FIGURE 4.19-CLUSTER MAP SHOWING A NEIGHBORHOOD AT HISTORIC CENTER OF THE CITY(NY CITY)

VLP: Very low population <16400
LP: Low Population <32800
MLP: Very Low Population <49200
MHP: Middle High Population<65599
HP: High Population<81999
VHP: Very High population<98399

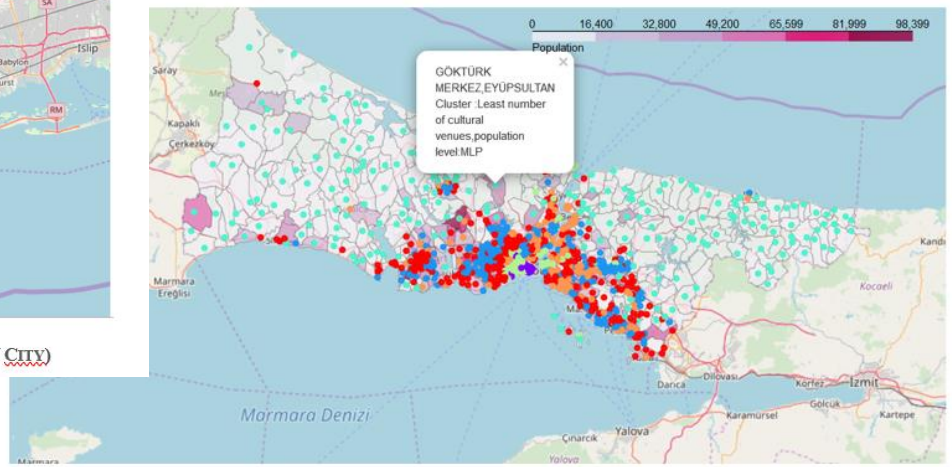


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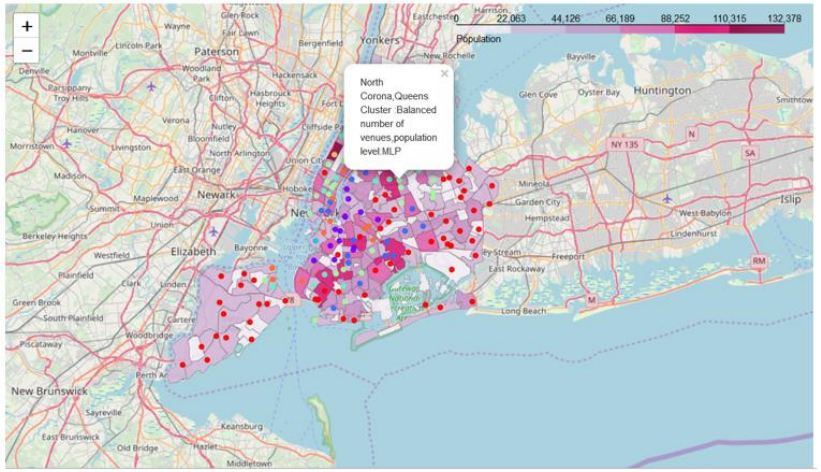
FIGURE 4.15-CLUSTER MAP(ISTANBUL)

Population level information were inserted into dataframe and cluster maps were generated as shown above.

K-MEANS CLUSTERING



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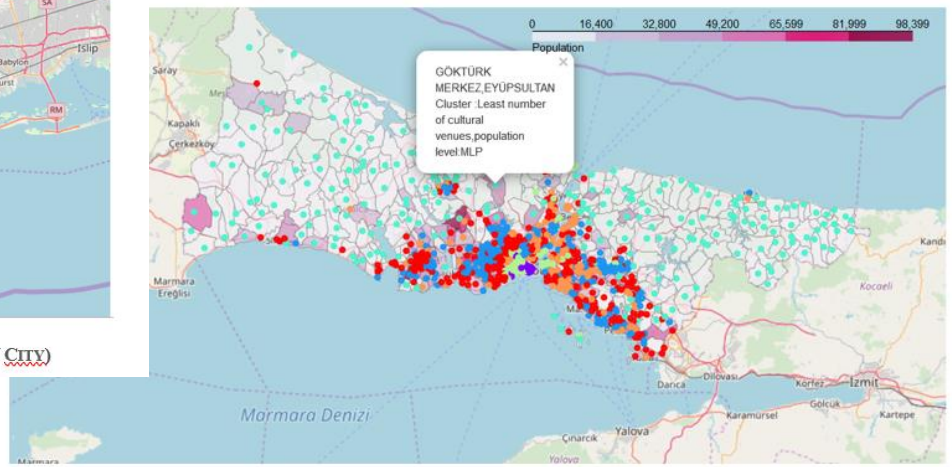

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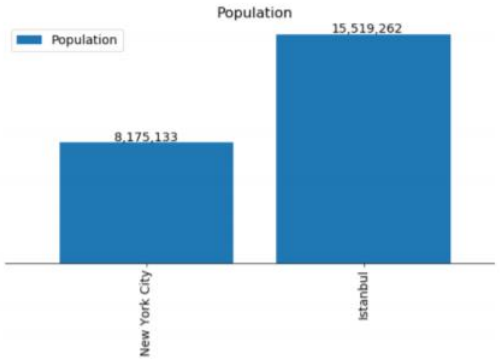


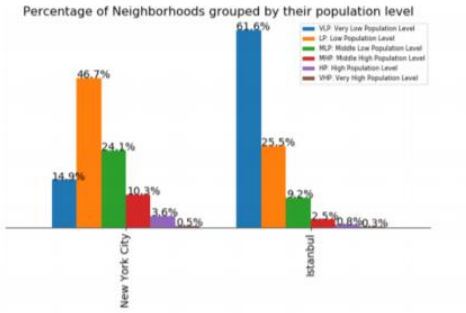
FIGURE 4.19-COMPARISON OF TOTAL POPULATION

The outcome of the analysis indicates that the population in New York city is more homogenously distributed than Istanbul. In Istanbul, even though 61.64% of neighborhoods are in very low population zone, this translates only into 22.5% of the total population. On the other hand, 14.9% of neighborhoods with low population level covers only 5.5% of the population in New York City. Neighborhoods with the label "LP","VLP" and "MLP" , which constitutes 85.7% of total neighborhoods in New York city, have 71.7% of total population whereas 96.3% of total neigborhoods in Istanbul, which are labelled as"LP","VLP" and "MLP", contain 84.9% of total population.

	VLP	LP	MLP	MHP	HP	VHP
New York City	14.87%	46.67%	24.10%	10.26%	3.59%	0.51%
Istanbul	61.64%	25.54%	9.23%	2.46%	0.82%	0.31%

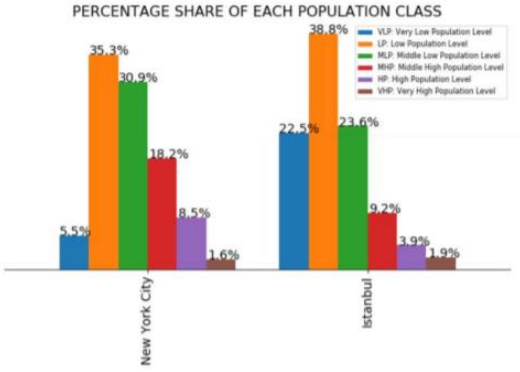
TABLE 4.15 -PERCENTAGE SHARE OF NEIGHBORHOODS FOR EACH POPULATION CLASS

The table above shows totally different population distribution; 61.64% of neighborhoc in Istanbul falls within VLP (Very low Population) Zone, whereas this percentage is 14.87% in New York City.



	VLP	LP	MLP	MHP	HP	VHP
New York City	5.49%	35.34%	30.88%	18.21%	8.47%	1.62%
Istanbul	22.52%	38.79%	23.58%	9.25%	3.95%	1.91%

TABLE 4.15 -PERCENTAGE SHARE OF EACH POPULATION CLASS



The two city was compared in terms of their population and cultural venue clustering pattern. Figures above show population pattern.

COMPARISON BETWEEN NEW YORK CITY AND ISTANBUL

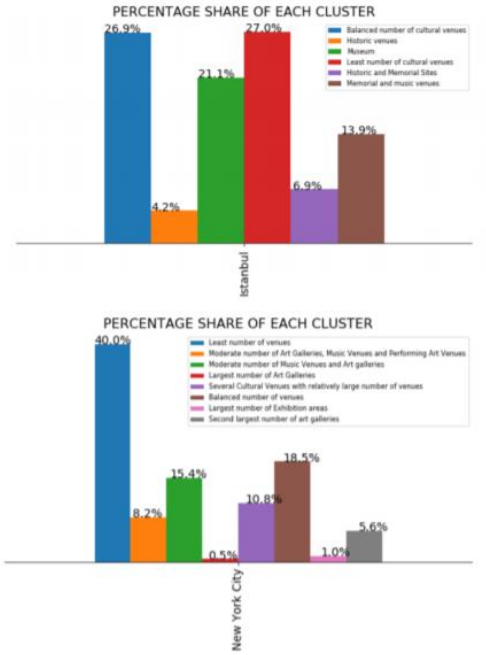
	Balanced number of cultural venues	Historic venues	Museum	Least number of cultural venues	Historic and Memorial Sites	Memorial and music venues
Istanbul	26.87%	4.21%	21.13%	26.97%	6.87%	13.95%

	Least number of venues	Moderate number of Art Galleries, Music Venues and Performing Art Venues	Moderate number of Music Venues and Art galleries	Largest number of Art Galleries	Several Cultural Venues with relatively large number of venues	Balanced number of venues	Largest number of Exhibition areas	Second largest number of art galleries
New York City	40.00%	8.21%	15.38%	0.51%	10.77%	18.46%	1.03%	5.64%

TABLE 4.16 -PERCENTAGE SHARE OF EACH POPULATION CLASS

The group names and the cluster pattern are different. 40% of neighborhoods in New York city are classified as “Least number of venues” whereas 27% of neighborhoods in Istanbul are considered as “Least number of venues”.

As can be interpreted from the figure above, Historic venues, museums and memorial sites are distinguished venues in Istanbul whereas Exhibition areas, Art Galleries, Music Venues and Performing art Venues take the center stage.



The figure shows the clustering pattern.

COMPARISON BETWEEN NEW YORK CITY AND ISTANBUL

In the first section of analysis, choropleth maps have been generated for each venue. This provides a deeper insight into the distribution each category of cultural venues. In Istanbul, low population zones lack cultural venues whereas In New York City, the distribution is more homogenous.

In the second part of Analysis, K-means clustering method have been applied to both cities. As a result, different clustering patterns have been observed. As Istanbul is historically significant city, it is not surprising that the number of historic sites, museums and memorial sites are in the forefront per the analysis outcome. On the other hand, Exhibition areas, Art Galleries, Music Venues and Performing art Venues determine the clustering pattern.

RESULTS AND DISCUSSION

In the final phase of analysis, these two metropolitan cities have been compared in terms of population distribution and clustering pattern. Neighborhoods with very low population outnumbers other neighborhoods with different level of population in Istanbul. However, Population in these neighborhoods are significantly smaller. In New York City, the population is distributed homogenously. As to cultural facilities, number of clusters and determining factors are different for each city. It can be concluded that cultural venues are scattered more evenly in New York City than in Istanbul.

RESULTS AND DISCUSSION

The analysis depends on the data obtained from web sources. Some venues may have been miscategorized affecting the outcome of the analysis. However, it is our belief that the effect of mis-categorization is not significant.

RESULTS AND DISCUSSION

This study conducted to find out the pattern of population cultural venue distrubution for Istanbul and New York City.

This study can be extended further to spot the weak and strong points of these cities. Distribution of Sport venues, Education facilities, health services, etc. are the possible subjects for the further analysis.

CONCLUSION