



# EVALUATING NEIGHBORHOOD IN MANHATTAN

**Saleh Ardameh**



# Introduction

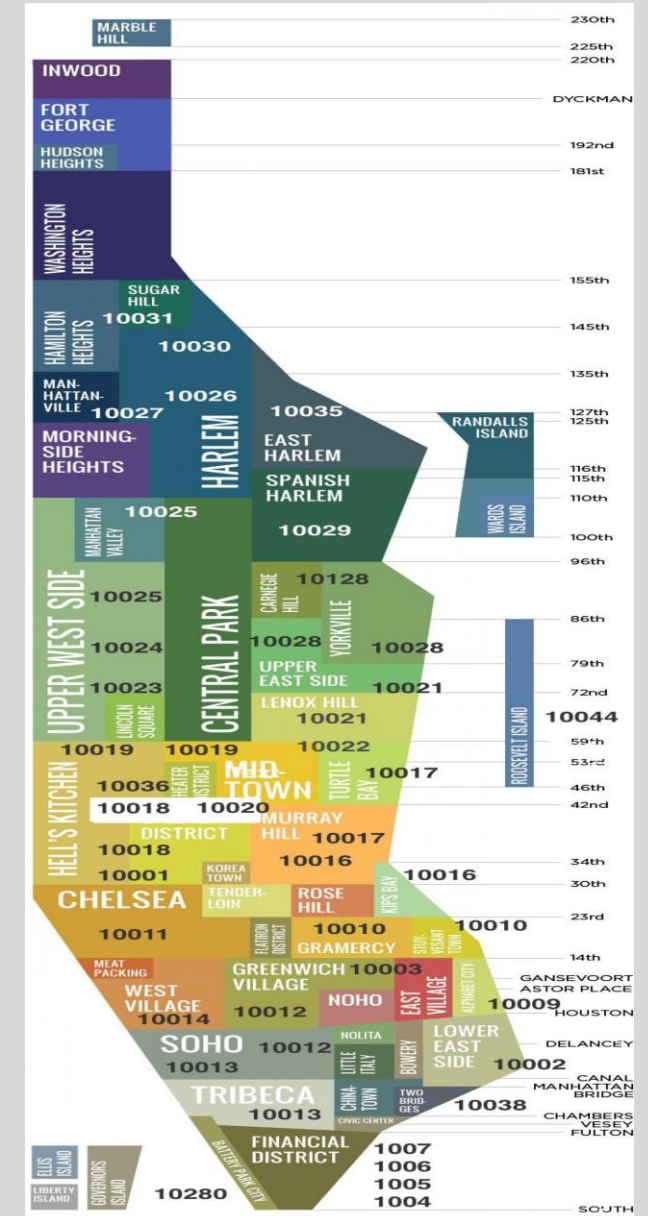
## Significance of the study

As issues (e.g. traffic congestion and environmental degradation) emerging from urbanization and urban sprawl have attracted considerable attention, there is a growing consensus that integrating land use and transport is a vital pathway to urban sustainable development (Bertolini et al. 2005; Kenworthy and Laube 1996; Lautso et al. 2004; Weiss et al. 2018). The physical components of urban spatial structure, or more specially land use, are connected by transport systems, which facilitate the functioning of cities by passengers and freight movements. The implementation of both urban functions and transport construction need substantial land requirement and consumption. Since urban land is a scarce resource and must be used efficiently (Lambin and Meyfroidt 2011), urban development, both in land use and transport, should be planned and managed rather than develop spontaneously (Tian et al. 2017). The integration of land use and transport thereby is necessitated in urban planning and management. The definition and representation of land use systems and transport systems vary in research purpose and scale. Land use/land cover pattern can reflect the spatial characteristics of land use practices and location-specific transport capacity can be measured by accessibility, which refers to the ease with which anyplace of a certain area can be reached by individuals at a particular location using the mobility service of specific transport systems. The relationship between land use/land cover types and accessibility can provide new insights into the synergy of land use and transport planning at regional scale

# Introduction

## Problem Definition

Since the choice of place of residence is one of the most important issues for people in choosing their desired neighborhood, so this project was defined in such a way as to be able to study the amount and types of land uses that people in each neighborhood have access to. For this reason, in New York City and in the Manhattan borough, different neighborhoods were considered for the study.



# Introduction

## Who would be interested in this project

The results of this project are suitable for all those who intend to choose the desired neighborhood to stay. Since the proposed method for this project is not limited to the study area, so the method can be generalized to other urban areas.

# Introduction

## Study area

Manhattan (/məˈnætən, mən-/), often referred to by residents of the New York City area as the City, is the most densely populated of the five boroughs of New York City, and coextensive with the County of New York, one of the original counties of the U.S. state of New York. Manhattan serves as the city's economic and administrative center, cultural identifier, and historical birthplace. The borough consists mostly of Manhattan Island, bounded by the Hudson, East, and Harlem rivers; as well as several small adjacent islands. Manhattan additionally contains Marble Hill, a small neighborhood now on the U.S. mainland, separated from the rest of Manhattan by the Harlem Ship Canal and later connected using landfill to the Bronx. Manhattan Island is divided into three informally bounded components, each aligned with the borough's long axis: Lower, Midtown, and Upper Manhattan

# Data acquisition and cleaning

## Data Source

The information used in this project consists of two parts:

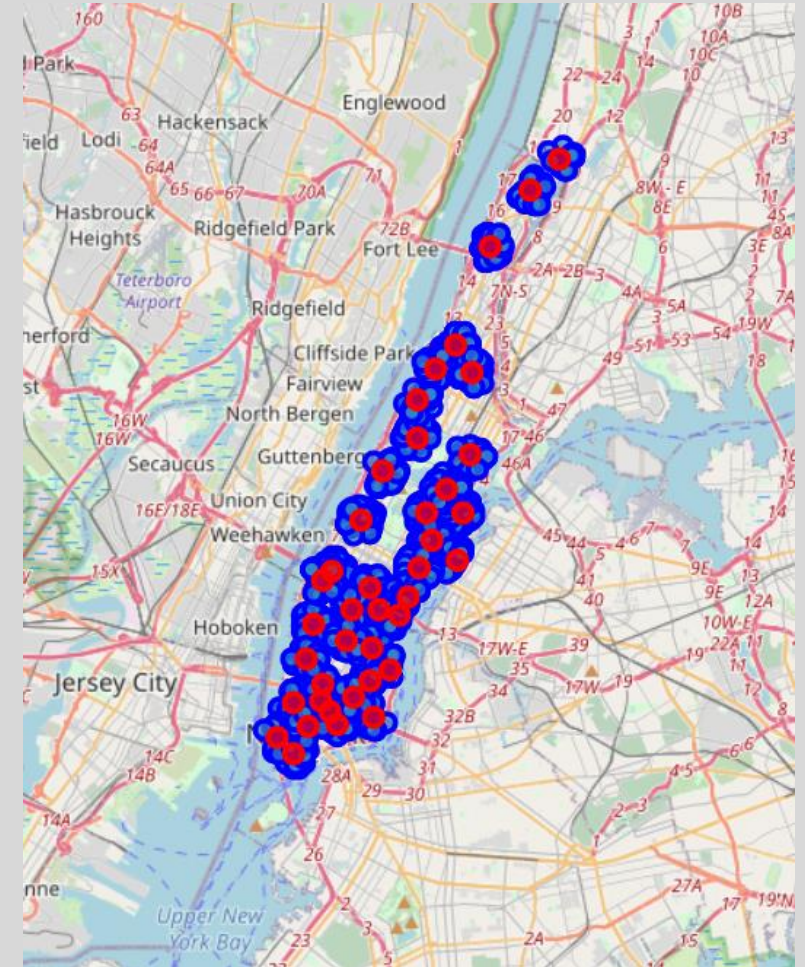
1. The first part is information in json format, which is used to determine the names of borough and their geographical location. This information was extracted from the third week of practice.
2. The second part of the information is extracted from the Foursquare, which includes places based on their land use classification. This information is used to classify land uses around our study sites.

# Data acquisition and cleaning

## Data preparation

The following steps are followed for this section:

1. Creating map of Manhattan using latitude and longitude values and add locations of the neighborhood along with the venues (Location of the neighborhood and venues are Displayed in red and blue).



# Data acquisition and cleaning

## Data preparation

2. Add a column named "Category". In this column, we create our classification using the classification in the Jason file. In this form of classification, we put all the items that are related to a type of land use in one category. For example, "shop" and "store" land use are put into the category of "Shop & Store". In order to classify land uses, 11 categories have been considered. These classifications are:

Neighborhood Latitude	Neighborhood Longitude	Arts	Transit	School
Bar	Cafe	Entertainment	Sport	
Health & Beauty	Office	Restaurant & Food	Shop & Store	



# Data acquisition and cleaning

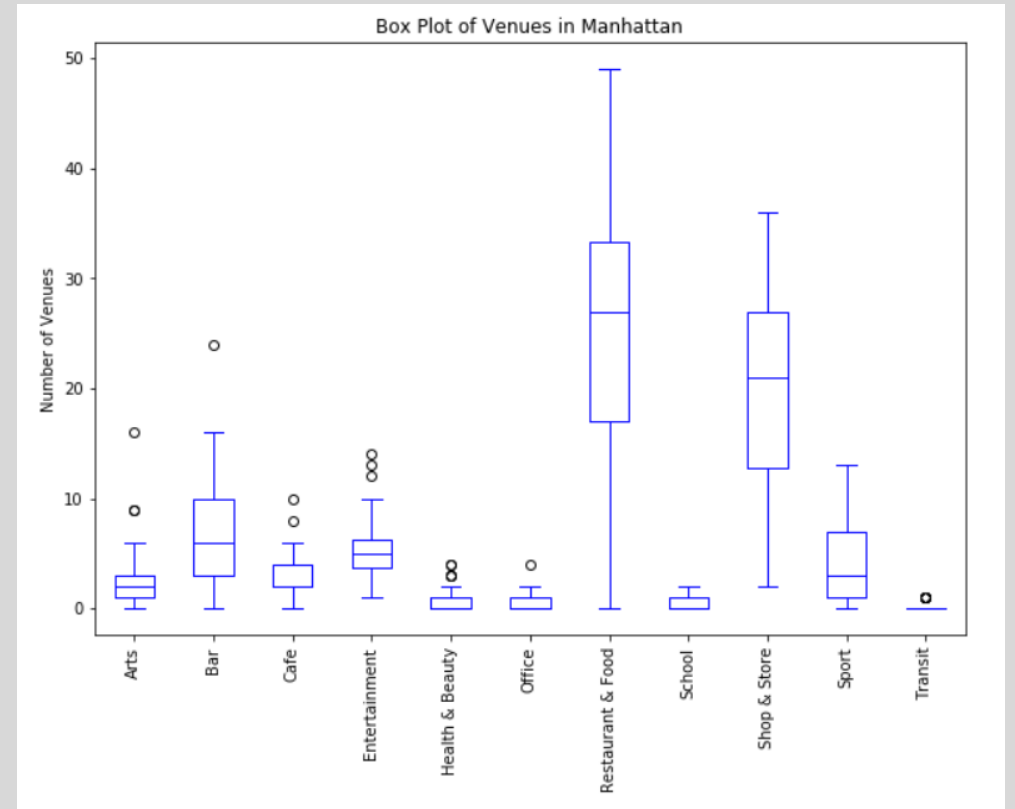
## Data preparation

3. Classification results, After performing the classification, the number of classifications that do not fit in our category will be determined. The reason for the existence of unclassified cases is not to go into the details of land use, and the study of land use is essential. Number of venue category that categorized: 2777 ,and Number of uncategorized: 409.
4. Calculating the number of land uses in each Neighborhood, By summing the number of land uses in each neighborhood, the total number of land use is determined according to the type and neighborhood location.

# Analyze Data

## Distributing of each land use in Neighborhoods

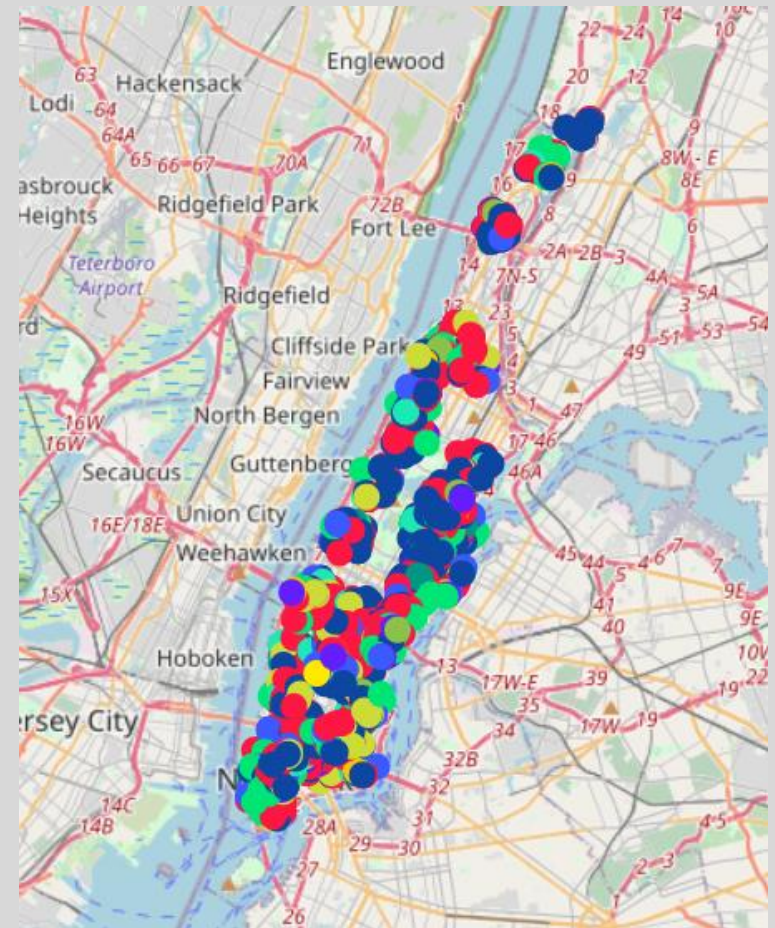
In order to investigate this, a box plot chart is drawn. As can be seen in the diagram below, the land use of "food and restaurant" and "shopping and store" in the distribution network is higher. Still, the amount of this distribution varies from region to region. This is well illustrated in the diagram. Other land uses that are found in these areas and have a high distribution.



# Analyze Data

## Show Manhattan Venues for each Neighborhood

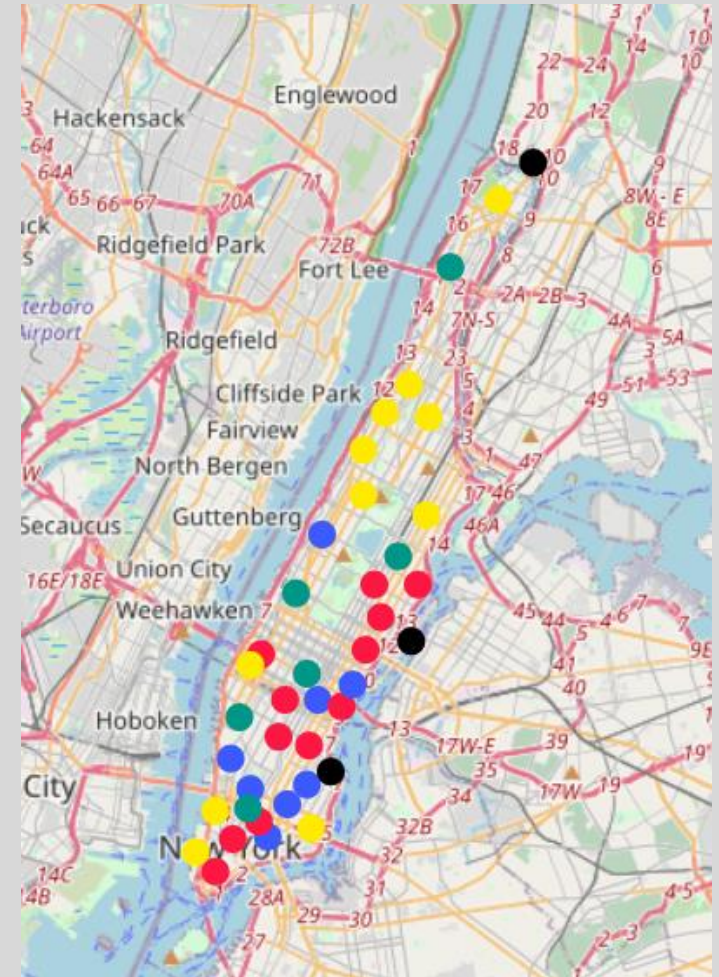
To show the distribution of venues in a different neighbourhood, the map of Manhattan has been used, and in it, each of the venues is shown on the map with its specific land use color.



# Analyze Data

## Clustering different Neighborhood based on the proximity of their land use to each other

In order to select the best neighbourhood that has the most access to different land uses, we use clustering. In this method, considering 5 clusters for the neighbourhoods in the Methane area, we perform the clustering operation.

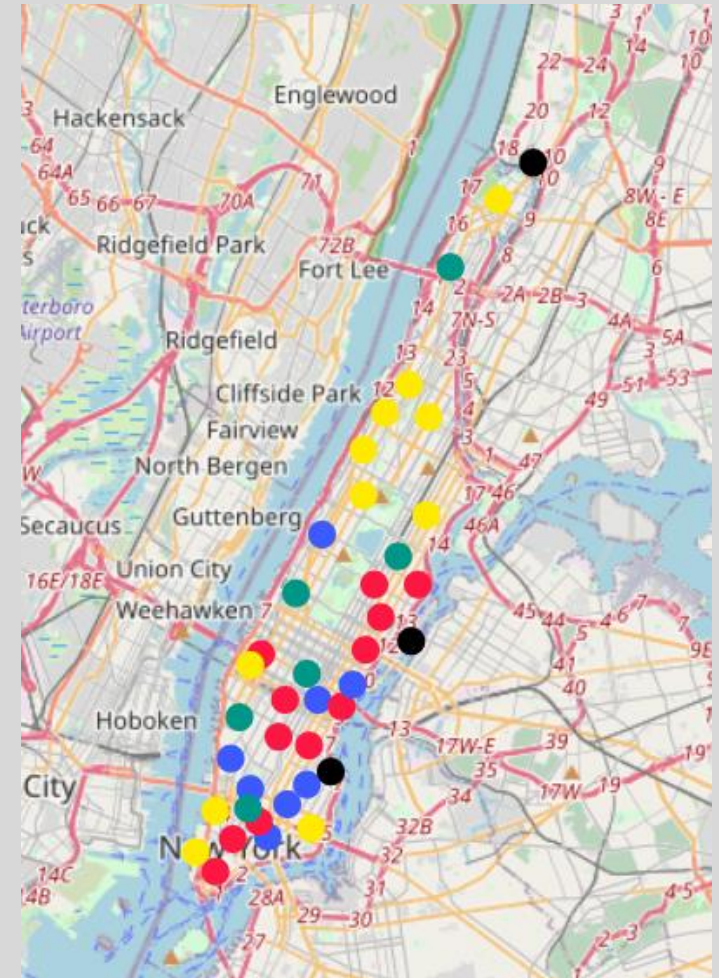




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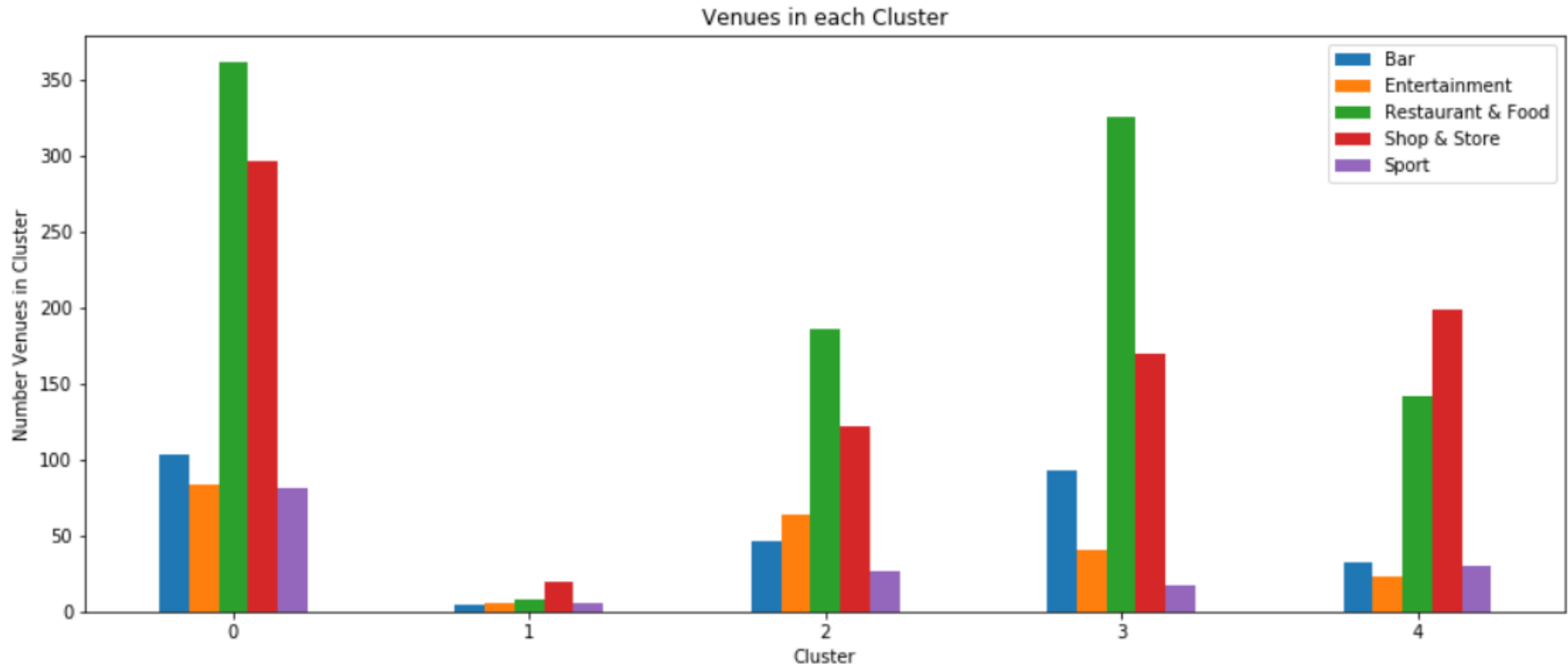


# Analyze Data

## **Clustering different Neighborhood based on the proximity of their land use to each other**

In the two bar graphs below, the amount of each land use is shown separately for each cluster. As can be seen in this figure, cluster number 1, which includes Neighborhoods 'Marble Hill', 'Roosevelt Island', 'Stuyvesant Town', has the least access to different uses. Other clusters are better in terms of access than the neighbourhoods in the first cluster but differ in the amount of access to each of the uses.

# Analyze Data



# Analyze Data

