

Potential Movie Theatre in New York City

Archana David

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1. Introduction

1.1. Background

The Movie industry has become one of the most promising entertainment industries and has evolved through ancient times. From theatres to musicals to silent movies to witnessing our favorite superheroes saving the world in Avengers: End Game. As movies are taken movie theatres are the platforms to provide entertainment to people.

With the numbers increasing in population we need to provide movie theatres that help to cater to the increasing demand.

1.2. Problem

Though there are many established movie theatre franchise like PVR cinemas in India, Cineworld in UK, Cineplex in Canada and AMC Theatres in US. These movie theatre chains would always be on the lookout for the next best investment.

The investment must cater to

- the growing demand of population
- check for existing other entertainment arts & theatres in the closest vicinity
- check for existing Movie theatres in the neighborhood

2. Data Acquisition and cleaning

2.1. Data Sources

As our current focus is to determine the potential neighborhoods to establish in New York, we need to procure information about

- New York neighbourhood dataset, data scraped from https://cocl.us/new_york_dataset
- Population of New york neighbourhoods, data scraped from <https://data.cityofnewyork.us>
- All venues of any type of theatre in the neighbourhoods in given Borough in New York city (Foursquare API)
- All venues which are movie theatre in a given Borough (Foursquare API)

2.2. Data cleaning

As part of data pre-processing stage, the data is loaded into a dataframe for data analysis. In data analysis, the data type of each column is analyzed, statistical summary of each column is analyzed and concise summary of the dataframe is analyzed as well.

Any Missing data is check with data source again or dropped or replaced with mean or frequency or based on other functions.

As part of Data Cleaning,

- data is checked to see if they are stored in other data format than our intended use
- Convert the data to the metrics that is specific for that country
- If the stored data is in the correct format

In our scenario, missing values were dropped and the cleaned data produced 44 theatres and 17 movie theatres.

3. Feature selection

For our use case we need the following features for analysis.

New York neighbourhood dataset, data scraped from https://cocl.us/new_york_dataset

- Borough
- Neighborhood in each Borough
- Latitude of each neighborhood
- Longitude of each neighborhood

From foursquare API we can get all venue details for a given borough/neighborhood.

- All Venues in a Borough
- All theatre venues which are can be any type of theatres in a neighborhood
- All movie theatre venues in a neighborhood
- Latitude of the venues
- Longitude of the venues

Thirdly we need to population details for each of the neighborhoods in New York city.

Population of New york neighbourhoods, data scraped from <https://data.cityofnewyork.us>

- Borough
- NTA Code
- NTA Name
- Population
- Latitude
- Longitude

The area and density features are calculated and added to the dataframe

4. Exploratory Data Analysis

4.1. Data Visualization

4.1.1. Boroughs in New York City

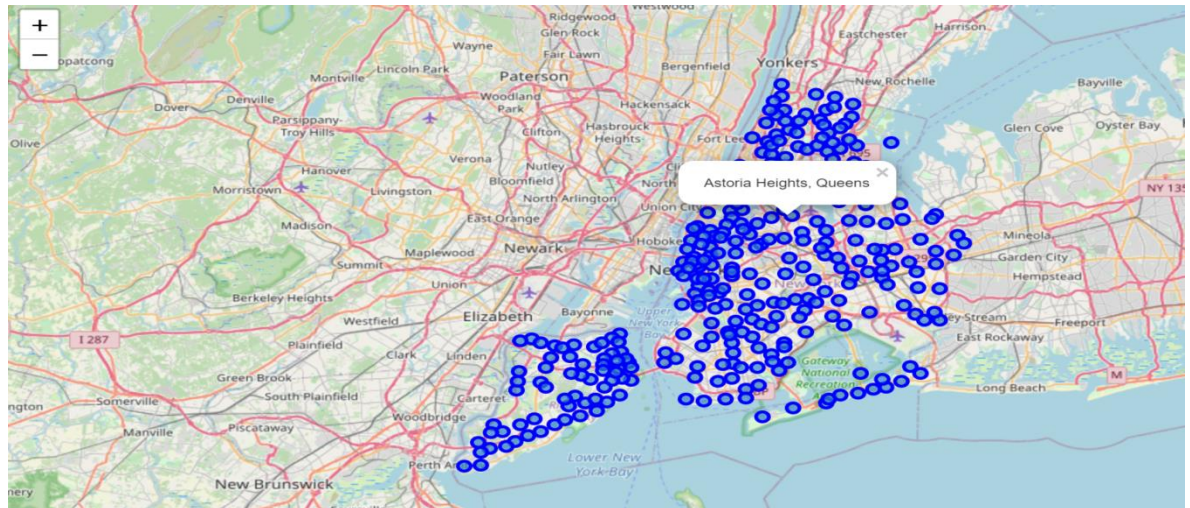
We need to understand the topology and geographical details of New York City Boroughs.

New York has 5 Boroughs and 205 neighborhoods.



4.1.2. Neighborhoods in New York city

A scatter plot was created in Folium using python to visualization all the neighborhoods in New York City. Below example is Astoria Heights neighborhood in Queens Borough

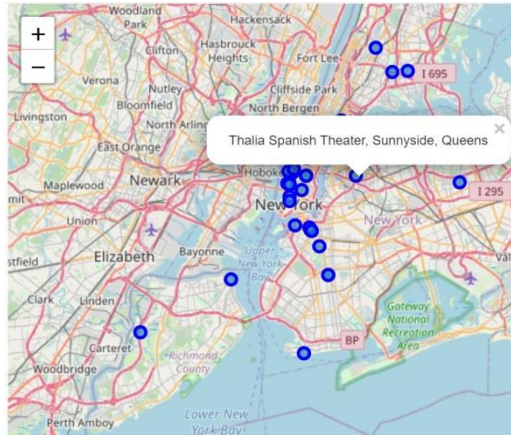


4.1.3. Theatres/Movie theatres in New York city

4.1.3.1. Theatre in neighborhoods in New York

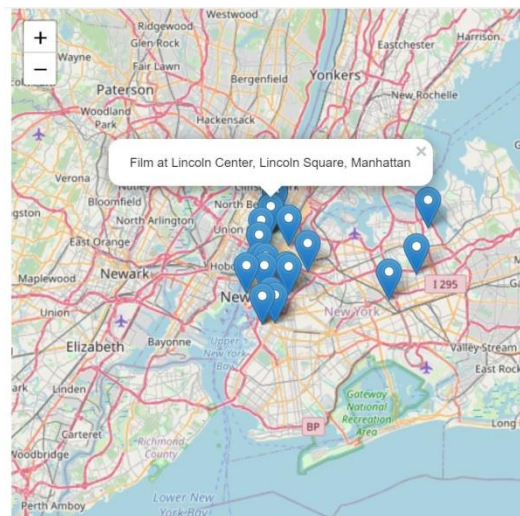
Our analysis now leads to understanding all venues which are a type of theatre musical/arts/movie theatre that are present in Boroughs Manhattan, Queens, Bronx, Brooklyn and Staten Island.

It is noted that there are 29 theatres in Manhattan, 3 in Bronx, 2 in Staten Island, 2 in Queens and 10 around in Brooklyn



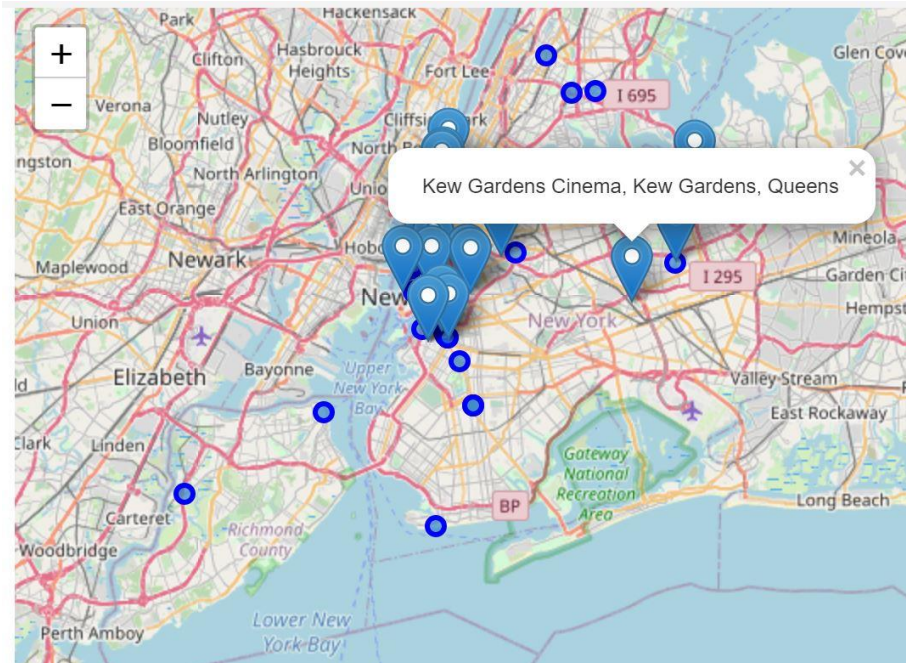
4.1.3.2. Movie Theatres in New York

Narrowing down our analysis, we analyze only the movie theatres in New York city. It is observed that there are sufficient movie theatres in Manhattan, 3 in Queens and 2 in Brooklyn and no movie theatres in Staten Island and Bronx Borough. Our potential area to establish movie theatres are in Boroughs Bronx and Staten Island.



4.1.3.3. Combined overview of all entertainments in New York

For better analysis, venues which are all types of theatres and also that of movie theatres are combined in the same map. Movie theatres are marked with Markers and theatres are marked with circle to differentiate.

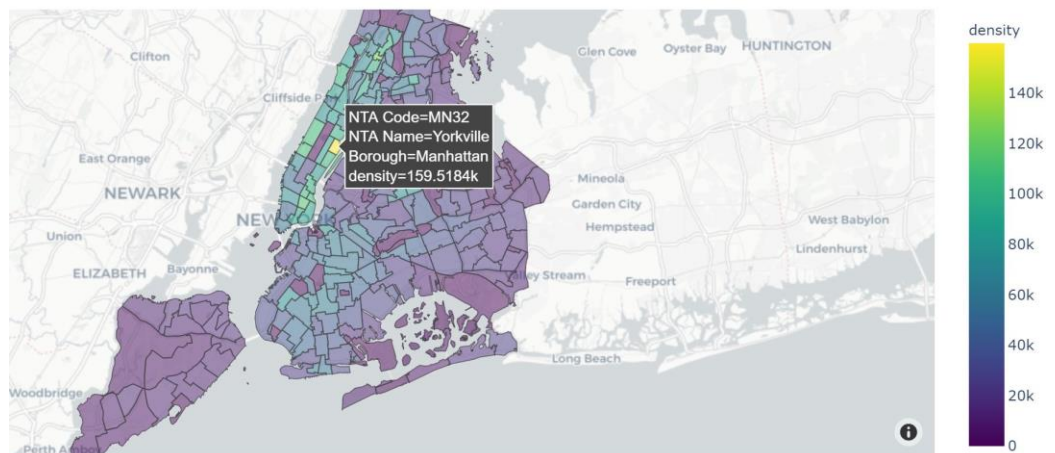


4.1.4. Population Density

4.1.4.1. Densely populated

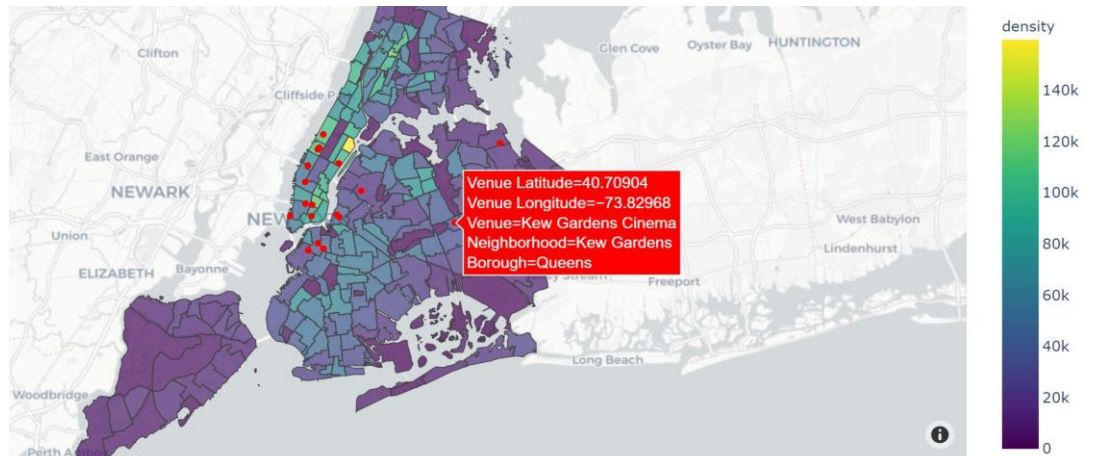
Now we have narrowed our potential business areas to Bronx and Staten Island in New York City. Best investment plan is where there is sufficient profit and we explore further to understand the population in New York Boroughs. The below plotly.express map shows neighborhoods based on density of population. The data utilized is referenced from *Population of New York neighbourhoods, data scraped from <https://data.cityofnewyork.us>*

From our analysis, Manhattan Borough is densely populated justifying the current demand of 10 movie theatres in Manhattan. Yorkville is the most densely populated neighborhood in Manhattan. Boroughs Brooklyn, Queens and Bronx range from low to moderate populated with Staten Island recording the lowest population in all of its neighborhoods.



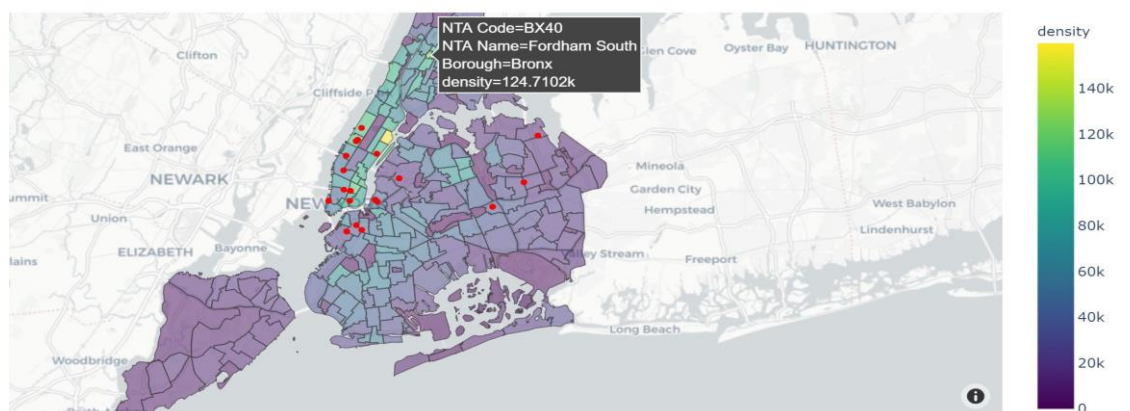
4.1.4.2. Movie theatre in New York city with population density

It's always best to analyze all the movie theatres based on the population in the Boroughs of New York City for better understanding. From our Analysis we can determine there are 10 movie theatres in Manhattan, New York. There are around 6 movie theatres in Brooklyn and 3 in Queens, New York. There are currently no movie theaters in Boroughs Staten Island and Bronx, New York.



4.1.4.3. Potential area to establish movie theatre

The highest populated neighborhood in Bronx Borough is neighborhood Fordham South. Taking into consideration, factors like population and lack of movie theatres in Bronx and Staten Island. It would be more ideal for investors to first make their invested in Fordham South, Bronx , New York.



5. Conclusion

- It's been observed that Manhattan is the borough that's densely populated and has sufficient movie theatres to cater to the needs of the people
- Boroughs Brooklyn and Queens are moderately populated and has sufficient movie theatres to cater to needs of its occupants
- Borough Staten Island population is quite low, though it is a potential area to bring a new movie theatre the profits initially would be low
- Borough Bronx is quite small and moderately populated. Fordham South is the second highest populated neighbourhood in New York City and is the most potential place to invest in a new movie theatre.

6. References

- <https://postmediaprovince2.files.wordpress.com/2018/04/0407-trav-reader-boroughs.jpg?quality=60&strip=all&w=580&zoom=2>
- <https://python-visualization.github.io/folium/>
- <https://plotly.com/python/choropleth-maps/>
- New York neighbourhood dataset, data scraped from https://cocl.us/new_york_dataset
- Population of New York neighbourhoods, data scraped from <https://data.cityofnewyork.us/City-Government/New-York-City-Population-By-Neighborhood-Tabulation/swpk-hqdp>
- Geojson data New York Neighbourhoods, <https://chriswhong.github.io/plutoplus/>