RESTAURANT RECOMMENDER SYSTEM

A Project by Akshita Basera

Recommender system

Restaurant recommender system is a machine learning model, developed to demonstrate as a capstone project to IBM through coursera. It recommends restaurants based on the user's likes and dislikes and his previous interest data

1. Intro to Data

To find a solution to the questions and build a recommender model, we need data and lots of data.

- **Geographical coordinates**
  Find out where exactly it is located. (latitude and longitude)
- **Population**
  Population of the neighborhood where the restaurant is located.
- **Average income**
  Average income of the neighborhood to know how much the restaurant is worth.

Data

	Borough	Neighborhoods	AverageIncome	Normalized_income
0	Central	Cantonment area	18944.099792	0.293051
1	Central	Domlur	56837.022198	0.879225
2	Central	Indiranagar	41991.817435	0.649581
3	Central	Jeevanbheemanagar	6667.447632	0.103140
4	Central	Malleswaram	53270.063892	0.824047

Income by neighborhood

Borough	Neighborhoods	Latitude	Longitude
Central	Cantonment area	12.972442	77.580643
Central	Domlur	12.960992	77.638726
Central	Indiranagar	12.971891	77.641151
Central	Jeevanbheemanagar	12.962900	77.659500
Central	Malleswaram	13.003100	77.564300
Central	Pete area	12.962700	77.575800
Central	Rajajinagar	12.990100	77.552500
Central	Sadashivanagar	13.006800	77.581300
Central	Seshadripuram	12.993500	77.578700
Central	Shivajinagar	12.985700	77.605700

Neighborhood with coordinates

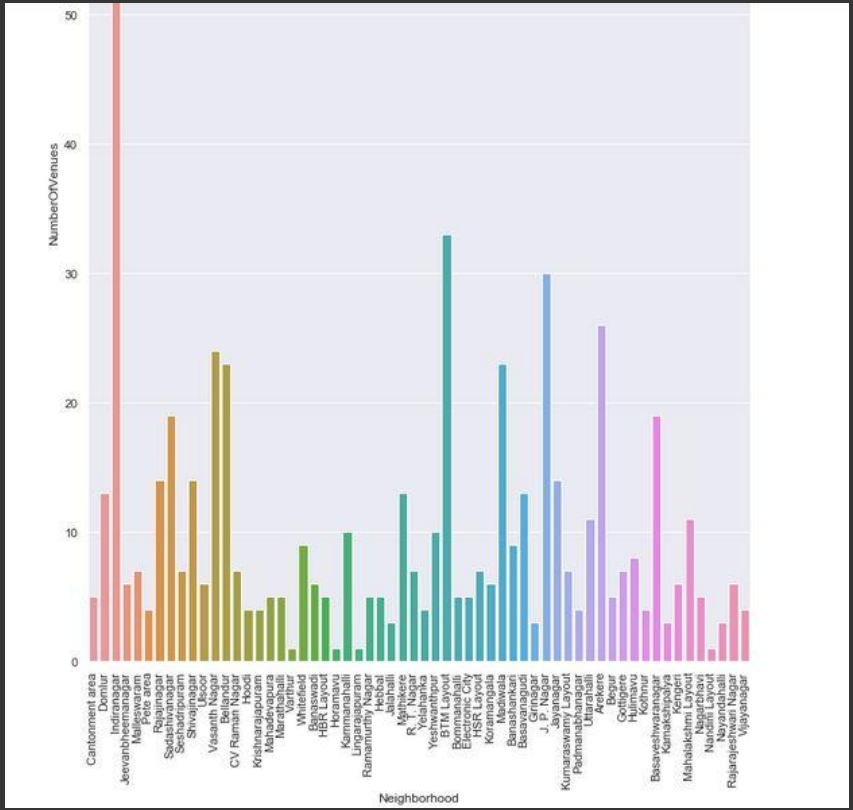
	Borough	Neighborhoods	Population	Normalized_population
0	Central	Cantonment area	866377	0.880810
1	Central	Domlur	743186	0.755567
2	Central	Indiranagar	474289	0.482190
3	Central	Jeevanbheemanagar	527874	0.536668
4	Central	Malleswaram	893629	0.908516

Population by neighborhood

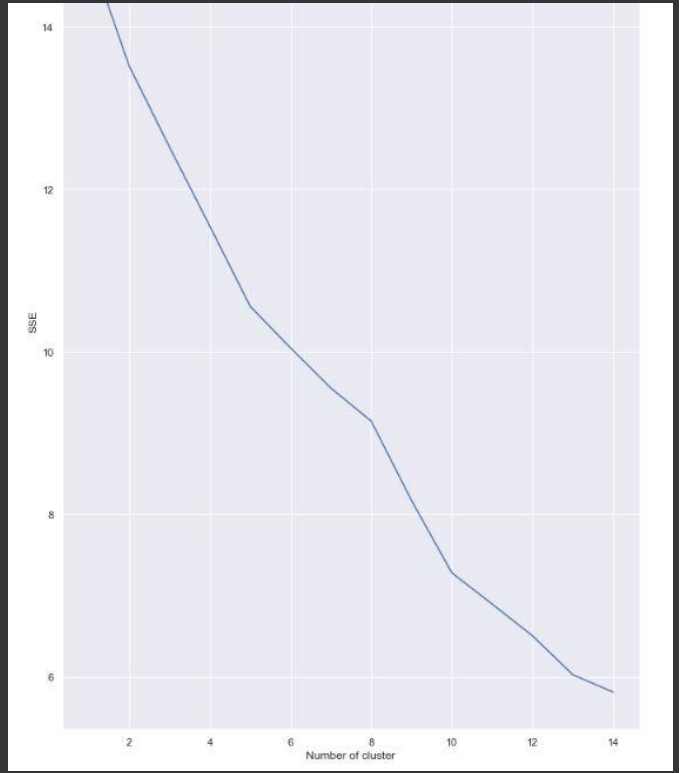
	Neighborhood	Borough	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Cantonment area	Central	12.972442	77.580643	Hotel Fishland	12.975569	77.578592	Seafood Restaurant
1	Cantonment area	Central	12.972442	77.580643	Sapna Book House	12.976355	77.578461	Bookstore
2	Cantonment area	Central	12.972442	77.580643	Vasudev Adigas	12.973707	77.579257	Indian Restaurant
3	Cantonment area	Central	12.972442	77.580643	Adigas Hotel	12.973554	77.579161	Restaurant
4	Cantonment area	Central	12.972442	77.580643	Kamat Yatrinivas	12.975985	77.578125	Indian Restaurant

Foursquare API to fetch nearest venue locations

Exploratory analysis:

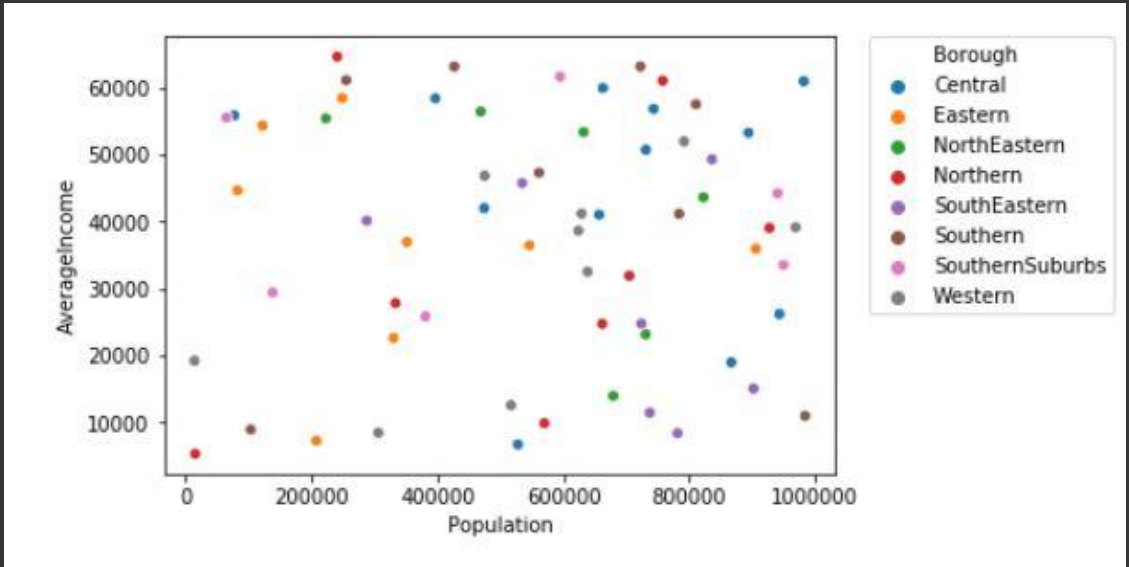


Finding K-mean value:



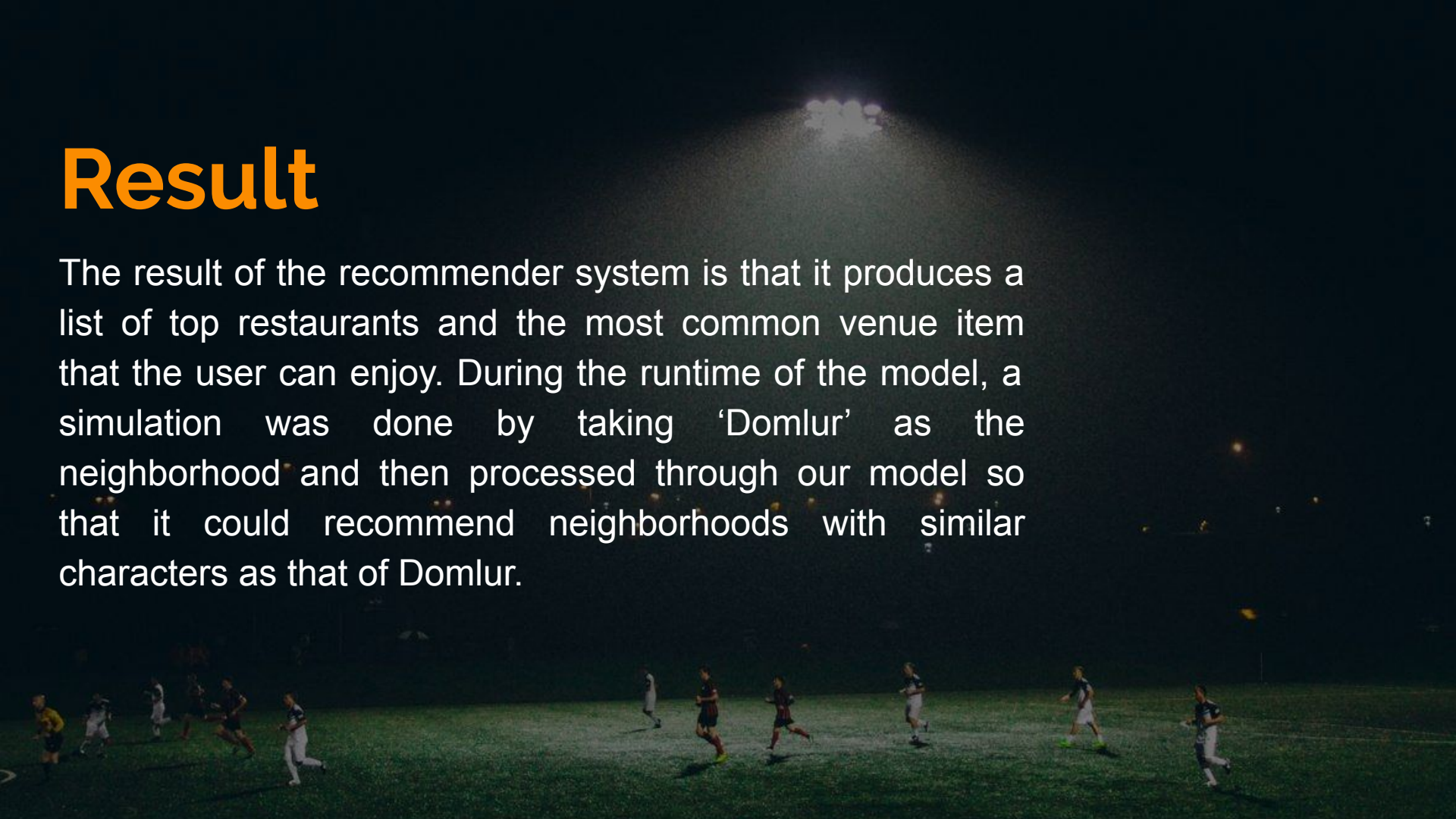
Inferential analysis:

- Most important factors while building the recommender system were population and income.
- They are the most important factor because they have a nonlinear relationship according to our dataset.



Result

The result of the recommender system is that it produces a list of top restaurants and the most common venue item that the user can enjoy. During the runtime of the model, a simulation was done by taking ‘Domlur’ as the neighborhood and then processed through our model so that it could recommend neighborhoods with similar characters as that of Domlur.



Conclusion and future directions

- ➔ Built useful models to consider factors such as population, income and makes use of Foursquare API to determine nearby venues
- ➔ It is a powerful data driven model whose efficiency may decrease with more data but accuracy will increase.