



# Restaurant Recommender System

# Introduction

- ▶ Problem Background:
  - ▶ - Bangalore, India's third-largest city, offers a diverse culinary experience.
  - ▶ - Travelers often face challenges in finding good, affordable restaurants.
- ▶ Problem Description:
  - ▶ - Need to recommend the right restaurant based on proximity, ratings, cost, and specialties.



# Questions to Address



How many types of food are available in restaurants?



Which is the nearest restaurant with a good rating?



How many similar restaurants are nearby?



Do similar restaurants cost more, and what makes them special?

# Target Audience



Travelers and local residents  
seeking restaurant  
recommendations.



People who prefer similar  
restaurants or highly rated  
options near them.

# Data



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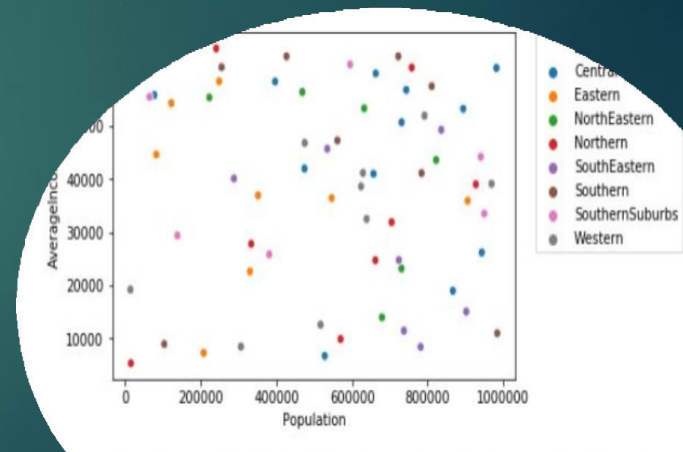
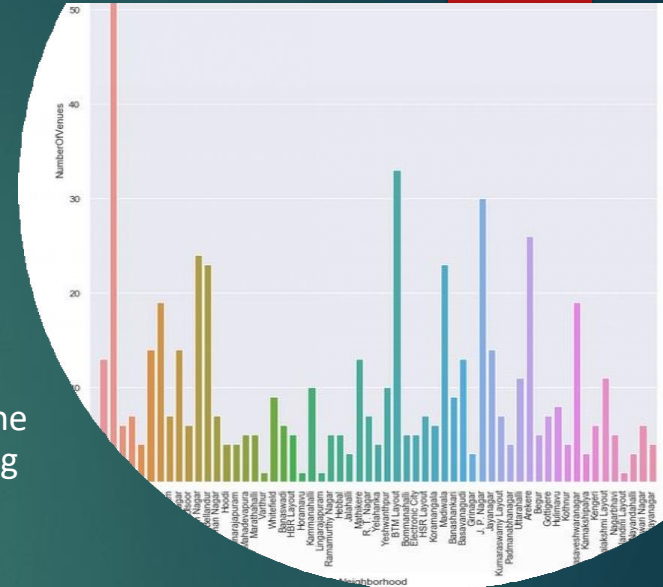
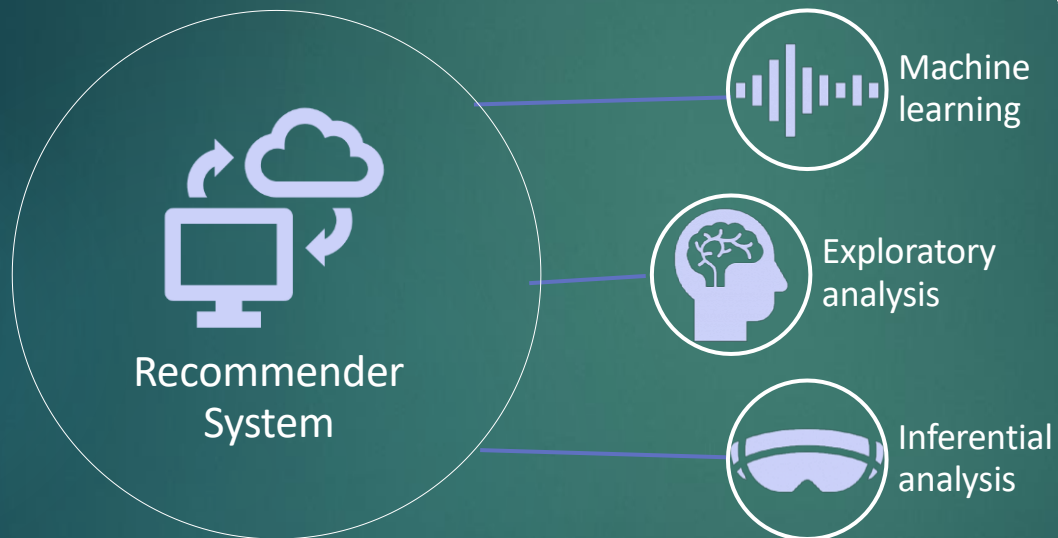
## Data Requirements:

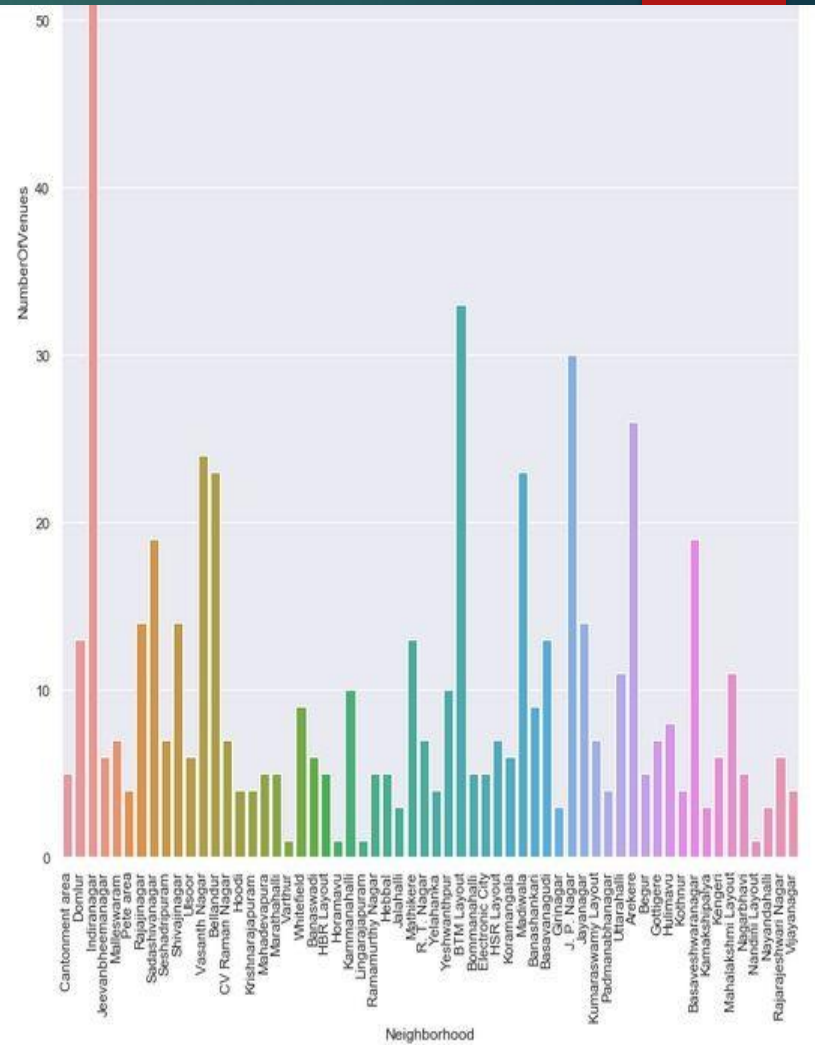
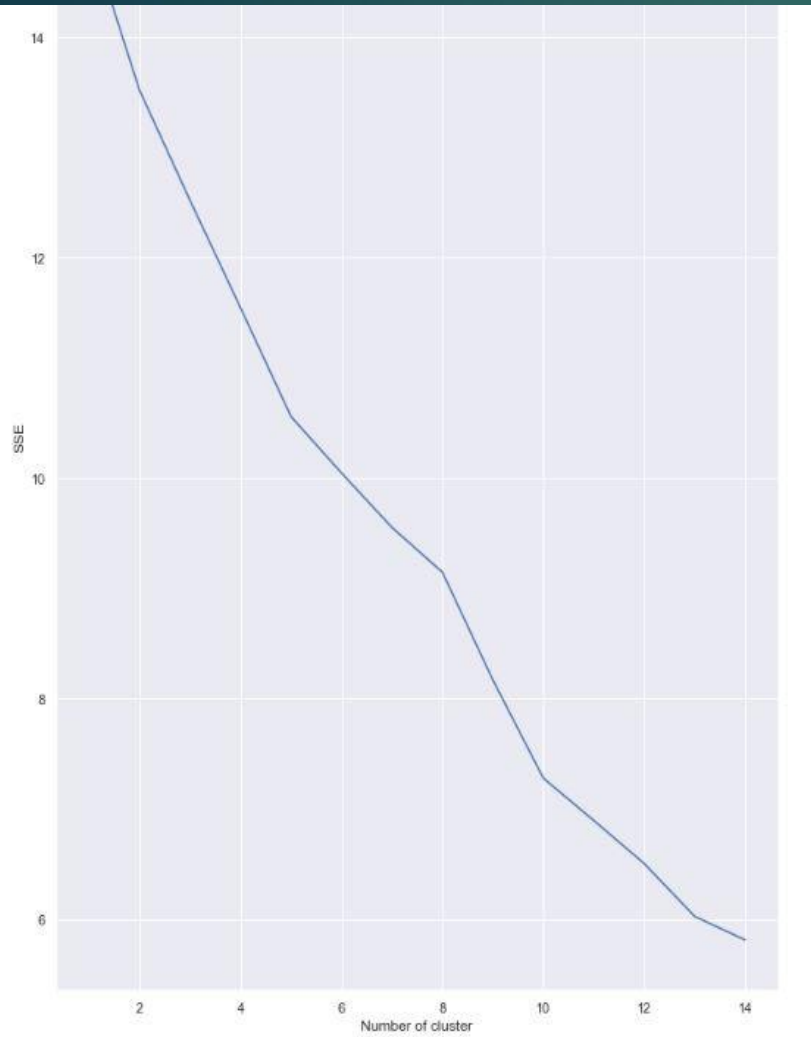
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- Restaurant coordinates (latitude, longitude).
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- Population and income of neighborhoods.
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## Data Collection:

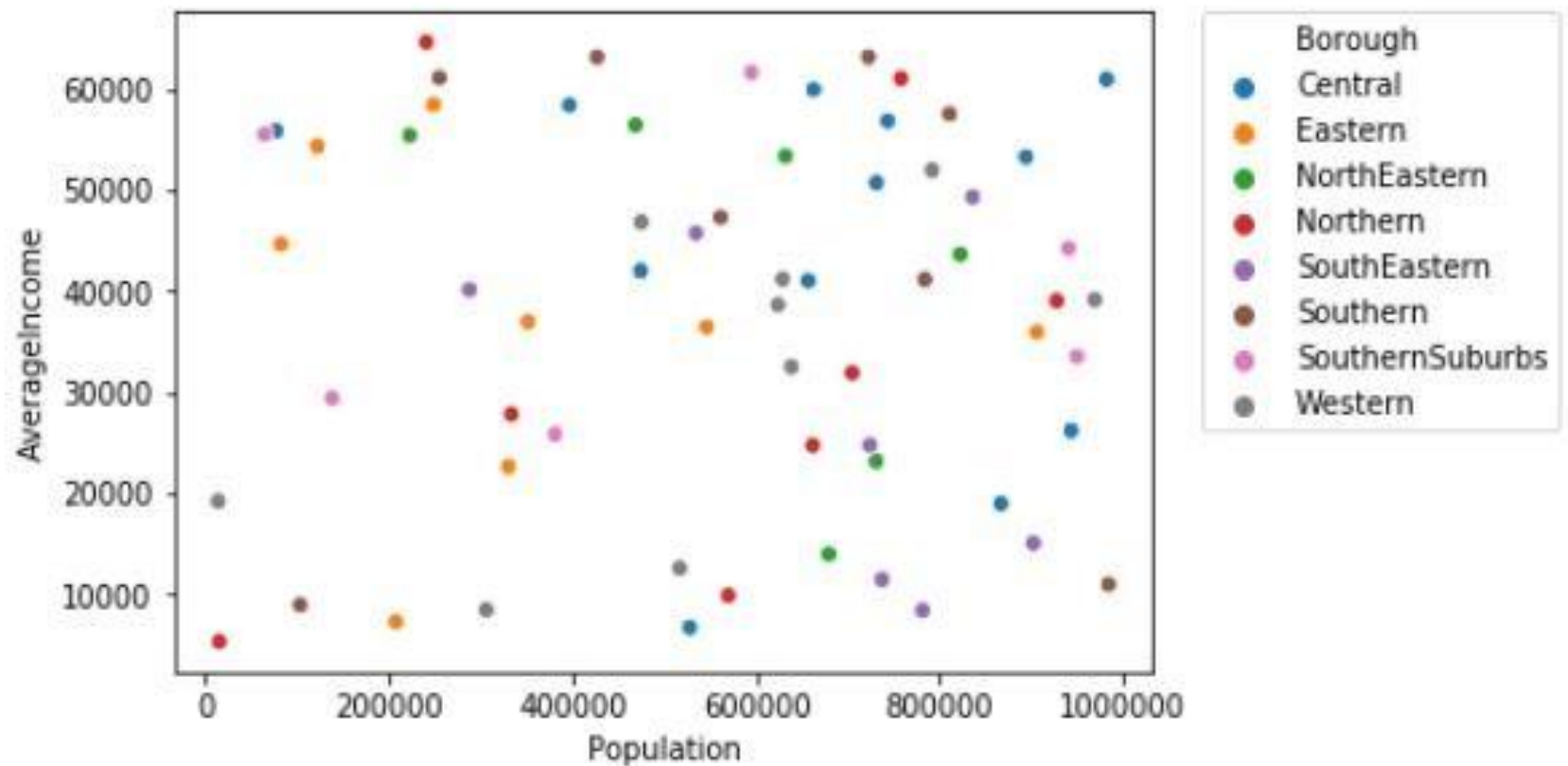
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- Used Google Maps API for coordinates, and web scraping for neighborhood data.

# METHODOLOGY











# DATASETS

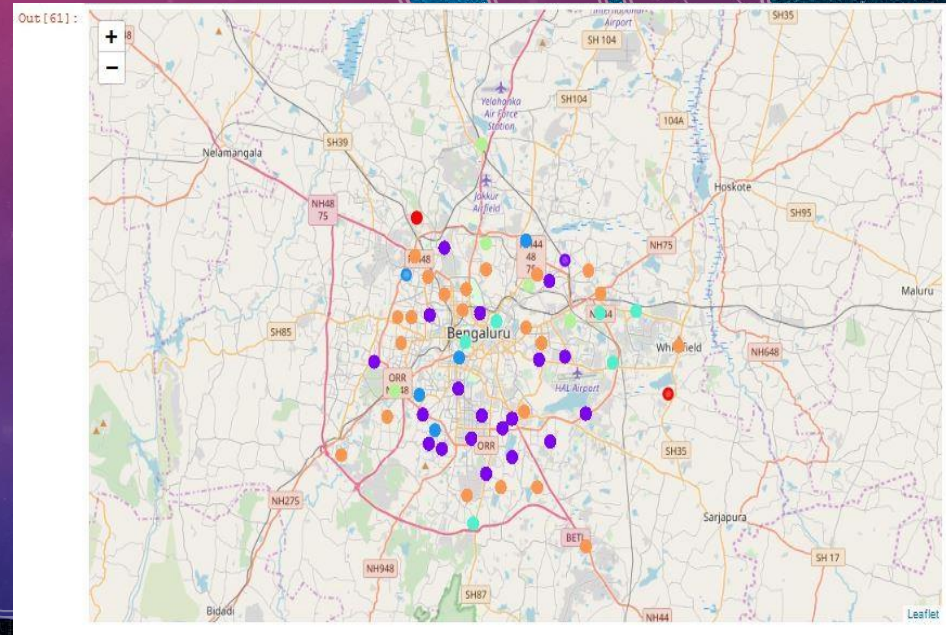
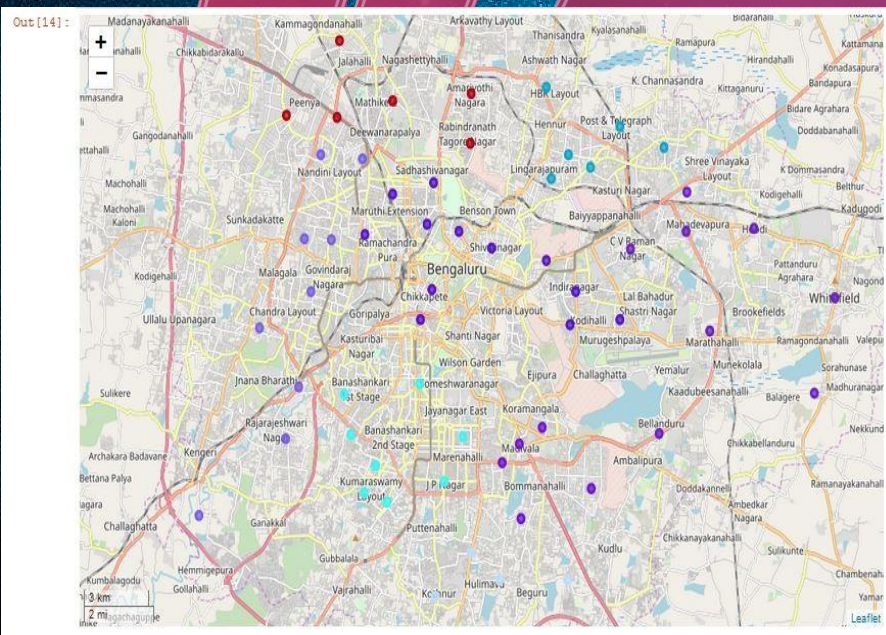
	Borough	Neighborhoods	Population	Normalized_population
0	Central	Cantonment area	866377	0.880810
1	Central	Domlur	743186	0.755567
2	Central	Indiranagar	474289	0.482190
3	Central	Jeevanbheemanagar	527874	0.536668
4	Central	Malleswaram	893629	0.908516

	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 Yatrivas	12.975985	77.578125	Indian Restaurant

	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

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

# MAPPING AND CLUSTERING





# RESULTS AND CONCLUSION

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----- Arekere -----
                                Venue  Frequency
0  Venue Category_Indian Restaurant    0.23
1  Venue Category_Sporting Goods Shop   0.15
2  Venue Category_Pizza Place           0.08
3  Venue Category_Department Store      0.08
4  Venue Category_Liquor Store           0.04

----- BTM Layout -----
                                Venue  Frequency
0  Venue Category_Indian Restaurant    0.18
1  Venue Category_Snack Place           0.09
2  Venue Category_Ice Cream Shop        0.09
3  Venue Category_Pizza Place           0.06
4  Venue Category_Vegetarian / Vegan Restaurant 0.06

----- Banashankari -----
                                Venue  Frequency
0  Venue Category_Indian Restaurant    0.22
1  Venue Category_Café                  0.22
2  Venue Category_Men's Store           0.11
3  Venue Category_North Indian Restaurant 0.11
4  Venue Category_Clothing Store         0.11

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Out[211]:

	Neighborhoods	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	Ranking
0	Basaveshwaranagar	Venue Category_Ice Cream Shop	Venue Category_Indian Restaurant	Venue Category_Fast Food Restaurant	[0.6426377807870477]
1	Begur	Venue Category_Indian Restaurant	Venue Category_Indian Sweet Shop	Venue Category_Food Court	[0.7361321887351776]
2	Electronic City	Venue Category_Outlet Store	Venue Category_Furniture / Home Store	Venue Category_Bus Stop	[0.5423513638809381]

# Clustering



USED CLUSTERING  
METHODS TO GROUP  
SIMILAR NEIGHBORHOODS.



ELBOW GRAPH HELPED  
DETERMINE THE OPTIMAL  
NUMBER OF CLUSTERS.



An aerial photograph of a suburban neighborhood. The houses are mostly single-story with light-colored roofs. Many have swimming pools in their backyards. Some roofs are covered with solar panels. The streets are paved and have some parked cars. There are trees and greenery throughout the area.

# Results

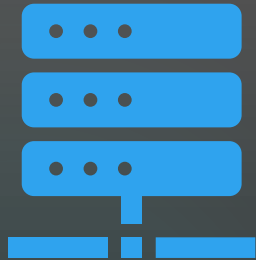
- ▶ Example of neighborhood 'Whitefield':
- ▶ Model recommended neighborhoods with similar characteristics.

# Discussion

Nonlinear relationships between population and income impact clustering.

Correct number of clusters is crucial to avoid overfitting or underfitting.

# Conclusion



Recommender system helps users find the best restaurant based on population, income, and Foursquare API data.



The system's accuracy improves with more data.