

ANALYSING BENGALURU NEIGHBORHOODS

FINAL ASSIGNMENT: PROFESSIONAL DATA
SCIENCE CAPSTONE PROJECT

- ROBIN VARGHEESE

Introduction

- ▶ The IT boom in India has made a Bengaluru (Bangalore) a cosmopolitan city. This is a city where we see a lot of variety, especially in food and culture. One can find people from many nationalities either working in Bengaluru or often visiting Bengaluru. This is in addition to a large number of people from other states of India. This has made Bengaluru a food lover's paradise. We can have a taste of both Italy and China in the same neighborhood itself. Hence it is very interesting to analyze the restaurants of Bengaluru. On analysis of Bengaluru restaurant and venue data, we get very interesting findings.
-



Data Preparation

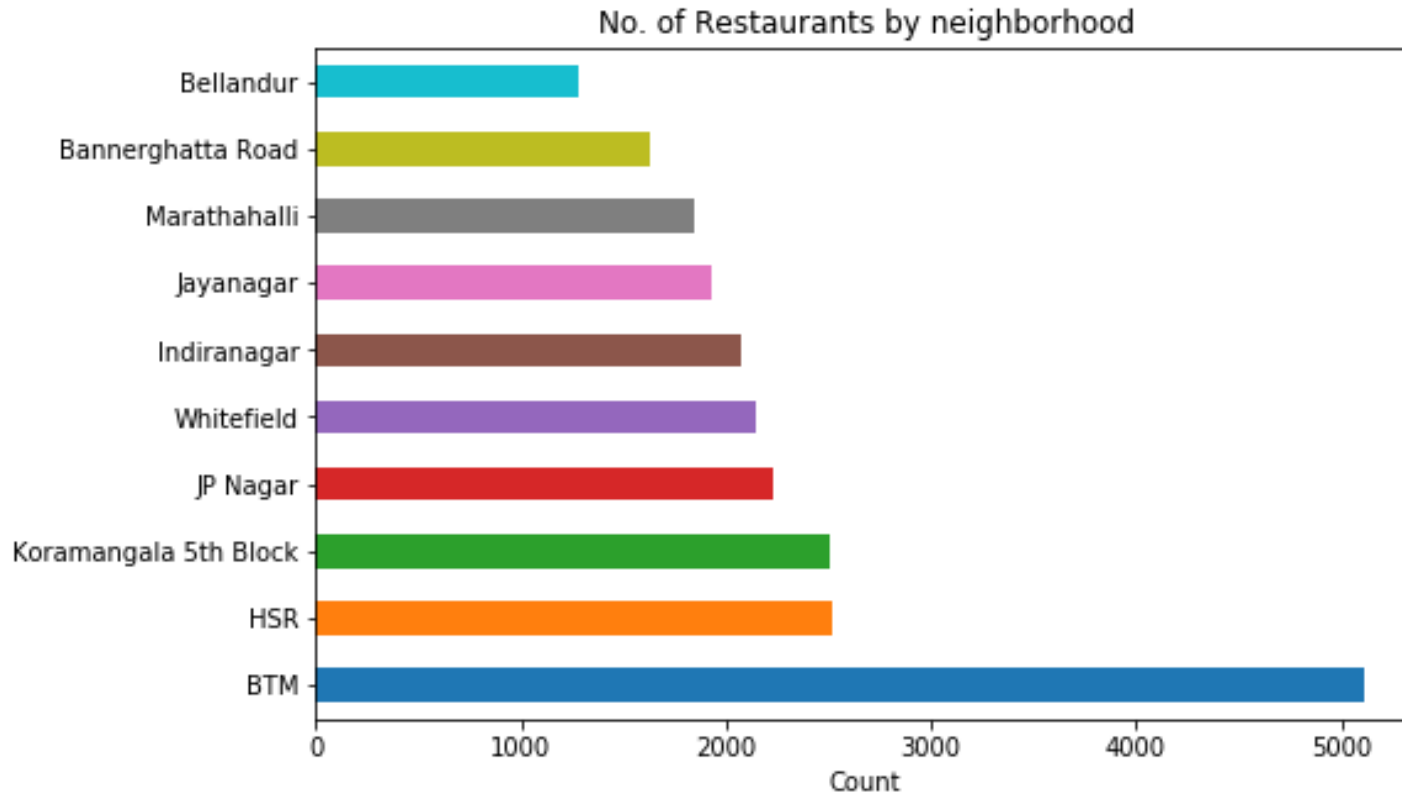
- ▶ I found [this kaggle dataset](#) interesting and suitable for our analysis. It has the restaurant data from the city of Bengaluru(Bangalore) scraped from the website of Zomato -the top restaurant review and food delivery service.
- ▶ The venue data is obtained from foursquare location data service through their API.
- ▶ I have also used an ETL tool pentaho kettle to reduce the size of kaggle dataset by removing the irrelevant columns
- ▶ Geographical coordinates (latitude, longitude) necessary for plotting the locations on map is obtained using GeoPy python library



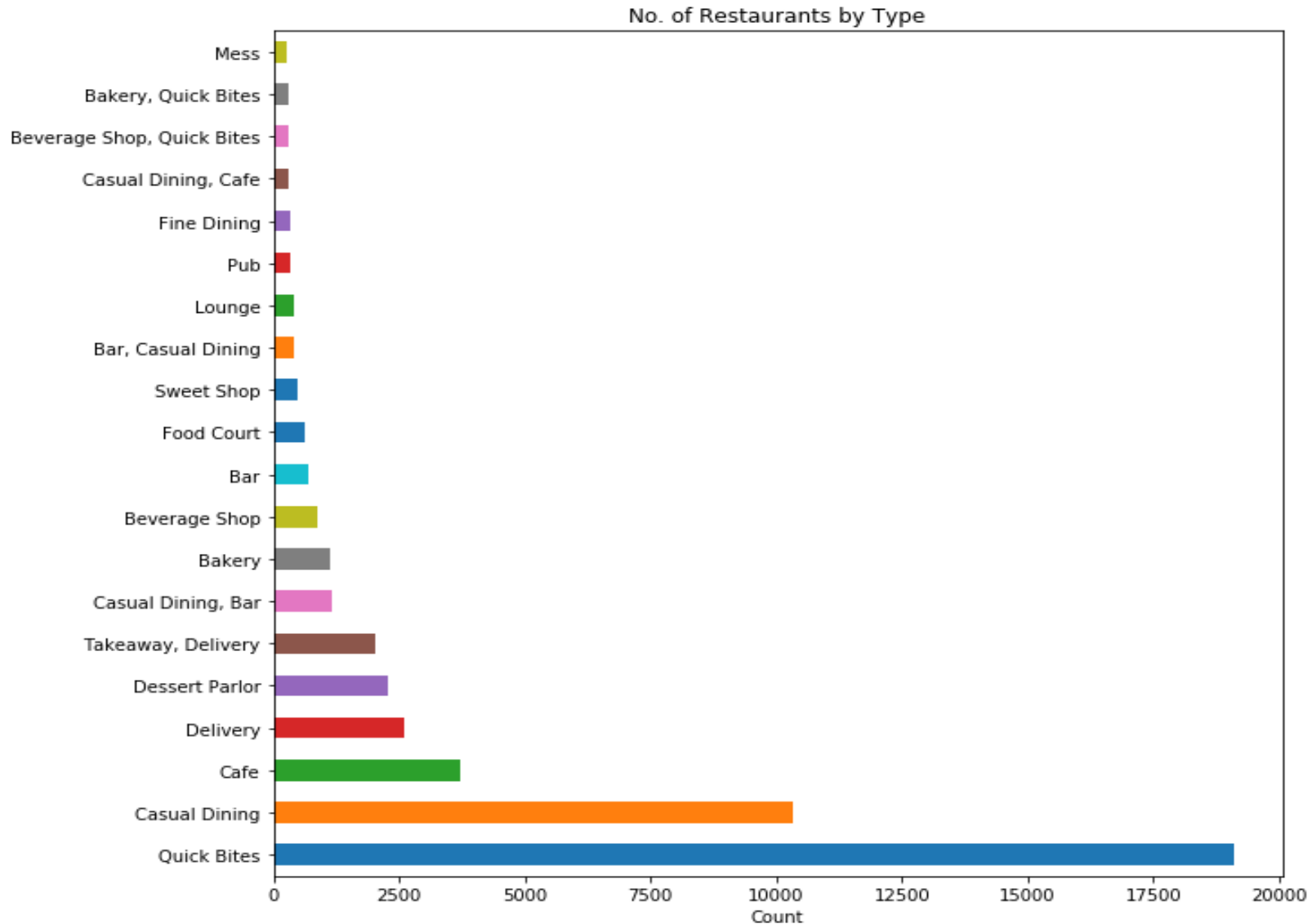
ANALYSING THE RESTAURANT DATA BY DRAWING CHARTS



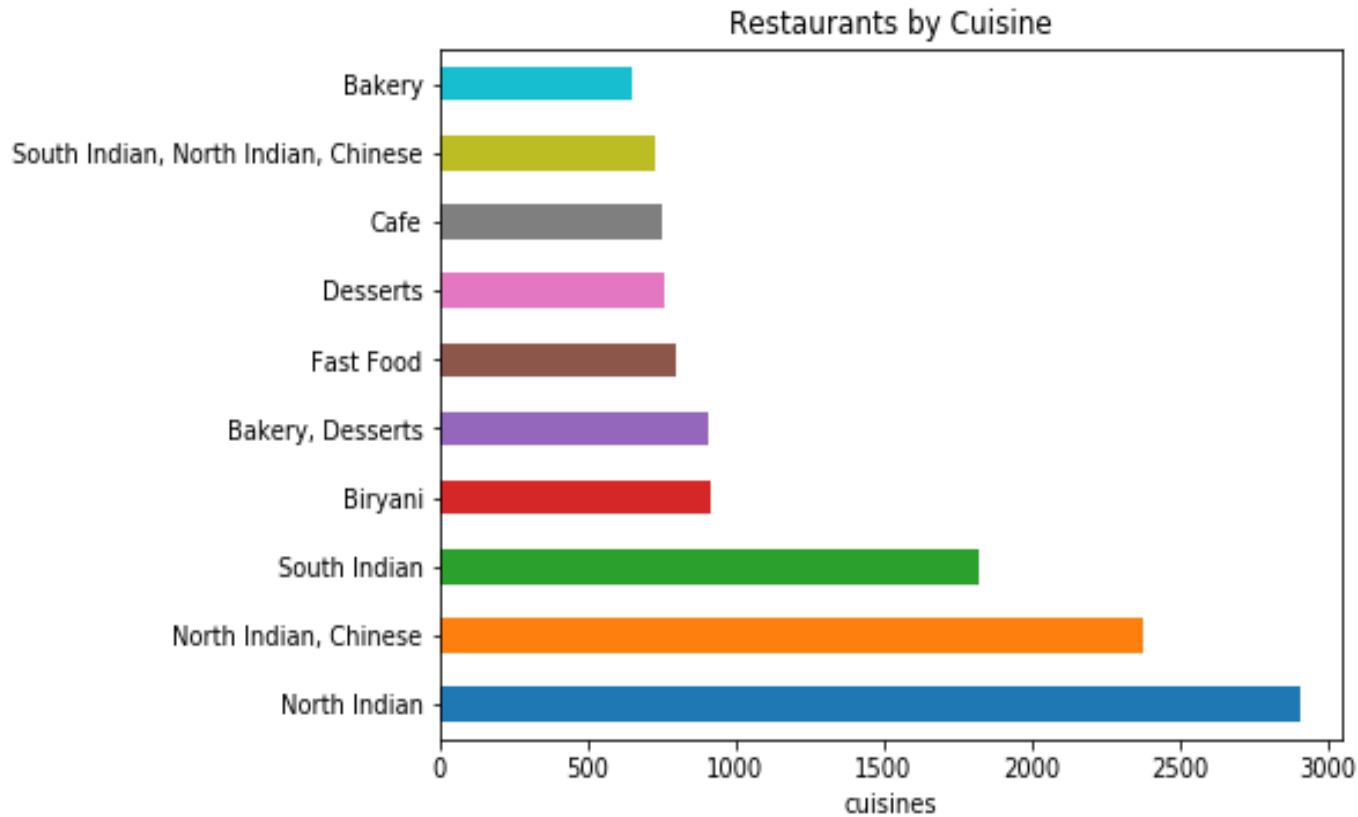
Neighborhoods that have most number of restaurants



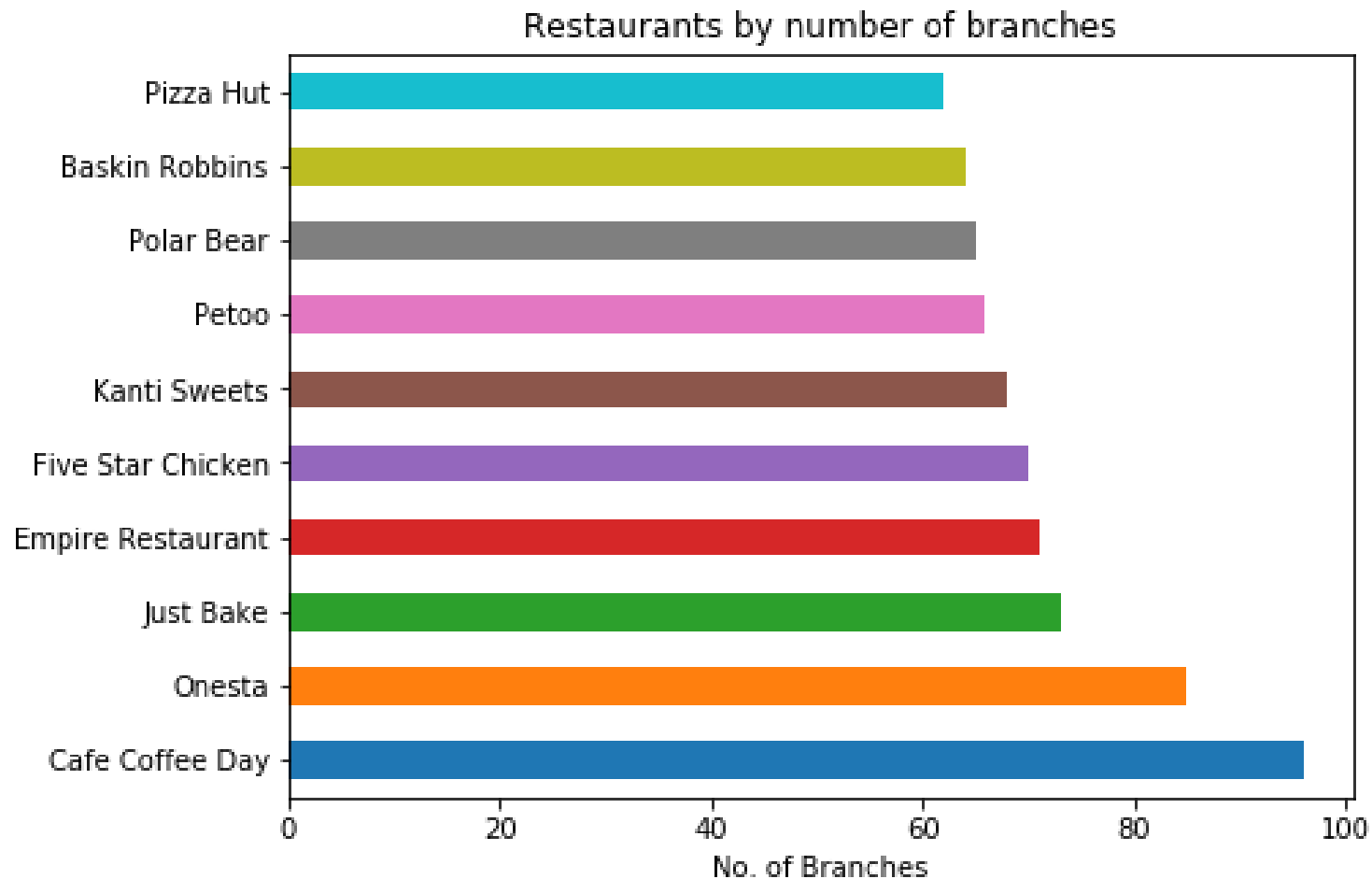
Top 20 restaurant categories in Bengaluru



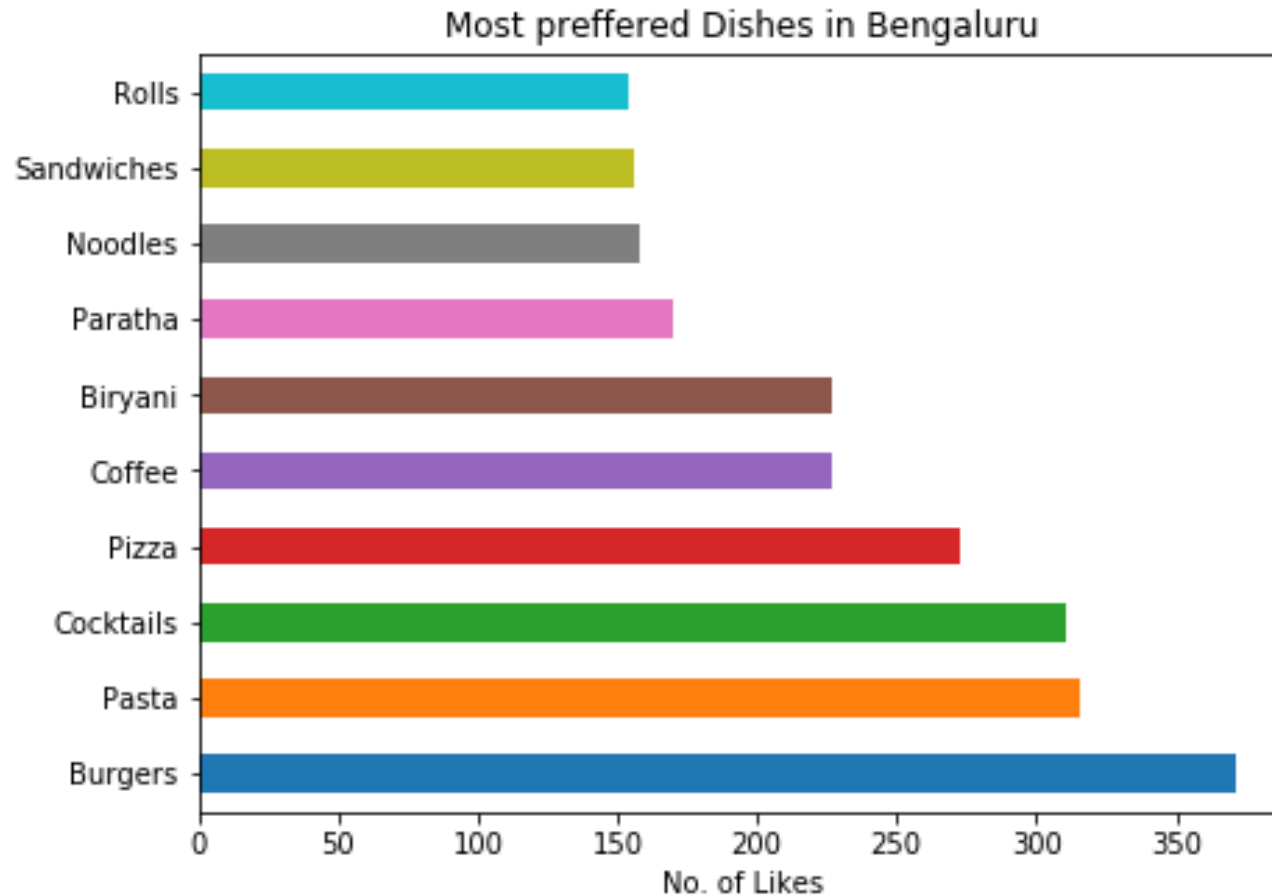
Top 10 cuisines served in Bengaluru



Top 10 restaurant chains



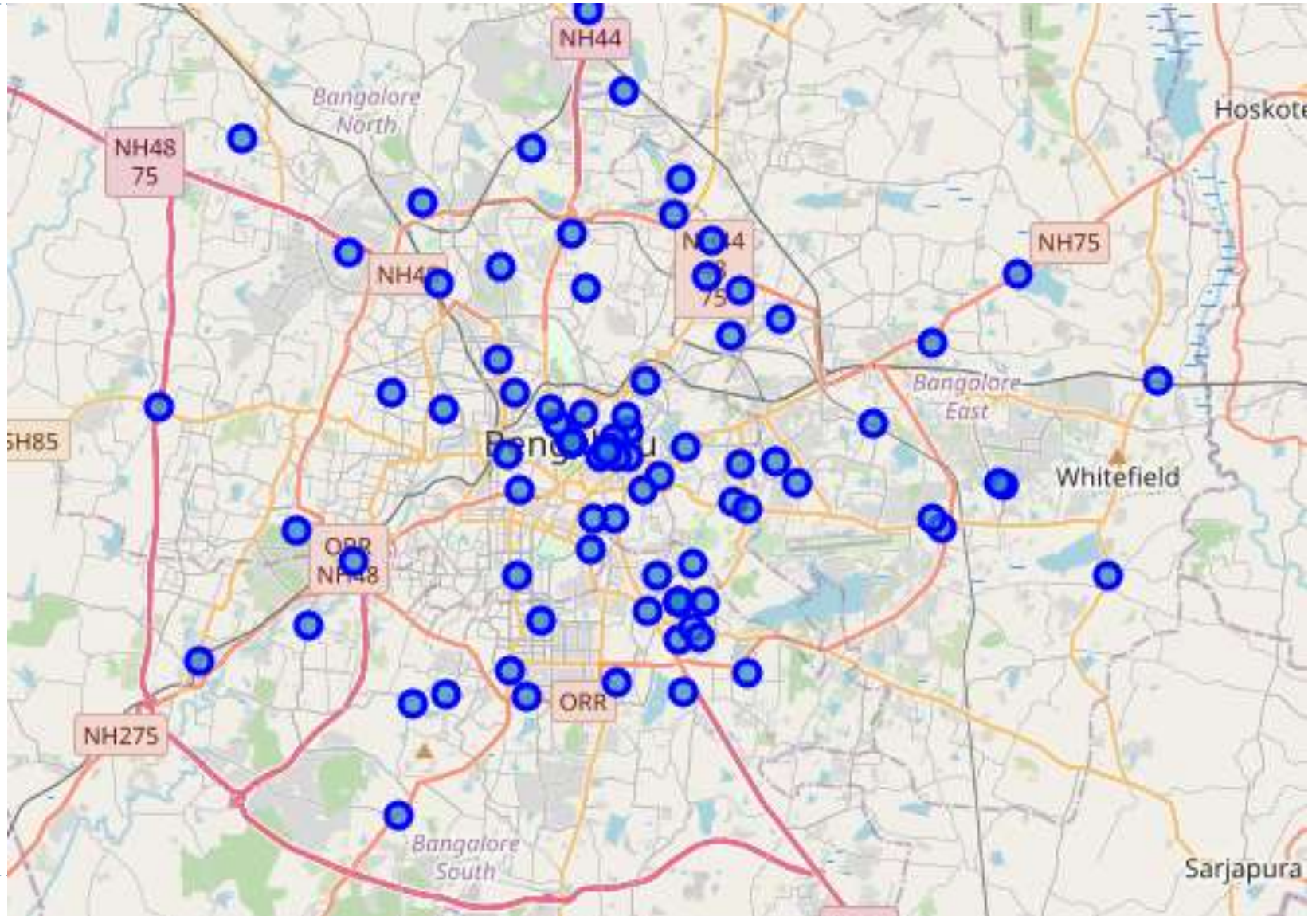
Most preferred dishes by number of likes



MAPPING THE VENUE DATA AND CLUSTERING ANALYSIS OF THE NEIGHBORHOODS



Bengaluru neighborhood map plotted using Folium



Venue data obtained from Foursquare

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
BTM	12.911276	77.604565	Ginger Tea House	12.912498	77.606373	Bakery
BTM	12.911276	77.604565	Ashirwad Departmental Store	12.915237	77.606057	Department Store
BTM	12.911276	77.604565	Cafe Coffee Day	12.912062	77.606156	Café
BTM	12.911276	77.604565	Flavours of China	12.913776	77.607662	Chinese Restaurant
BTM	12.911276	77.604565	Baskin-Robbins	12.913697	77.607022	Ice Cream Shop
BTM	12.911276	77.604565	Disney Bakery	12.913697	77.607225	Bakery
BTM	12.911276	77.604565	Balaji's Veg	12.913810	77.608180	Vegetarian / Vegan Restaurant
BTM	12.911276	77.604565	Nandi Chat House	12.913762	77.607803	Snack Place
BTM	12.911276	77.604565	Faaso's	12.913709	77.607115	Fast Food Restaurant
BTM	12.911276	77.604565	Leo's Paratha Rolls	12.913787	77.607815	Snack Place
BTM	12.911276	77.604565	Shree Ram Chat	12.913400	77.608407	Snack Place



Count of venues available for each neighborhood

	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Neighborhood						
BTM	14	14	14	14	14	14
Banashankari	4	4	4	4	4	4
Banaswadi	8	8	8	8	8	8
Basavanagudi	11	11	11	11	11	11
Basaveshwara Nagar	19	19	19	19	19	19
Bellandur	4	4	4	4	4	4
Bommanahalli	4	4	4	4	4	4
Brigade Road	93	93	93	93	93	93
Brookefield	13	13	13	13	13	13
CV Raman Nagar	5	5	5	5	5	5
Central Bangalore	4	4	4	4	4	4
Church Street	32	32	32	32	32	32
City Market	11	11	11	11	11	11
Commercial Street	29	29	29	29	29	29
Cunningham Road	40	40	40	40	40	40

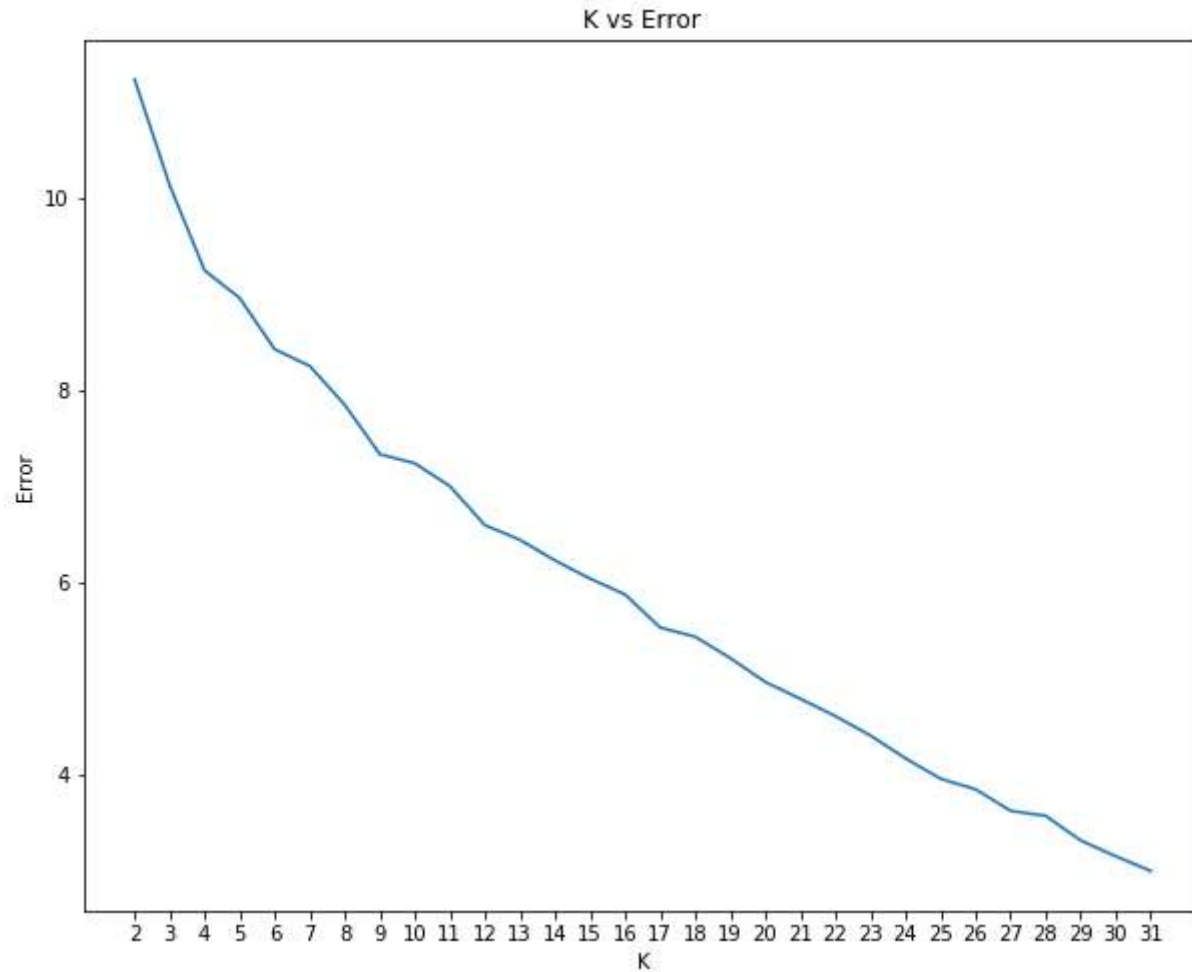


K-MEANS CLUSTERING

- ▶ K – means analysis on the venue data is performed for segmentation of the neighborhoods into different clusters each having some common characteristics.
- ▶ Finding the best K value (ie. Number of clusters) is important in k-means. We have derived the best k value as 8 by making an error plot as shown in the next page.
- ▶ K-means clustering run with $k=8$ produces eight different clusters having similar neighborhoods grouped into each cluster.
- ▶ The top venues of the eight clusters, their differences and similarities etc. can then be analyzed. The K vs Error plot and the clusters are shown in the following slides.



Plotting K vs Error to obtain suitable K value



First Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Banashankari	Indian Restaurant	Metro Station	Gym / Fitness Center	Liquor Store	Fast Food Restaurant	Food Court	Food & Drink Shop	Food	Flea Market	Fish Market
Banaswadi	Indian Restaurant	Vegetarian / Vegan Restaurant	Juice Bar	Kerala Restaurant	BBQ Joint	Convenience Store	Andhra Restaurant	Financial or Legal Service	French Restaurant	Food Truck
Basavanagudi	Indian Restaurant	Café	Snack Place	Hookah Bar	Mediterranean Restaurant	Athletics & Sports	Restaurant	Tea Room	Yoga Studio	Food
Bommanahalli	Indian Restaurant	Restaurant	Lake	Auto Garage	Department Store	Dessert Shop	Food Court	Food & Drink Shop	Food	Flea Market
City Market	Indian Restaurant	Plaza	Diner	Middle Eastern Restaurant	Food Truck	South Indian Restaurant	Bookstore	Market	Miscellaneous Shop	Historic Site
Commercial Street	Indian Restaurant	Clothing Store	Hotel	Women's Store	Juice Bar	Bar	Donut Shop	Fast Food Restaurant	Candy Store	Burger Joint
Cunningham Road	Indian Restaurant	Coffee Shop	Chinese Restaurant	Hotel	Café	Pizza Place	Italian Restaurant	Hookah Bar	Middle Eastern Restaurant	Mediterranean Restaurant



Second Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Bellandur	Restaurant	Park	Capitol Building	Yoga Studio	Electronics Store	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
Central Bangalore	Restaurant	Park	Capitol Building	Yoga Studio	Electronics Store	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
East Bangalore	Restaurant	Park	Capitol Building	Yoga Studio	Electronics Store	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
Electronic City	Restaurant	Park	Capitol Building	Yoga Studio	Electronics Store	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
North Bangalore	Restaurant	Park	Capitol Building	Yoga Studio	Electronics Store	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
West Bangalore	Restaurant	Park	Capitol Building	Yoga Studio	Electronics Store	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service



Third Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Koramangala 3rd Block	Indian Restaurant	Hotel Bar	Hotel	Breakfast Spot	Electronics Store	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop
Langford Town	Indian Restaurant	Hotel	Juice Bar	Electronics Store	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
Race Course Road	Indian Restaurant	Hotel	Planetarium	Juice Bar	Coffee Shop	Racetrack	Hotel Bar	Vietnamese Restaurant	Cricket Ground	Eastern European Restaurant
Ulsoor	Indian Restaurant	Light Rail Station	Hotel	Café	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
Vasanth Nagar	Indian Restaurant	Hotel	Nightclub	Golf Course	Coffee Shop	Art Gallery	Restaurant	Lounge	Art Museum	Hotel Bar



Fourth Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Varthur Main Road, Whitefield	Indian Restaurant	Candy Store	Cricket Ground	Cupcake Shop	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service



Fifth Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Old Madras Road	Café	Restaurant	Yoga Studio	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service	Fast Food Restaurant



Sixth Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Nagarbhavi	Gym	Food Truck	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service	Fast Food Restaurant	Farmers Market



Seventh Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Jeevan Bhima Nagar	Indian Restaurant	Café	Department Store	Chinese Restaurant	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
Koramangala 8th Block	Indian Restaurant	Ice Cream Shop	Market	Electronics Store	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
Magadi Road	Indian Restaurant	Resort	Electronics Store	Food & Drink Shop	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service	Fast Food Restaurant
Majestic	Indian Restaurant	Asian Restaurant	Fast Food Restaurant	Bus Station	Metro Station	Platform	Hotel	Hookah Bar	Electronics Store	Flea Market
Shivajinagar	Indian Restaurant	Fast Food Restaurant	Shoe Store	South Indian Restaurant	Clothing Store	Furniture / Home Store	Juice Bar	Donut Shop	Market	Tea Room



Eighth Cluster

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
BTM	Bakery	Snack Place	Indian Restaurant	Department Store	Ice Cream Shop	Coffee Shop	Chinese Restaurant	Café	Fast Food Restaurant	Shopping Mall
Basaveshwara Nagar	Fast Food Restaurant	Ice Cream Shop	Café	Pizza Place	Liquor Store	Bakery	Sporting Goods Shop	Bus Station	Gym	Clothing Store
Brigade Road	Indian Restaurant	Café	Pub	Chinese Restaurant	Lounge	Bar	Coffee Shop	Hotel	Bookstore	Fast Food Restaurant
Brookefield	Indian Restaurant	Fast Food Restaurant	Ice Cream Shop	Breakfast Spot	Department Store	Dessert Shop	Asian Restaurant	Salon / Barbershop	Gym	Multiplex
CV Raman Nagar	Fried Chicken Joint	Electronics Store	Health & Beauty Service	Breakfast Spot	Department Store	Financial or Legal Service	Cupcake Shop	Food Court	Food & Drink Shop	Food
Church Street	Indian Restaurant	Café	Coffee Shop	Lounge	Pub	Bookstore	Music Store	Plaza	Clothing Store	Steakhouse
HBR Layout	Café	Road	South Indian Restaurant	Coffee Shop	North Indian Restaurant	Food	Flea Market	Fish Market	Fish & Chips Shop	Financial or Legal Service
Indiranagar	Pub	Lounge	Cocktail Bar	Indian Restaurant	Café	Restaurant	Bakery	Italian Restaurant	Cupcake Shop	Ice Cream Shop
JP Nagar	Department Store	Indian Restaurant	Pub	Boarding House	Bus Station	Chinese Restaurant	Brewery	Fast Food Restaurant	Bakery	Yoga Studio
Kalyan Nagar	Indian Restaurant	BBQ Joint	Ice Cream Shop	Korean Restaurant	Fast Food Restaurant	Coffee Shop	Café	Italian Restaurant	Electronics Store	Clothing Store



Conclusion

- ▶ We have made an analysis of bengaluru restaurant data according to its neighborhoods and also found out the characteristics of different neighborhoods by getting their most common venue details. We have also segmented the neighborhoods into eight clusters and analysed them. Some interesting findings are:
- ▶ BTM is the neighborhood that have most number of restaurants.
- ▶ Quick bites and casual dining are more popular types of restaurants in B'lore.
- ▶ North Indian cuisine is the most preferred cuisine of the city.
- ▶ Cafe coffee day is the largest restaurant chain by number of branches followed by Onesta.
- ▶ Top three among the most liked dishes/drinks are Burger, Pasta and Cocktails.
- ▶ We have segemented the neighborhoods into eight clusters using k-means technique.
- ▶ First cluster and eighth cluster are bigger ones with more number of neighborhoods while remaining are smaller ones.
- ▶ First, third and seventh cluster have a large number of retaurants and have them as most common venues



Thank You !!!

