German Restaurant

Location Planning - Bangalore

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Photo by Daniel Schludi on Unsplash

Content

Background info

Customer Details

Name : Avinash (self)

Description:

A Non-Resident Indian (NRI) looking to start a German Restaurant in India

Preferred Location

City : Bangalore

Area : 8005 sq. km

Population (2011) : 10,456,000

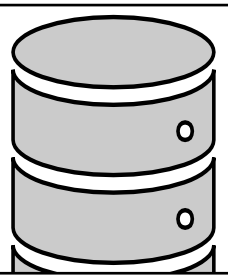
Question to be answered

1. Where in Bangalore?
2. Where are most restaurants in Bangalore?
3. How much do people spend for a meal?

Dataset or Data sources

Wikipedia page

- Url : https://en.wikipedia.org/wiki/List_of_neighbourhoods_in_Bangalore
- Content :
  - Name of neighbourhoods in Bangalore
  - Region within Bangalore
  - Image and background information of the neighbourhood



Geonames dump

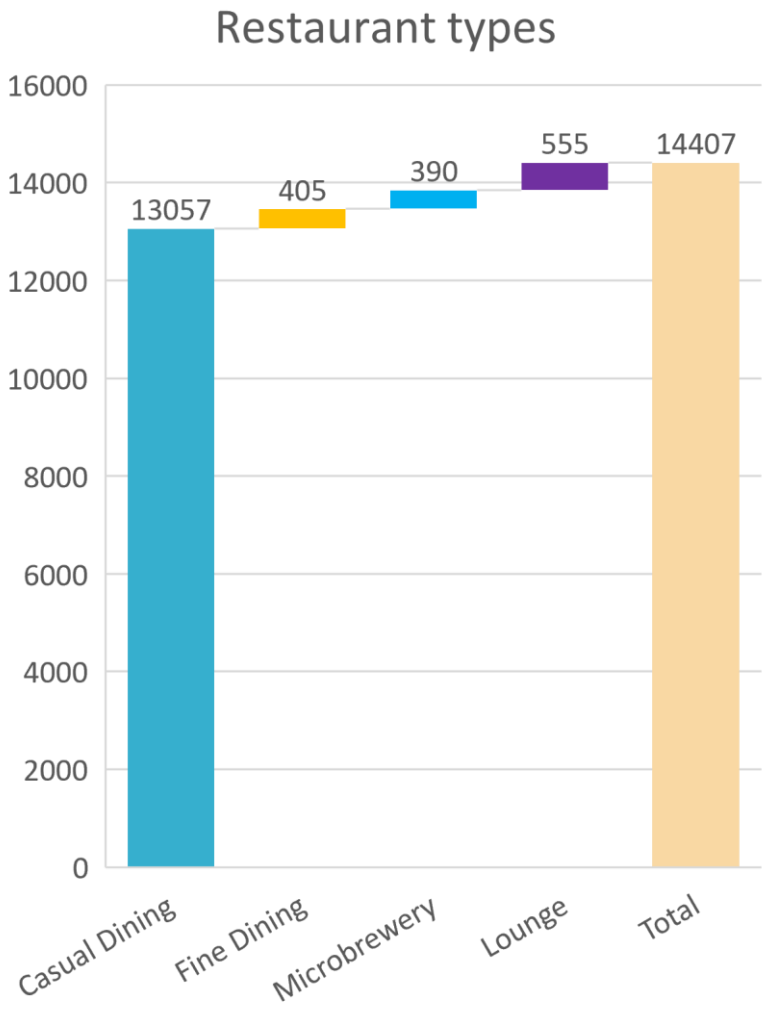
- Url : http://download.geonames.org/export/dump/IN.zip
- Content:
  - Name of places in India
  - Postal codes (Pincodes)
  - Name of states and cities

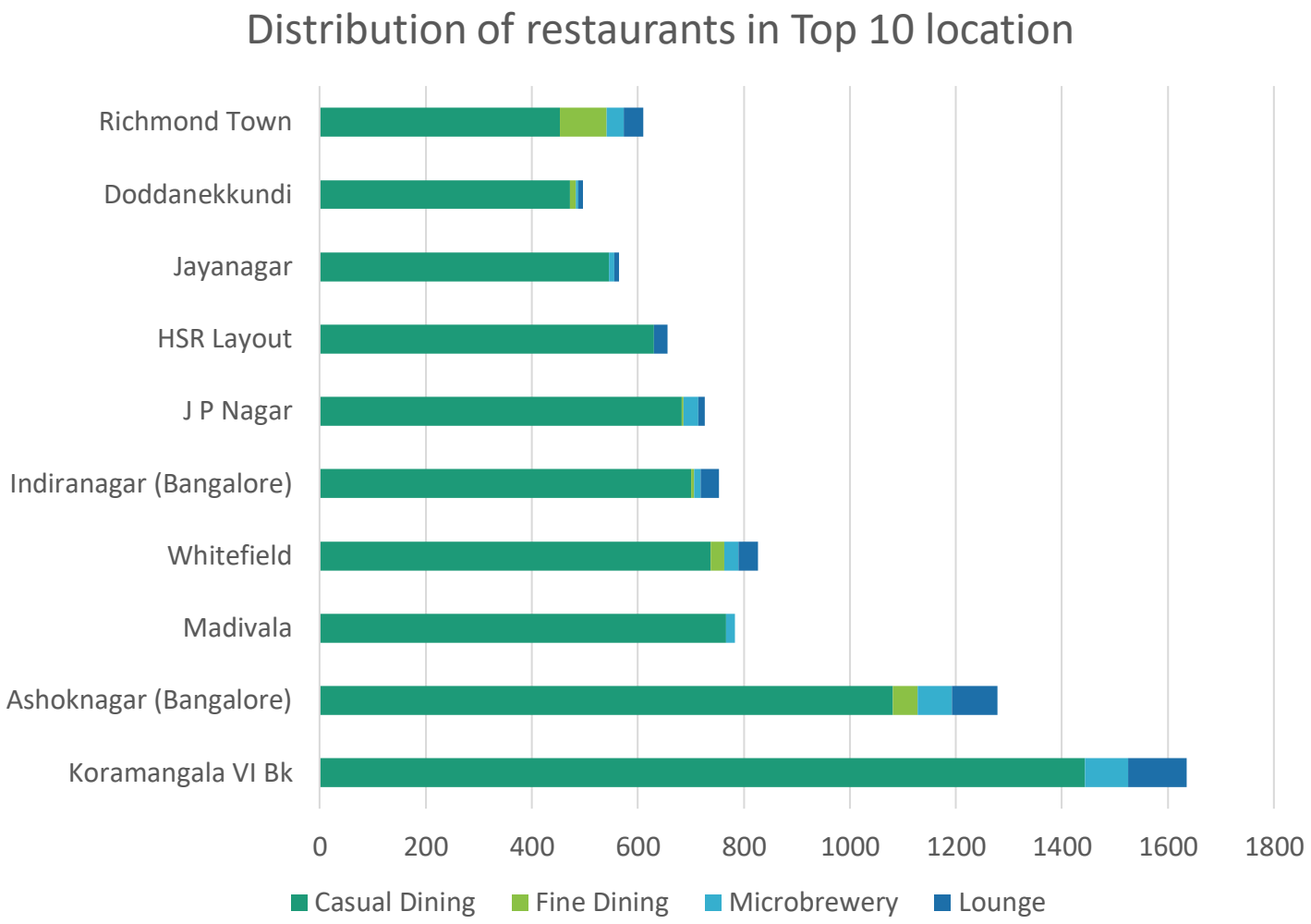
kaggle

Zomato restaurants dataset

- Url : https://www.kaggle.com/himanshupoddar/zomato-bangalore-restaurants
- Content :
  - Details of Restaurants in Bangalore (Name , address , restaurant type , rating , online order , table booking , url , approx. cost for two people , city , number of votes , cusinies , dishes liked…)
  - 51,717 Restaurants listed
  - 25 different restaurant types listed

Overview of Restaurants in Bangalore



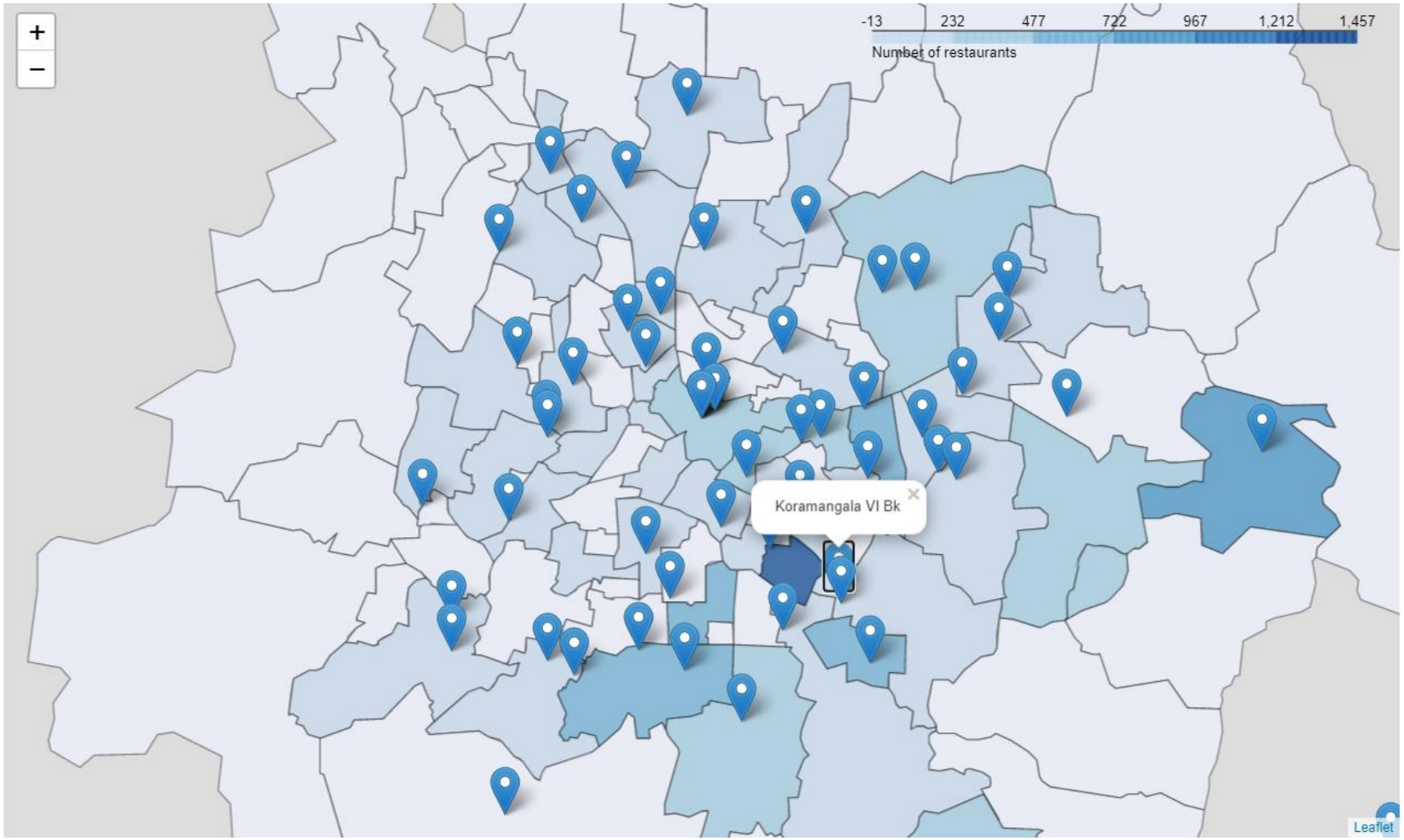


Total : 7512 Restaurants

Overview of Restaurants in Bangalore

Heatmap of the Restaurants in Bangalore

The darker the colour the higher the number of restaurants



Top 10 Locations in Bangalore

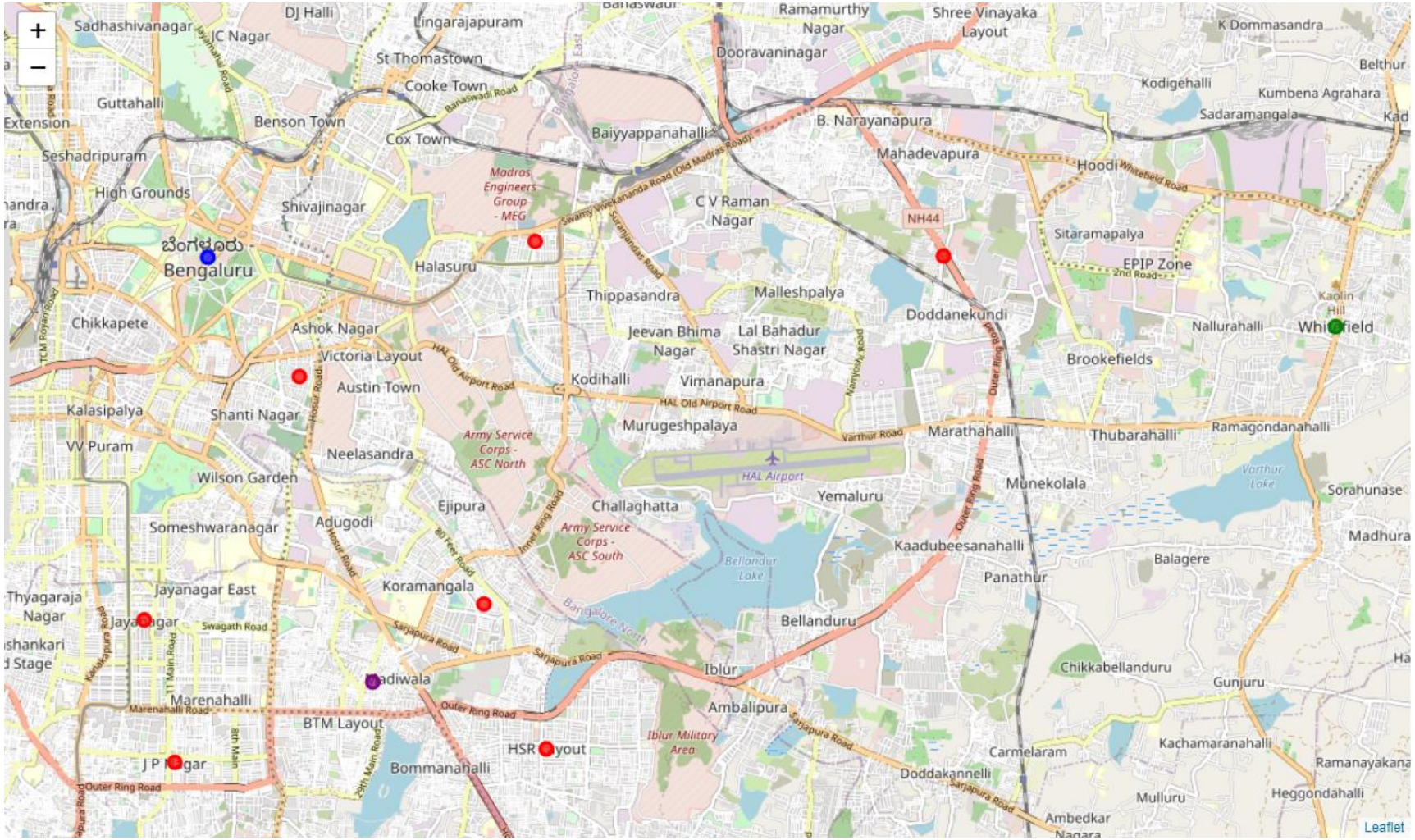
Top 10 venues in top 10 locations

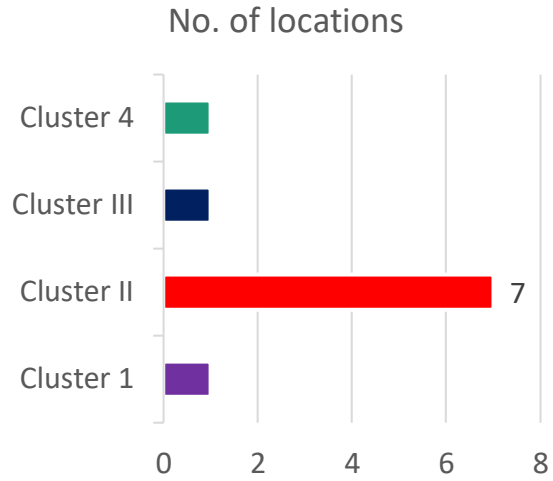
Red marked are restaurants

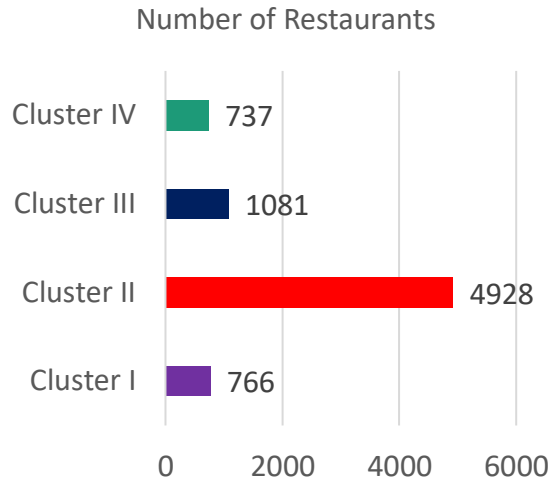
Sl. No.	location	Most common venue									
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
0	Ashoknagar	Park	Capitol Building	Garden	Sports Bar	Restaurant	Yoga Studio	Electronics Store	Cupcake Shop	Department Store	Dessert Shop
1	Doddanekkundi	Coffee Shop	Indian Restaurant	Multiplex	Fast Food Restaurant	Clothing Store	Restaurant	Sandwich Place	Motorcycle Shop	Movie Theater	Sports Bar
2	HSR Layout	Indian Restaurant	Café	Liquor Store	Coffee Shop	Farmers Market	Snack Place	Ice Cream Shop	Punjabi Restaurant	Mediterranean Restaurant	Chettinad Restaurant
3	Indiranagar	Indian Restaurant	Café	Fast Food Restaurant	Vegetarian / Vegan Restaurant	Pub	Andhra Restaurant	Chinese Restaurant	Pizza Place	Department Store	Bar
4	J P Nagar	Indian Restaurant	Fast Food Restaurant	Snack Place	Chinese Restaurant	Hotel	Diner	Performing Arts Venue	Electronics Store	Café	Brewery
5	Jayanagar	Indian Restaurant	Café	Chinese Restaurant	Juice Bar	Fast Food Restaurant	Sandwich Place	Restaurant	Gym / Fitness Center	Women's Store	Flower Shop
6	Koramangala VI Bk	Indian Restaurant	Café	Italian Restaurant	Bakery	Ice Cream Shop	Pizza Place	Juice Bar	Coffee Shop	Bar	Brewery
7	Madivala	Indian Restaurant	Pizza Place	Italian Restaurant	Gym / Fitness Center	Tea Room	Park	Indie Movie Theater	Sandwich Place	Restaurant	Electronics Store
8	Richmond Town	Indian Restaurant	Bakery	Chinese Restaurant	Hotel	Coffee Shop	BBQ Joint	Middle Eastern Restaurant	Mobile Phone Shop	Market	Gym
9	Whitefield	Bakery	Hotel	Gym / Fitness Center	Hotel Bar	Swiss Restaurant	Eastern European Restaurant	Market	Café	Kerala Restaurant	Farmers Market

Cluster of Restaurants

4 Clusters

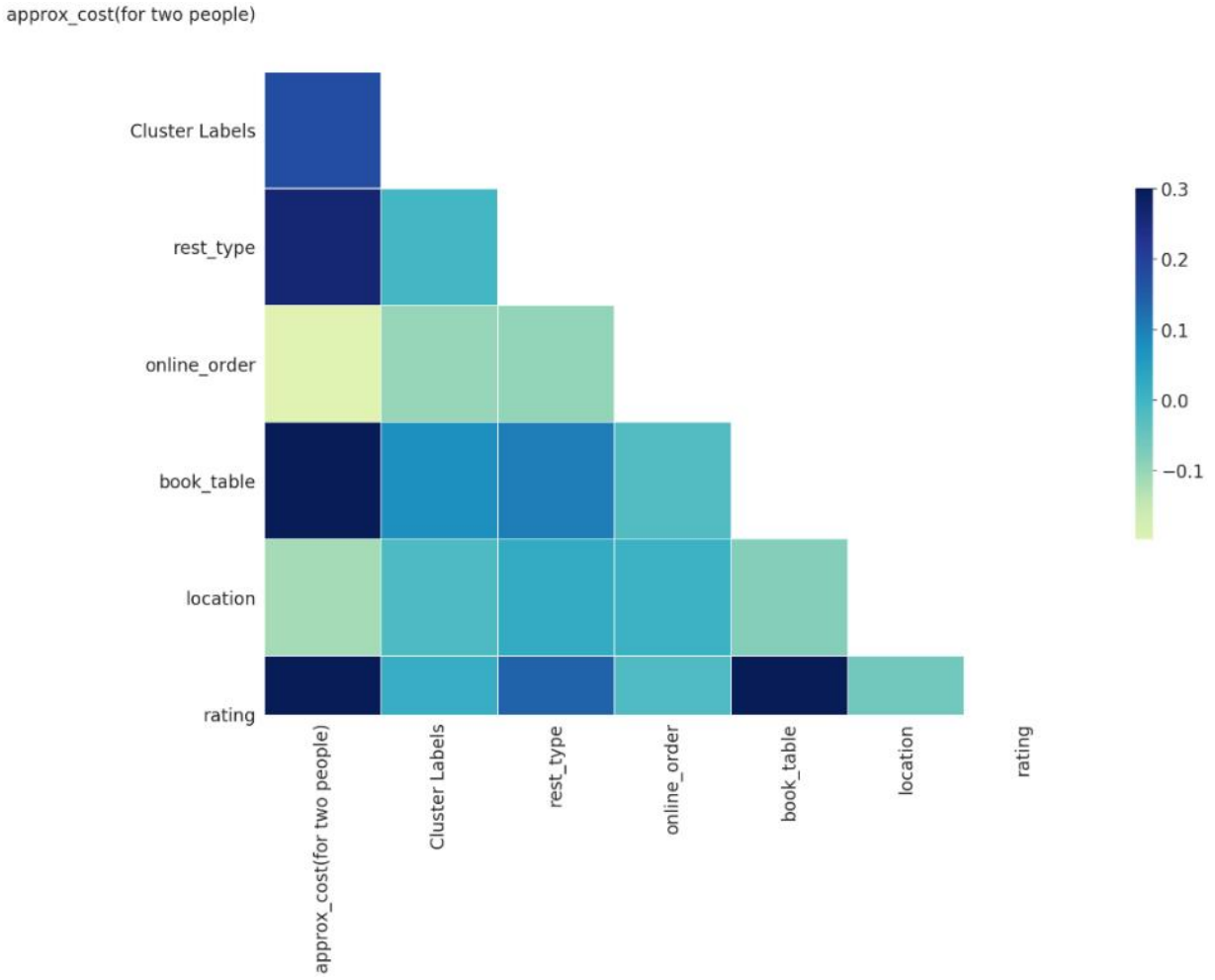






Approx. cost for two people

Correlation Matrix of features

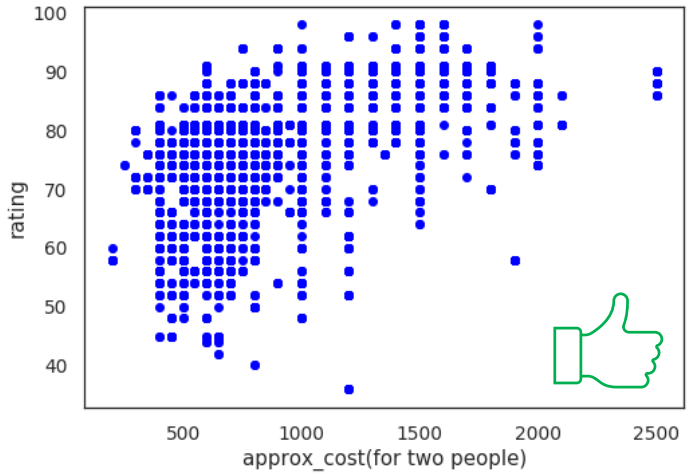


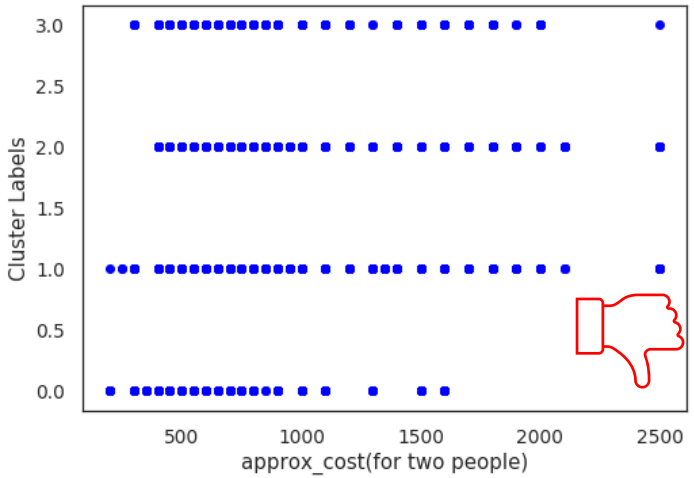
The correlation matrix shows the following :

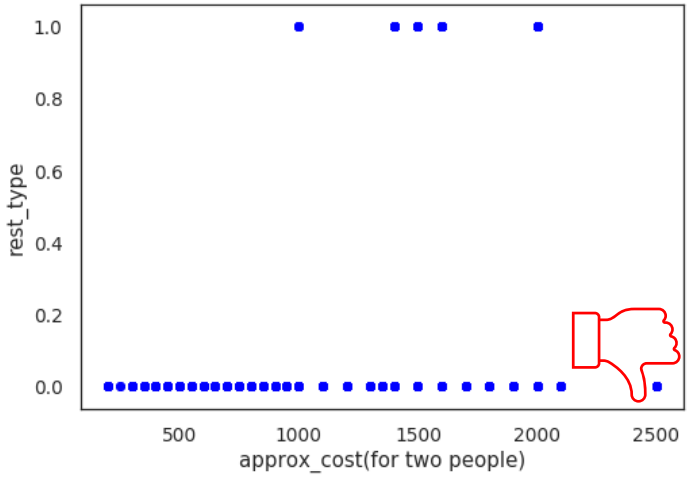
- Approx. cost of two people relates to
  - Rest_type (Restaurant Type)
  - book_table (Table booking)
  - Rating(Rating by customers)
  - Cluster Label (which cluster the restaurant belongs to)
- The correlation coefficient is within 0.3 , hence there is no significant correlation identified here.

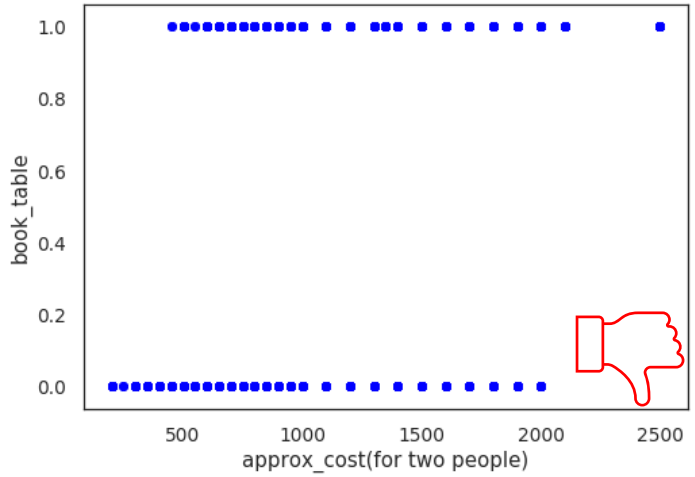
Approx. cost for two people

Correlation between the features









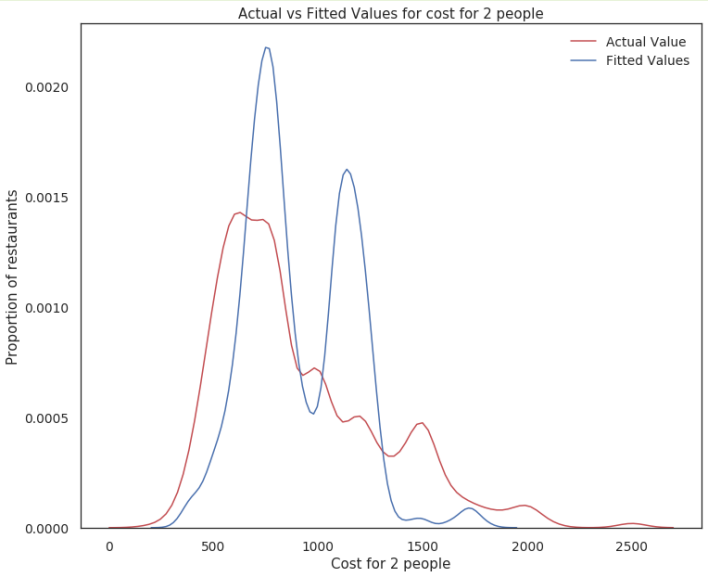
The correlation scatter plots show :

- ❑ Approx. cost of two people relates to rating
  - ○ There is not definite hint on positive or negative correlation
- ❑ The other correlations are not visible hence these features will not be considered for statistic analysis

Approx. cost for two people

Regression Analysis

Linear Regression



R-Square = 0.24177

Multilinear Regression

X1 = book_table
X2 = Rest_type
X3 = Rating
X4 = Cluster label

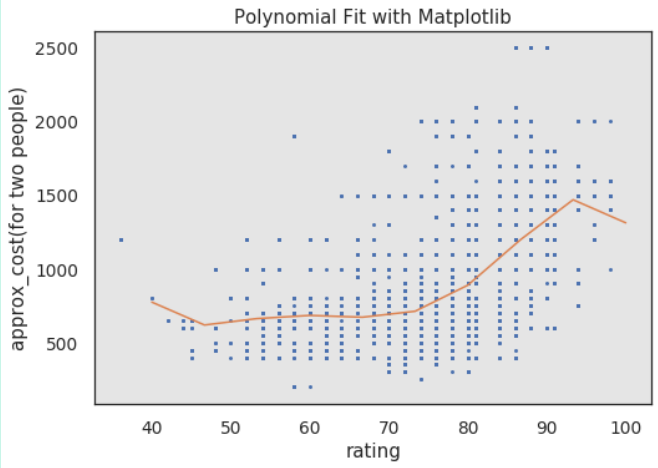
Equation

$$\hat{Y} = 287.43 + 558.48X1 + 11.54X2 + 74.92X3 + X4$$

Residual sum of squares = 78443.67

R-Square = 0.4144

Polynomial Regression



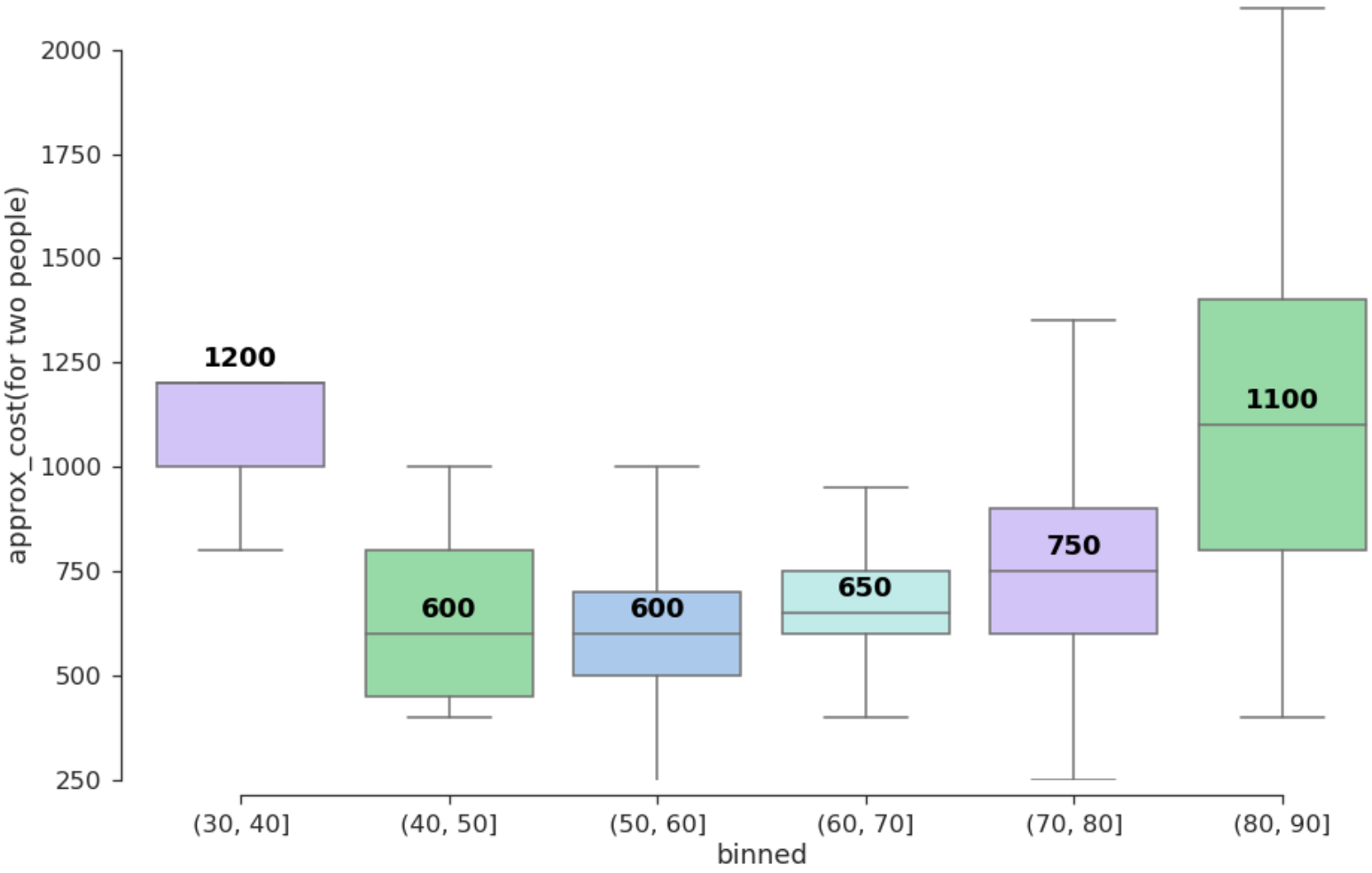
Equation

$\hat{Y}$
$= 7.903e{+}04 - 6592\ x + 221\ x^2 - 3.742\ x^3 + 0.03314\ x^4 - 0.0001404\ x^5 + 2.035e{-}07\ x^6$

R-Square = 0.4144

Approx. cost for two people

Recommendation based on rating



Regression analysis models did not predict the approx. cost for two people with a high accuracy (highest accuracy was ~42%

Hence this box plot can be used as a support to define the approx. cost for two people based on rating by customers.

Conclusion

1. Based on the top 10 location clustering and Choropleth the **CLUSTER II with 7 locations** is the most apt for starting the restaurant.
2. Based on R-square values (maximum of 0.41) of Linear, Multilinear and Polynomial regression it is evident that we do not have enough numerical data to predict the “Approx. cost for two people”. This also because the dataset is majorly categorical data.
3. Due to point 2., an average value for “Approx. cost for two people” is recommended based on the rating that the restaurant earns. The box plot also gives the hint on the min-max values for the same.
4. To facilitate a reliable value prediction further data collection (quantitative) should be organized.

Future Steps

1. **<u>To define location</u>**

   Gather additional information as below to finalize the suitable location

   - Availability of commercial buildings for rent meeting the space and surrounding requirements for the decided restaurant (Parking space, elevator, day light, noise levels, etc.)
   - Check availability of working staff in the location
   - Availability of accommodation for staff in the neighbourhood

2. **<u>To define the average cost for two people</u>**

Conduct a sample survey with diverse target groups to understand the willingness of the customer. The survey can include question to understand the deciding parameter while choosing a restaurant for dining. Survey can also be having open ended question to collect comments from customer towards the cuisine served.

Based on the outcome of the survey including the numeric parameters (number of customer willing to spend, number of willing to try German cuisines ,…) the models can be redone to predict the cost for two people.