

Understanding Restaurant in Bengaluru

Introduction & Business problem:

Problem Background: Bengaluru in Karnataka India is one of the fastest growing cities in the world. Hence it is imperative that it becomes a battleground for restaurateurs and businessmen to gain market share specially in the culinary industry. Hence as an entrepreneur it can be difficult to find and isolate a location for opening a new restaurant. As the market outlook in Bengaluru is highly competitive it is important to plan and analyze the current market as well as understating the need for your product which in this case is a restaurant.

Problem Description : The purpose of this report is to help budding entrepreneurs understand the outlook of the restaurant business in Bengaluru. Also, to provide them with suggestions such as the type of cuisine and area they should focus on in order for the business to be successful.

The Key factors we would be focusing on in order to make any suggestion are :

- The current trends in terms of cuisine and type of restaurant.
- Finding the most promising locations for the new business.
- Understanding the overall market outlook.
- Using Foursquare and Folium in order to explore and map data points.

Target Audience: the target audience for this report are entrepreneurs and business owners looking to establish new restaurants in Bengaluru.

Success criteria: for this project, narrowing down the cuisine and location for the new venture to be established is a critical success factor.

Data Requirements:

- 1) We will be using a Kaggle dataset : <https://www.kaggle.com/himanshupoddar/zomato-bangalore-restaurants> which contains information about restaurants in bangalore with fields such as :url, address, name, online_order, book_table, rate, votes, phone, location, rest_type, cuisines, etc. This dataset will be used for exploratory data analysis and reccomendations.

| | url | address | name | online... | book.ta... | rate | # votes | phone | location | rest_type |
|---|--|---|-------|-----------|------------|-------|---------|-----------------------------|--------------|---------------|
| 1 | https://www.zomato.com/bangalore/jalsa-banashankari?context=eyJzZSt6eyJlIjpbNTQ2OTQsIjE4Mzc1NDc8IiwiaWNTkwOTAiLCIxODM4MjkbNCIsIjE4MjI0Njc2IiwiaWNTkyODkiLCIxODM4MjM4N1JldCJ8Ijo1UmVzdGF1cmFudHgaW4gQmFuYXNo... | 942, 21st Main Road, 2nd Stage, Banashankari, Bangalore | Jalsa | Yes | Yes | 4.1/5 | 775 | 886 42297555 +91 9743772233 | Banashankari | Casual Dining |

Fig 1: Snapshot of Kaggle dataset.

- Secondly, foursquare data for location and venues will be used to supplement and enhance the Kaggle data set. The foursquare API will be used to find and explore current – real time information about particular areas within Bengaluru. We will focus on finding and analysing restaurants, gathering information such as latitude, longitude and venues within an area.

Methodology:

In order to get a fair idea about the kind of restaurants and cuisines, the Kaggle dataset was used. Initial exploratory data analysis was performed in order to determine the best location for opening a new restaurant. Pandas and seaborn libraries were used in order to perform exploratory analysis.

In terms of feature extraction and feature engineering some preprocessing steps preceded the analysis, these steps included:

- Dropping irrelevant columns from the dataset.
- Creating a new field with the ratings of the restaurants.
- Initial data cleansing and rearranging the dataset.

```
In [10]: df[['rating', 'out_of']] = df.rate.str.split("/", expand=True)

In [11]: df.drop(['out_of'], inplace = True, axis=1)

In [12]: df['rating'] = pd.to_numeric(df['rating'].astype(str).str[:1], errors='coerce')
df.dropna(subset=['rating'], inplace = True)

In [13]: df['cuisines'].value_counts()[:10].plot(kind = 'barh')

Out[13]: <matplotlib.axes._subplots.AxesSubplot at 0x7f494264bd30>
```

Fig 2: Data preprocessing.

```
In [4]: df.drop(['url', 'phone', 'reviews_list', 'menu_item'], axis = 1, inplace = True)

In [5]: df = df[['name', 'address', 'online_order', 'book_table', 'rate', 'votes', 'location', 'dish_liked', 'cuisines']]
cols = df.columns.tolist()

Out[5]: ['name',
'address',
'online_order',
'book_table',
'rate',
'votes',
'location',
'dish_liked',
'cuisines',
'approx_cost(for two people)',
'listed_in(type)',
'rest_type']
```

Fig3 : Data preprocessing.

Exploratory Data Analysis & Results:

- Initial exploratory analysis was performed for understanding the market for Bengaluru. The main attributes which were explored were cuisines, restaurant types, votes for a particular restaurant and cuisine and understanding the distribution of ratings.

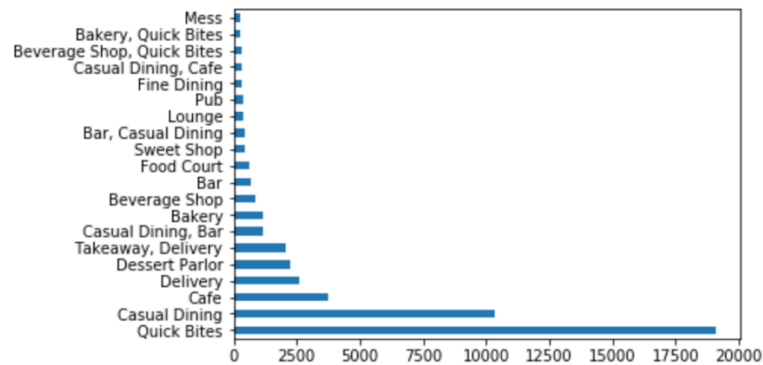


Fig 4: Restaurant type.

- Looking at the count for different restaurants within Bengaluru, we can clearly see that Quick Bites and Casual dining were by far the leading restaurants in terms of number in and around the city. It can be clearly established that opening a new restaurant in either of these categories would be a safer bet.

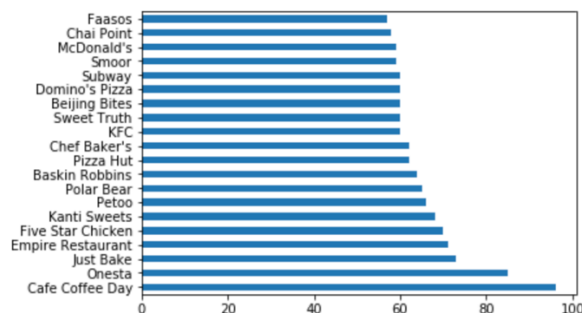


Fig 5: Popular Restaurant chain.

- Also, analyzing the popular restaurant chains we see that Café Coffee Day is the most popular in terms of number of restaurants and other restaurants like just bake, KFC and Dominos which fall under fast food/ quick bite restaurants are highly prevalent within the city.

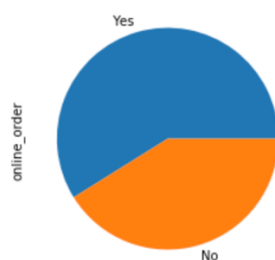


Fig 6: Online order facility.

- Online order facility which is now the standard in terms of delivery options in every restaurant seems to be present in more than half of the restaurants within the city. As the market for technology and smartphones increases, having such a facility/option for the techno savvy market of Bengaluru is necessary.

| location | votes |
|--------------------|--------|
| BTM | 619376 |
| Brigade Road | 429620 |
| Bannerghatta Road | 219077 |
| Bellandur | 206027 |
| Banashankari | 162374 |
| Brookefield | 118991 |
| Basavanagudi | 94919 |
| Banaswadi | 35657 |
| Basaveshwara Nagar | 18133 |
| Bommanahalli | 7703 |

Fig 7: Most popular location.

- Looking at the most popular locations for opening a new restaurant, Brigade road and BTM have higher number of votes than any other location in Bengaluru making them hotspots for the restaurant business. Also, understanding the popular cuisines in the city we see that North Indian cuisine (fig 8) is the most popular, this can also be attributed to the city being multicultural and diverse.

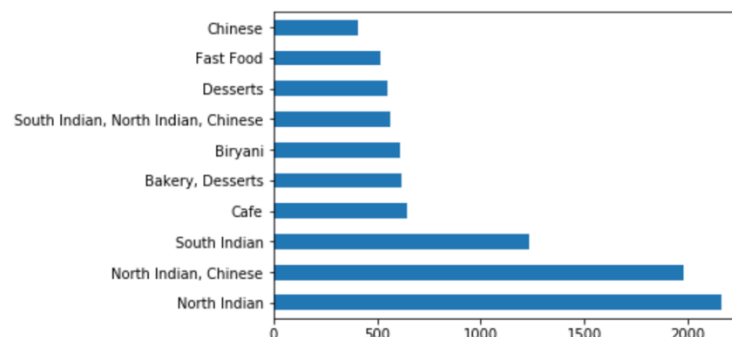


Fig 8: Most popular Cuisines.

| | |
|-----------------------------|------|
| Casual Dining | 6318 |
| Quick Bites | 6243 |
| Delivery | 907 |
| Casual Dining, Bar | 658 |
| Takeaway, Delivery | 598 |
| Bar | 414 |
| Pub | 215 |
| Cafe | 213 |
| Bar, Casual Dining | 202 |
| Fine Dining | 184 |
| Lounge | 178 |
| Pub, Casual Dining | 151 |
| Food Court | 138 |
| Casual Dining, Cafe | 92 |
| Mess | 58 |
| Casual Dining, Pub | 56 |
| Casual Dining, Microbrewery | 50 |
| Microbrewery, Casual Dining | 49 |
| Sweet Shop, Quick Bites | 47 |
| Pub, Cafe | 40 |

Fig 8: Restaurant type for North Indian Cuisine

- Narrowing down our search to north Indian cuisine and subsequent restaurants, we see that most of the north Indian restaurants fall under the 2 categories being Casual dining and Quick Bites.

Analysing the results from the Zomato dataset, we see that to open a new restaurant these are the recommendations that can be made in order to maximise the chances of it being successful:

- The most popular cuisine in the city being North Indian, has the most number of votes and the highest number of restaurants serving such food.
- BTM and brigade road are densely packed with such restaurants which fall under the broad categories of casual dining and quick bites.
- Online order facility is a must in order for the restaurant to be successful in a highly competitive and technologically driven market.

Now putting these recommendations into use, we try to look at forming clusters for highly dense and recommended areas for the new business. In order to achieve this real time data from Foursquare API is used. This data provides us a clear picture of the current situation for restaurants in Bengaluru.

```
In [117]: search_query = 'Restaurant'
radius = 5000
url = 'https://api.foursquare.com/v2/venues/search?client_id={}&client_secret={}&ll={},{}&v={}&query={}&radius={}&limit={}'.format(CLIENT_ID, CLIENT_SECRET, lat_BTM, long_BTM, VERSION, search_query, radius, LIMIT)
url

Out[117]: 'https://api.foursquare.com/v2/venues/search?client_id=E2Q2HJGPSF3L0IBC4PD4RE05HP042HVQSDRVXME1BE5C05DQD&client_secret=
TZXD01R4CRDVLSCQ0EADM2AQ3X1RX2DDJI42SYKHEBJS1Q&ll=12.9166,77.6101&v=20180604&query=Restaurant&radius=5000&limit=10
0'

In [118]: rest_locs = requests.get(url).json()
rest_locs

Out[118]: {'meta': {'code': 200, 'requestId': '5elfe3b25fb726001b491be4'},
'response': {'venues': [{'id': '4f8da203e4b01d92a6e3d3f5',
'name': 'Sandy's Korner Restaurant',
'location': {'address': '13th Main, 7th Cross',
'crossStreet': 'BTM 2nd Stage',
'lat': 12.91398475233245,
'lng': 77.60912093170366,
'labeledLatLngs': [{'label': 'display',
'lat': 12.91398475233245,
'lng': 77.60912093170366}],
'distance': 309,
'cc': 'IN',
'city': 'Bangalore',
'state': 'Karnataka',
'country': 'India',
'formattedAddress': ['13th Main, 7th Cross (BTM 2nd Stage)',
'Bangalore',
'Karnataka',
'India']},
'categories': [{'id': '4bf58dd8d48988d10f941735',
```

Fig 9: Foursquare API

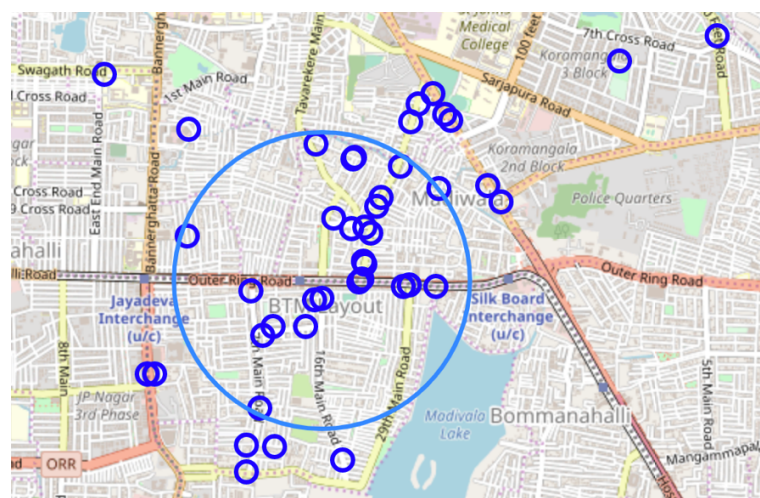


Fig 10: Cluster for restaurant hotspot

Discussion :

As cluster analysis and exploratory data analysis was performed on the Zomato dataset, the foursquare API was used to mimic and validate the recommendations made based on the exploratory data analysis. We see that BTM is a highly clustered location for restaurants. This area currently also has a lot of bustling restaurants which serve the most popular cuisine 'North Indian'.

Based on the exploratory analysis and foursquare data the following recommendations for a new restaurant were made:

- The restaurant should be located in either of the most popular areas :BTM or Brigade road. This is due to the affinity and number of votes for these particular are. Which is also highlighted in exploratory data analysis.
- Cuisines which should be selected for establishing the restaurant should be North Indian, due to the popularity of this cuisine. Initial data analysis showed the popularity of the cuisine making it a safer bet in a highly competitive market.
- Online order facility is also a necessity for a techno savvy market such as Bengaluru, thus making it an important feature.
- The type of restaurant is a crucial factor for creating a new restaurant in the market, based on the analysis performed, Casual dining/Quick Bite eateries are the most popular in the city thus making it a clear choice for creating a new project.

Conclusion and Future Considerations:

- The analysis of the Kaggle dataset gave us insights into the culinary market for the city of Bengaluru. Contrary to beliefs, north Indian cuisine is the most prevalent and popular in South India. Although the culinary business is a highly unpredictable and competitive business leveraging data science and analytics right throughout the process of setting up, maintenance and revamping restaurants is now a necessity. This project is used to depict the advantage and exploratory analysis that can be done to support strategic decisions.
- Although this project does not involve machine learning, leveraging machine learning in future project would increase the efficiency and granularity of analysis that can be performed. Here are some future suggestions that can be leveraged for a much more complex system for prediction:
 - o Leveraging machine learning for clustering and predictive analytics.
 - o Incorporating individual characteristics for restaurants for better predictions.
 - o NLP and Sentiment analysis for reviews of the restaurant.
 - o Creating a robust machine learning system with real time analytics for granular and robust data analysis.

