Analyzing Key Factors Affecting Restaurant Ratings and Popularity

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# Abstract

This study analyzes restaurant data to identify key factors influencing customer ratings and popularity. Using Python for data cleaning and Power BI for visualization, the project explores relationships among restaurant type, cost, area, service options, and ratings. Insights help understand customer preferences and guide restaurants to enhance their performance.

# 1. Introduction

With the growth of online food services, restaurants face challenges in understanding what drives customer satisfaction and popularity. This project uses data-driven methods to analyze key features such as pricing, service options, and cuisine diversity to understand their impact on restaurant ratings.

# 2. Problem Statement

Restaurants often struggle to identify which factors—such as pricing, area, cuisine, or service availability—significantly affect their customer ratings and popularity. This lack of clarity limits their ability to make data-informed operational decisions.

# 3. Objectives

* To analyze how restaurant type, cost, and location influence customer ratings.
* To examine the relationship between service options (online order, table booking) and popularity.
* To visualize trends and insights using Power BI.
* To provide data-driven recommendations for restaurant improvement.

# 4. Data Description

The dataset contains restaurant information such as name, type, ratings, cost, service options, cuisine type, and location details. The following table describes each attribute:

|  |  |
| --- | --- |
| Attribute | Description |
| restaurant\_name | Name of restaurant |
| restaurant\_type | Type (Quick Bites, Cafe, Casual Dining) |
| rate\_(out\_of\_5) | Customer rating |
| num\_of\_ratings | Number of ratings received |
| avg\_cost\_(two\_people) | Average cost for two |
| online\_order | Whether online ordering is available |
| table\_booking | Whether table booking is available |
| cuisines\_type | Cuisines offered |
| area | Restaurant area |
| local\_address | Full location |

# 5. Data Cleaning and Preprocessing (Python)

Data cleaning was performed in Python using Pandas. The process included removing duplicates, handling missing values, converting categorical variables to numeric form using label encoding, and exporting the cleaned dataset to CSV for Power BI visualization.

# 6. Tools & Technologies Used

|  |  |
| --- | --- |
| Tool | Purpose |
| Python (Pandas, Matplotlib, Seaborn) | Data cleaning and initial analysis |
| Power BI | Data visualization and dashboard creation |
| Excel/CSV | Data storage |
| DAX | Custom calculations in Power BI |

# 7. Data Visualization and Analysis (Power BI)

Power BI dashboards were created to visualize trends and relationships in the dataset. The report includes multiple pages such as:  
- Overview (Average Rating, Avg Cost, Total Restaurants)  
- Rating vs Cost Analysis (Scatter plots, bar charts)  
- Area & Service Insights (Map, online/table booking analysis)

# 8. Results & Findings

Key findings include:  
- Casual Dining restaurants have the highest average ratings.  
- Restaurants with online ordering tend to get more reviews.  
- Average cost doesn’t always correlate with better ratings.  
- Multi-cuisine restaurants show slightly better ratings than single-cuisine ones.

# 9. Hypothesis Testing

H₀: Online order availability does not affect ratings.  
H₁: Online order availability affects ratings.  
  
Result: Rejected H₀ — restaurants with online ordering show higher average ratings.

# 10. Conclusion

The study demonstrates that restaurant performance depends on a mix of factors including service availability, cuisine diversity, and area. Data visualization and analysis helped identify trends that can inform marketing and operational strategies.

# 11. Recommendations

* Promote online ordering and digital visibility.
* Focus on high-performing areas for expansion.
* Offer multi-cuisine options for broader appeal.
* Monitor cost-to-rating balance to optimize pricing.

# 12. Future Scope

Future work may include incorporating real-time customer feedback, analyzing delivery performance, or applying machine learning to predict restaurant success based on historical trends.

# 13. References

1. Kaggle/Zomato Restaurant Dataset  
2. Python and Power BI official documentation  
3. Research articles on restaurant analytics and customer satisfaction