

# High Level Design for Zomato Rating Prediction

Prepared by

**Vikram Nayyar**  
**vikramnayyar@live.com**

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## Abstract

In the recent past, a number of restaurants have emerged. Subsequently, the restaurant business is witnessing a surge in the customer count. This has resulted in various restaurant categories at several locations with numerous cuisines, prices, services and offers. Therefore, predicting the customer's liking is remarkably challenging. To overcome the limitation, various data science models were trained on the dataset. The best validated model was selected. Using this model an application was developed for the user. This application accepts six user inputs, and accordingly; provides the accurate rating prediction.

# 1. Introduction

## 1.1 Purpose

The document provides a high level technical description of the Restaurant Rating Prediction Application. The application was developed to accurately predict a restaurant's rating.

The document also provides essential insights to overcome any difficulties in application development.

## 1.2 Scope

The document is aimed to be a foundational basis for technical insights of the application. The targeted audiences are

- Development Team
- Marketing Team
- Administration

## 1.3 Definitions

- **GUI-** Graphical User Interface is the front end of the application. This is an interface between the user and the model.
- **Model-** This is a data science model; created after training on a suitable dataset.
- **Prediction-** The output of the model; that represents the outcome.
- **User-** The customer using the application.

## **2. General Description**

### **2.1 Problem Statement**

In the past six years, over 1400 new eateries have been opened. Evidently, the population's willingness to visit restaurants; has phenomenally increased. Subsequently, numerous restaurant categories have emerged at several locations. Furthermore, they offer several cuisines, price ranges and services and offers.

Therefore, predicting the customer's liking is remarkably challenging. As; a large amount of finance and time is invested, evaluation of customer tendency is critical. To make the business successful the restaurant must attract customers.

### **2.2 Goal**

The purpose of the product is to predict restaurant ratings. For a restaurant, maintaining a good rating is of chief importance. A highly rated restaurant consistently attracts large customers. This is essential to popularize the restaurant in town.

A good customer evaluation; certainly lays a lasting platform for the restaurant's profit.

### **2.3 Product Merits**

- Prior awareness of restaurant's rating
- Accurately rates over 10,000 types of restaurants
- Awareness of market trend
- Multiple strategies for increased profits

## 3. Product Description

### 3.1 Proposed Solution

A general product design is represented in figure 1. Based on the particular restaurant, a user enters desired inputs. GUI accepts the inputs; and assigns them values according to the model dictionary. Succeeding inputs are fed to the model.

The model processes the inputs and sends the predictions to the GUI. GUI displays the output to the user.



**Fig. 1.** General design of the data science application.

### 3.2 Wireframe

Wireframe of the product's UI is depicted in figure 2. In order to predict rating, the application expects 6 user inputs. Each input is properly labeled and is clearly annotated with the user selection. This prevents any confusion in selection. Please note; usual values are pre-selected for each user field. This is for the user's convenience.

The user selections are followed by the predict button. Clicking this button; inputs the user selections to the model, and the predicted rating is displayed below the predict button.

### Rating Prediction for a Bangalore Restaurant

1. Does restaurant provide online orders?

- ☒ Yes  
☐ No

2. Does restaurant provide booking?

- ☒ Yes  
☐ No

3. How many votes have restaurant received?

4. What is approximate cost of restaurant?

5. What is restaurant's location?

6. What is restaurant's type?

Predict

Prediction Statement

**Fig. 2.** Wireframe of the data science application.

### 3.3 Future Scope

As the product is based on Bangalore restaurants, this can be extended to a number of cities.

### 3.4 System Environment

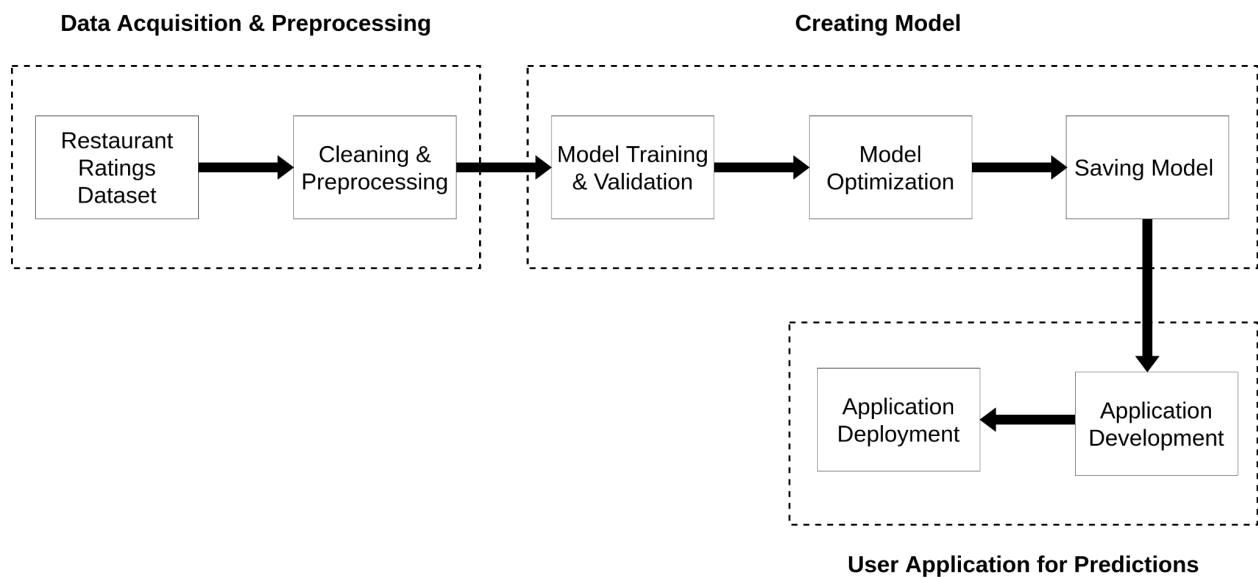
- **Programming Language:** Python 3.8.8
- **Numerical Calculations:** Numpy, Scipy
- **Plots:** Matplotlib, Seaborn
- **Model Training:** Scikit Learn, XGBoost, LightGBM, CatBoost
- **Application Interface:** Streamlit
- **Deployment:** Heroku

### 3.5 Constraints

Previously discussed wireframe; depicts a suitable layout and describes necessary inputs. Therefore, referring to the wireframe will prevent any oversight. Given a number of user inputs, the application should be prefilled with usual values. This will be convenient for the user.

New market trends emerge constantly. Therefore; after a suitable period, the model is required to be updated. This will maintain the model accuracy.

## 4. Design Description



**Fig. 3.** Process flow description of application.

The process flow diagram is shown in figure 3. The primary design constituents are described in following subsections.

### 4.1 Data Acquisition & Preprocessing

Bangalore restaurants dataset was acquired from Zomato. This was uploaded by Himanshu Poddar in Kaggle. The dataset features are cleaned and unnecessary features are dropped. The features are converted to categorical variables and consequent outliers are removed. Subsequently, the data is split to training and test sets.



## 4.2 Modeling

A number of regression models are trained and validated. The model with highest accuracy is selected. The weak features corresponding to the selected model are removed. This further improves the accuracy. Finally, the resulting model is saved.

## 4.3 User Application

The model requires 6 different inputs to make rating prediction. These inputs are specific to the user and restaurant. Therefore, to accept different inputs from user; an application was developed. The application wireframe was described in the previous section. This application imports the saved model to make predictions.