High Level Design (HLD)

Restaurant Rating Prediction

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Abstract

The number of restaurants is increasing day by day. With such a high number of restaurants. This industry hasn't been saturated yet. And new restaurants are opening every day. However it has become difficult for them to compete with already established restaurants. The key issues that continue to pose a challenge to them include high real estate costs, rising food costs, shortage of quality manpower, fragmented supply chain and over-licensing. This Zomato data aims at analysing demography of the location. Most importantly it will help new restaurants in deciding their theme, menus, cuisine, cost etc for a particular location. It also aims at finding similarity between neighbourhoods of Bengaluru on the basis of food. During this machine learning implementation we are going to see various factors affecting the rate of restaurant

Introduction

Why this high level design document?

The purpose of this High Level Design (HLD) Document is to add necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding and can be used as a reference manual for how the modules interact at high level.

The HLD will:

- Present all of the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of project
- List and describe the non functional attributes like:

  -> security

  -> reliability

  -> maintainability

  -> portability

  -> reusability

  -> application compatibility

  -> resource utilisation

  -> serviceability

Scope

The HLD documentation presents the structure of the system, such as database design, architectural design, application flow

and technology architecture. The HLD uses non-technical terms to technical terms that can be understandable to the administrator of the system

General Description

Product perspective

The restaurant rating predictor is a regression based model which helps predict the rating of a restaurant given online_order, book_table, rate, votes, location, rest_type(restaurant type), cuisines, cost, menu_item.

Problem Statement

The main goal of this project is to perform extensive Exploratory Data Analysis(EDA) on the Zomato Dataset and build an appropriate Machine Learning Model that will help various Zomato Restaurants to predict their respective Ratings based on certain features.

Proposed Solution

To solve the problem, we have created a User interface for taking the input from the user to predict the rating of a restaurant using our trained Machine learning model after processing the input and at last the output (predicted value) from the model is communicated to the User.
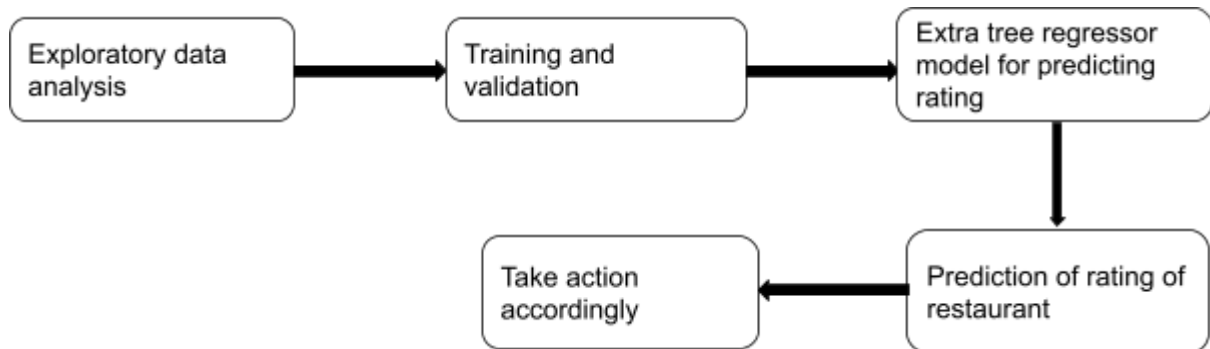
Tools Used

1. Google colab(notebook environment) is used for developing machine learning model
2. For visualisation of the plots, Matplotlib, Seaborn and Plotly are used
3. Flask is used for developing web application of the machine learning model trained
4. Front end development is done using HTML/CSS

Design Details

Process Flow

```
Exploratory data    →    Training and    →    Extra tree regressor
analysis                 validation           model for predicting
                                              rating
                                                      │
                                                      ▼
Take action         ←    Prediction of rating of
accordingly              restaurant
```

Logging

In logging, each time an error or an exception occurs, the event is logged into the system log file with reason and timestamp. This helps the developer to debug the system bugs and rectify the error.

Error Handling

Once the error occurs, the reason is logged into the log file with timestamp to rectify and handle it.

Performance

Reusability

The code written and the components used should have the ability to be reused with no problems.

Application Compatibility

The different parts of the system are communicating or using Python as an interface between them. All the components have their own tasks to perform and it is the job of a Python to ensure proper transfer of data.

Resource Utilisation

When a task is performed, it'll doubtless use all the process power offered till the process is finished.

Deployment

The model can be deployed using any cloud services such as Microsoft Azure, Amazon web services, Heroku, Google cloud, etc.

Here we have deployed locally

Conclusion

Restaurant rating predictor predicts the approximate rating of the restaurant given online_order, book_table, rate, votes, location, rest_type(restaurant type), cuisines, cost, menu_item through the user interface with approximation of 90% accuracy