Low Level Design (LLD)

Restaurant Rating Prediction

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Contents

Abstract

Restaurants nowadays prefer taking online orders. It not only helps in getting effective customer feedback but also useful for managing orders easily. We are moving towards an automated and digital world. Having a significant online presence is necessary for any restaurant to be successful and prosperous. Getting customer feedback and analyzing them in an effective manner makes the difference. This study analyses the restaurant reviews and presents useful information that the ratings do not consider or overlook. Combined research is done using datasets of different restaurant features. Machine learning algorithms like Random Forest and Extra Tree regression is used for first classifying the reviews in proper aspects then performing EDA on them. Summarization is done using effective visualization techniques. Future work is also discussed so that an efficient analysis system can be developed utilizing the potential of reviews.

1.Introduction

Why this Low-Level Design Documentation?

The purpose of this documentation is detailed description of restaurant rating prediction system which will explain the purpose and the feature of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will perform under different parameters. This document is intended for both the stack holders and developers of the system and will be proposed for the higher management for its approval.

The main objective of the project is taking restaurant's location and services provided by them into consideration this model will predict the rating of the restaurant. The restaurants make sure that all the data is available at that time in order to get the optimum utilization of this system and earn maximum profits.

This project can be delivered in three phases

Phase 1: Building Machine learning model depending on the requirements.

Phase 2: Integration of UI and database to all the functionalities.

Phase 3: Deployment of project on cloud.

Scope

This software system will be a web application, this system will be designed to predicts the rating of the restaurant based on the user's input in which there are several categories to fill in like the online order, table booking, votes, location, restaurant type, dish liked, cuisines, cost of two person and type of restaurant. Based on these features model will predict the rating of a restaurant. We make sure that all the given features should be available at that time in order to get the optimum utilization and earn maximum profits by the company.

Constraints

It is a project based of zomato restaurant data.

Out of scope

System will Not perform correctly if the data in good format.

2. Technical Specifications

Data : Zomato Restaurant

Finalized : Yes

Source : https://www.kaggle.com/datasets/himanshupoddar/zomato-bangalore-restaurants

Data Set Overview

51717 – Rows

17 – Columns

Out[62]:

	url	address	name	online_order	book_table	rate	votes	phone	location	rest_type
0	https://www.zomato.com/bangalore/jalsa-banasha...	942, 21st Main Road, 2nd Stage, Banashankari, ...	Jalsa	Yes	Yes	4.1/5	775	080 42297555\r\n+91 9743772233	Banashankari	Casual Dining
1	https://www.zomato.com/bangalore/spice-elephan...	2nd Floor, 80 Feet Road, Near Big Bazaar, 6th ...	Spice Elephant	Yes	No	4.1/5	787	080 41714161	Banashankari	Casual Dining
2	https://www.zomato.com/SanchurroBangalore?cont...	1112, Next to KIMS Medical College, 17th Cross...	San Churro Cafe	Yes	No	3.8/5	918	+91 9663487993	Banashankari	Cafe, Casual Dining
3	https://www.zomato.com/bangalore/addhuri-udupi...	1st Floor, Annakuteera, 3rd Stage, Banashankar...	Addhuri Udupi Bhojana	No	No	3.7/5	88	+91 9620009302	Banashankari	Quick Bites
4	https://www.zomato.com/bangalore/grand-village...	10, 3rd Floor, Lakshmi Associates, Gandhi Baza...	Grand Village	No	No	3.8/5	166	+91 8026612447\r\n+91 9901210005	Basavanagudi	Casual Dining
...	...	...	...	...	...	...	...	...	...	...
51712	https://www.zomato.com/bangalore/best-brews-fo...	Four Points by Sheraton Bengaluru, 43/3, White...	Best Brews - Four Points by Sheraton Bengaluru...	No	No	3.6 /5	27	080 40301477	Whitefield	Bar
51713	https://www.zomato.com/bangalore/vinod-bar-and...	Number 10, Garudachar Palya, Mahadevapura, Whi...	Vinod Bar And Restaurant	No	No	NaN	0	+91 8197675843	Whitefield	Bar

Input Schema

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51717 entries, 0 to 51716
Data columns (total 17 columns):
 #   Column                       Non-Null Count  Dtype
---  ------                       --------------  -----
 0   url                          51717 non-null  object
 1   address                      51717 non-null  object
 2   name                         51717 non-null  object
 3   online_order                 51717 non-null  object
 4   book_table                   51717 non-null  object
 5   rate                         43942 non-null  object
 6   votes                        51717 non-null  int64
 7   phone                        50509 non-null  object
 8   location                     51696 non-null  object
 9   rest_type                    51490 non-null  object
 10  dish_liked                   23639 non-null  object
 11  cuisines                     51672 non-null  object
 12  approx_cost(for two people)  51371 non-null  object
 13  reviews_list                 51717 non-null  object
 14  menu_item                    51717 non-null  object
 15  listed_in(type)              51717 non-null  object
 16  listed_in(city)              51717 non-null  object
dtypes: int64(1), object(16)
memory usage: 6.7+ MB
```

Predicting

✓ The system displays the restaurant rating according to the users input.

✓ The system presents the set of inputs required from the user.

✓ The user gives required information.

✓ The system should be able to predict the rating of restaurant for the information provided by the user.

Logging

✓ We have chosen File logging.

✓ System logs each and every system flow.

✓ Each and every user's input information is logged.

Database

The system stores each and every data given by the user or received on request to the database. We have used Cassandra.

Deployment

1.Heroku

3. Technology Stack

* Python
* Flask
* Html
* python libraries

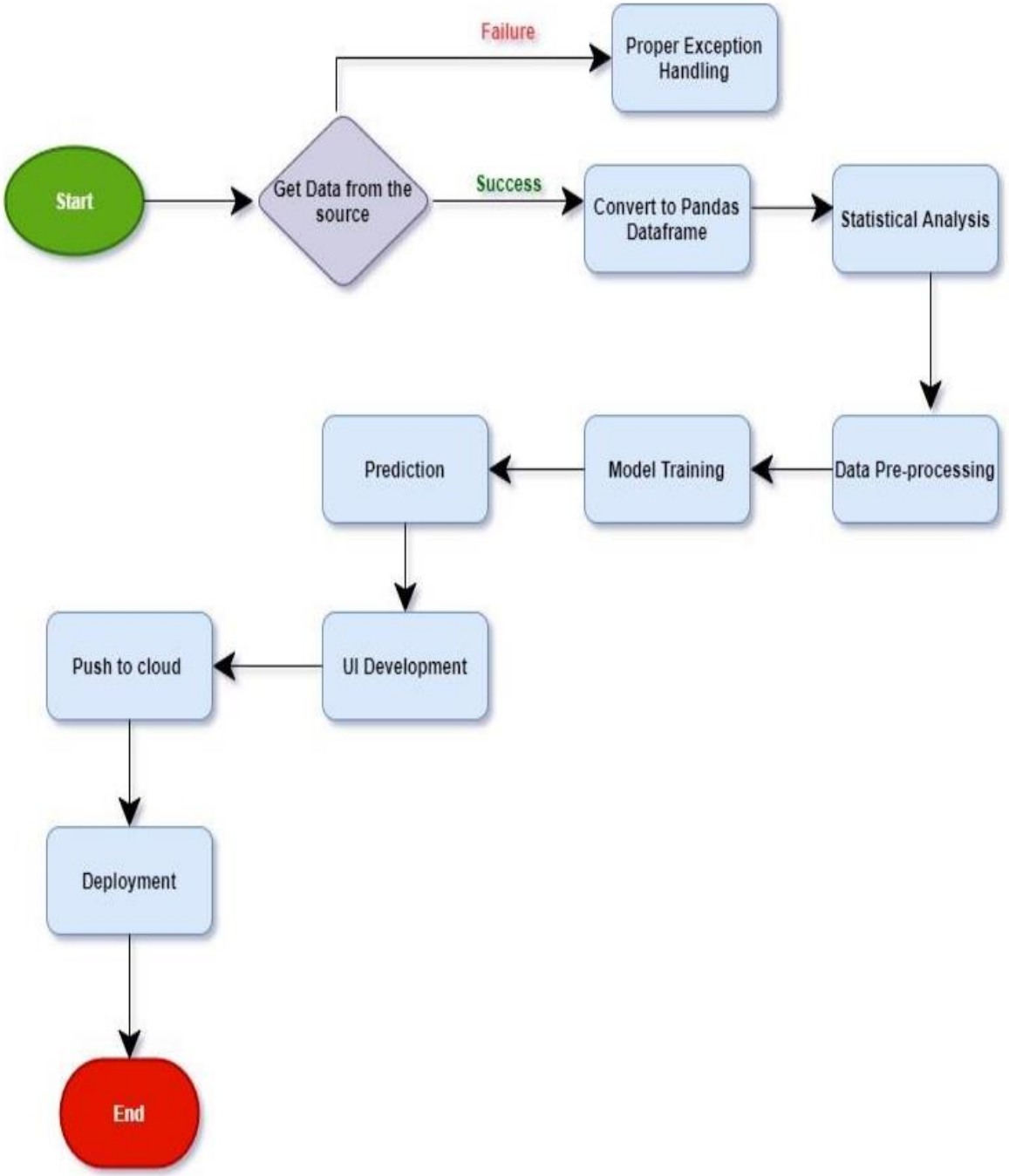
4. Proposed Solution

The restaurant industry is one of the prevailing competitive sectors. People enjoy cherishing communal dining for centuries, hence the demand for restaurants increasing day by day. Bangalore is a heaven for foodies with a range of cuisines from different parts of the world. In this paper, the data set for restaurants for a specific location is identified and the Data Visualization tools are applied to understand the trends and patterns of the food culture. This software proposes a model to understand the factors affecting the rating of restaurants. Machine learning and predictive analytics with wide spread range of tools and techniques aids to predict the rating of restaurants. In this paper model is built using various regression algorithms and the most efficient algorithm is considered. The result of this model helps new restaurants in deciding their menu, cuisine, theme, cost, demographic location etc. thereby increasing the business.

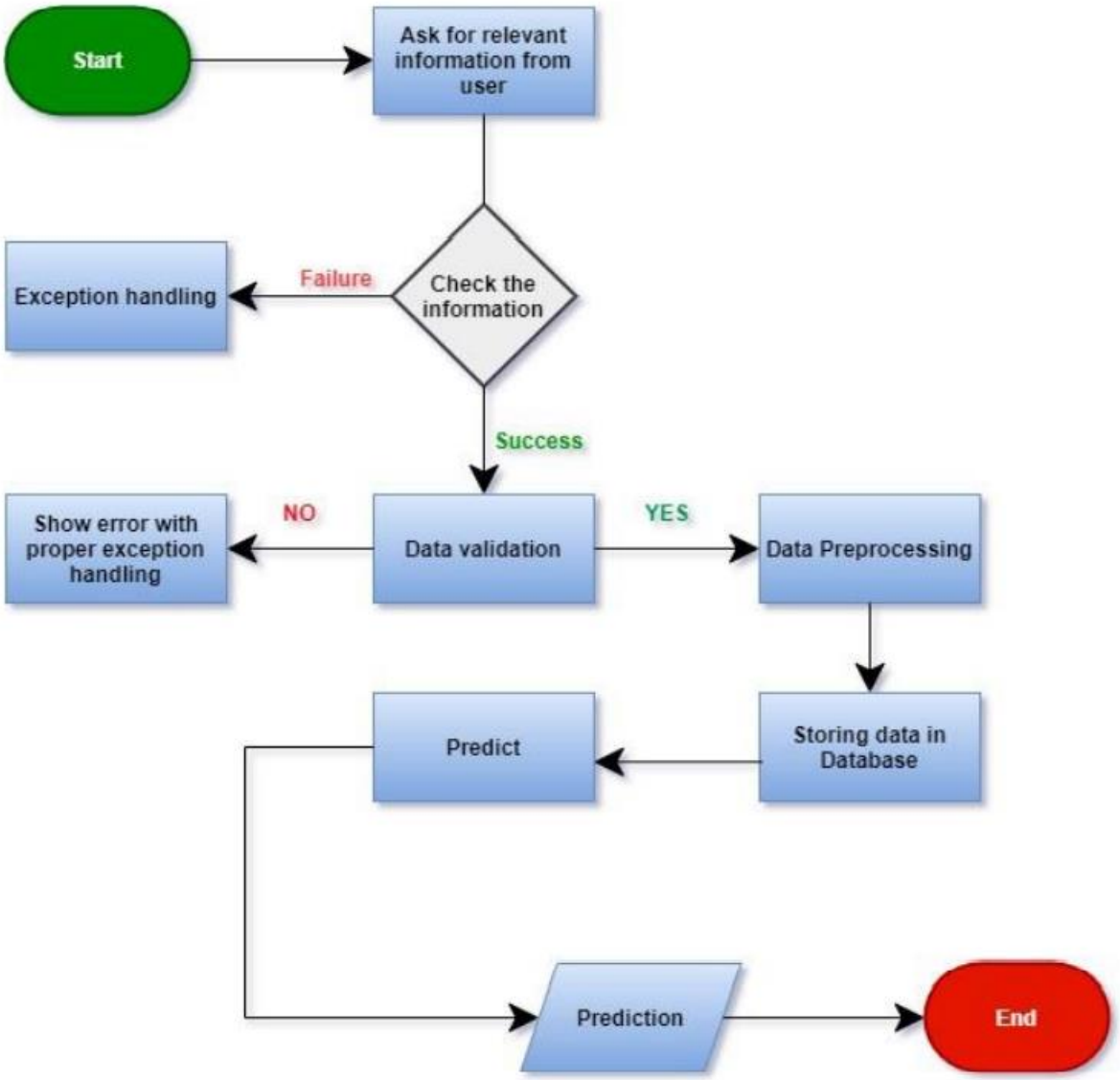
Taking different features into consideration we have created a machine learning model which will predict the rating of a restaurant.

This is a regression problem statement. We will be using linear regression and followed by the other regression algorithms in case we are not satisfied with pervious model performance, as the data is not very huge our main aim is to complete this use case with machine learning algorithm as a best optimized solution, In future if we are expected to get more data and different categories, if needed we might use deep-learning algorithm to get best solution

5. Model Training / Validation workflow 8



6. User I/O Workflow



7. Test Cases

Test Case Description	Pre-Requisite	Expected Result
Verify whether the Application URL is accessible to the user	Application URL should be defined	Application URL should be accessible to the user
Verify whether the Application loads completely for the user when the URL is accessed	1. Application URL is accessible 2. Application is deployed	The Application should load completely for the user when the URL is accessed
Verify whether user is able to edit all input fields	1. Application is accessible 2. User is logged in to the application	User should be able to edit all input fields
Verify whether user gets Submit button to submit the inputs	1. Application is accessible 2. User is logged in to the application	User should get Submit button to submit the inputs
Verify whether user is presented with recommended results on clicking submit	1. Application is accessible 2. User is logged in to the application	User should be presented with recommended results on clicking submit
Verify whether the recommended results are in accordance to the selections user made	1. Application is accessible 2. User is logged in to the application	The recommended results should be in accordance to the selections user made