Architecture

Restaurant Rating Prediction

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Contents

Abstract

Whenever we try to order some food online the first thing most of us do is check the ratings and reviews of the restaurant to confirm whether the restaurant serves quality food in time. To know whether the restaurant can provide quality food or not, one first looks at the restaurant rating and reviews about the restaurant and quality of food. Bengaluru is one the top cities in India. Most of the people here are dependent mainly on restaurant food as they might be busy in their own works. With such an overwhelming demand for restaurants, studying the demography of a location becomes important. In the world of rising new technology and innovation, the industry is advancing with the role of Artificial Intelligence. Machine learning algorithms can help us to simplify the tasks by helping us to predict and forecast the fututre. This study demonstrates how different Regression algorithms can forecast the rating of restaurants so that one can make a decision whether to buy food(online) from a particular restaurant or not based on ratings and reviews. Different regression algorithms such as Decision Tree, Random forest, XGboost, have been tested and compared to predict the ratings and the algorithm which performed better was chosen.

1 Introduction

1.1 Why this Low-Level Design Document?

The basic idea of analyzing the Zomato dataset is to get a fair idea about the factors affecting the aggregate rating of each restaurant, the establishment of different types of restaurant at different places, Bengaluru being one such city has more than 12,000 restaurants with restaurants serving dishes from all over the world. With each day new restaurants opening the industry hasn't been saturated yet and the demand is increasing day by day. In spite of increasing demand, it however has become difficult for new restaurants to compete with established restaurants. Most of them serve the same food. Bengaluru is the IT capital of India. Most of the people here are dependent mainly on the restaurant food as they don't have time to cook for themselves. With such an overwhelming demand for restaurants, it has therefore become important to study the demography of a location. What kind of food is more popular in a locality. Does the entire locality love vegetarian food? If yes, then is that locality populated by a particular set of people for eg. Jain, Marwaris, Gujaratis who are mostly vegetarian. This kind of analysis can be done using the data, by studying different factors.

This project shall be delivered in two phases:

Phase 1: All the functionalities with PyPi packages. Phase2: Integration of UI to all the functionalities.

1.2 Scope

This software system will be a Web application. This system will be designed to predict the rating of the restaurant based on the input by the user.

1.3 Constraints

The restaurant rating prediction application must be user-friendly, as automated as possible and users should not be required to know any of the workings.

1.4 Risks

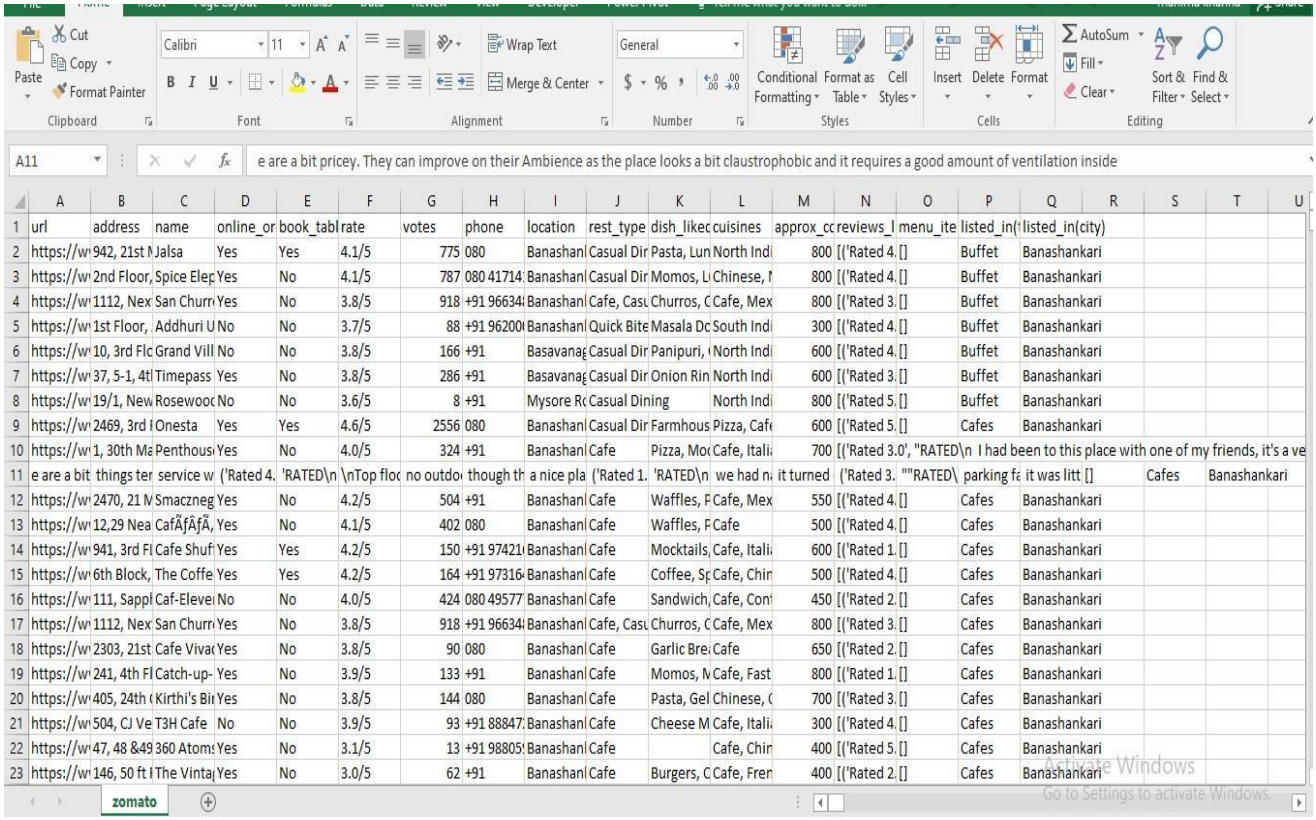
Document specific risks that have been identified or that should be considered.

1.5 Out of Scope

Delineate specific activities, capabilities, and items that are out of scope for the project.

2 Technical specifications

2.1 Dataset



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	url	address	name	online_or	book_tabl	rate	votes	phone	location	rest_type	dish_likec	cuisines	approx_cc	reviews_l	menu_ite	listed_in(	listed_in(city)				
2	https://w	942, 21st M	Jalsa	Yes	Yes	4.1/5	775	080	Banashan	Casual Dir	Pasta, Lun	North Indi	800	[('Rated 4.	[]	Buffet	Banashankari				
3	https://w	2nd Floor,	Spice Elep	Yes	No	4.1/5	787	080 41714	Banashan	Casual Dir	Momos, Li	Chinese, M	800	[('Rated 4.	[]	Buffet	Banashankari				
4	https://w	1112, Nex	San Churr	Yes	No	3.8/5	918	+91 96634	Banashan	Cafe, Casu	Churros, C	Cafe, Mex	800	[('Rated 3.	[]	Buffet	Banashankari				
5	https://w	1st Floor,	Addhuri U	No	No	3.7/5	88	+91 96200	Banashan	Quick Bite	Masala Do	South Indi	300	[('Rated 4.	[]	Buffet	Banashankari				
6	https://w	10, 3rd Flo	Grand Vill	No	No	3.8/5	166	+91	Basavanag	Casual Dir	Panipuri, (	North Indi	600	[('Rated 4.	[]	Buffet	Banashankari				
7	https://w	37, 5-1, 4t	Timepass	Yes	No	3.8/5	286	+91	Basavanag	Casual Dir	Onion Rin	North Indi	600	[('Rated 3.	[]	Buffet	Banashankari				
8	https://w	19/1, New	Rosewooc	No	No	3.6/5	8	+91	Mysore Ro	Casual Dining		North Indi	800	[('Rated 5.	[]	Buffet	Banashankari				
9	https://w	2469, 3rd I	Onesta	Yes	Yes	4.6/5	2556	080	Banashan	Casual Dir	Farmhous	Pizza, Cafe	600	[('Rated 5.	[]	Cafes	Banashankari				
10	https://w	1, 30th Ma	Penthous	Yes	No	4.0/5	324	+91	Banashan	Cafe	Pizza, Mo	Cafe, Itali	700	[('Rated 3.0', "RATED\n I had been to this place with one of my friends, it's a ve							
11	e are a bit	things ter	service w	('Rated 4.	'RATED\n	\nTop floo	no outdo	though th	a nice pla	('Rated 1.	'RATED\n	we had n	it turned	('Rated 3.	""RATED\	parking fa	it was litt	[]	Cafes	Banashankari	
12	https://w	2470, 21 M	Smaczneg	Yes	No	4.2/5	504	+91	Banashan	Cafe	Waffles, F	Cafe, Mex	550	[('Rated 4.	[]	Cafes	Banashankari				
13	https://w	12,29 Nea	CafÃƒÂƒÃ‚,	Yes	No	4.1/5	402	080	Banashan	Cafe	Waffles, F	Cafe	500	[('Rated 4.	[]	Cafes	Banashankari				
14	https://w	941, 3rd Fl	Cafe Shuf	Yes	Yes	4.2/5	150	+91 97421	Banashan	Cafe	Mocktails,	Cafe, Itali	600	[('Rated 1.	[]	Cafes	Banashankari				
15	https://w	6th Block,	The Coffe	Yes	Yes	4.2/5	164	+91 97316	Banashan	Cafe	Coffee, Sp	Cafe, Chin	500	[('Rated 4.	[]	Cafes	Banashankari				
16	https://w	111, Sappl	Caf-Eleve	No	No	4.0/5	424	080 49577	Banashan	Cafe	Sandwich,	Cafe, Cont	450	[('Rated 2.	[]	Cafes	Banashankari				
17	https://w	1112, Nex	San Churr	Yes	No	3.8/5	918	+91 96634	Banashan	Cafe, Casu	Churros, C	Cafe, Mex	800	[('Rated 3.	[]	Cafes	Banashankari				
18	https://w	2303, 21st	Cafe Viva	Yes	No	3.8/5	90	080	Banashan	Cafe	Garlic Bre	Cafe	650	[('Rated 2.	[]	Cafes	Banashankari				
19	https://w	241, 4th Fl	Catch-up-	Yes	No	3.9/5	133	+91	Banashan	Cafe	Momos, N	Cafe, Fast	800	[('Rated 1.	[]	Cafes	Banashankari				
20	https://w	405, 24th (	Kirthi's Bi	Yes	No	3.8/5	144	080	Banashan	Cafe	Pasta, Gel	Chinese, C	700	[('Rated 3.	[]	Cafes	Banashankari				
21	https://w	504, CJ Ve	T3H Cafe	No	No	3.9/5	93	+91 88847	Banashan	Cafe	Cheese M	Cafe, Itali	300	[('Rated 4.	[]	Cafes	Banashankari				
22	https://w	47, 48 &49	360 Atom	Yes	No	3.1/5	13	+91 98805	Banashan	Cafe		Cafe, Chin	400	[('Rated 5.	[]	Cafes	Banashankari				
23	https://w	146, 50 ft I	The Vinta	Yes	No	3.0/5	62	+91	Banashan	Cafe	Burgers, C	Cafe, Fren	400	[('Rated 2.	[]	Cafes	Banashankari				

2.1.1 Dataset overview

The dataset consists of a table with 56251 records and 17 features.

- url: contains the URL of the restaurant on the zomato website.
- address: contains the address of the restaurant in Bengaluru
- name: contains the name of the restaurant
- online_order: whether online ordering is available in the restaurant or not
- book_table: table book option available or not
- rate: contains the overall rating of the restaurant out of 5
- votes: contains the total number of ratings for the restaurant as of the above-mentioned date
- phone: contains the phone number of the restaurant
- location: contains the neighborhood in which the restaurant is located
- rest_type: restaurant type
- dished_liked: dishes people liked in the restaurant
- cuisines: food styles, separated by comma
- approx._cost(for two people): contains the approximate cost for a meal for two people
- reviews: list of tuples containing reviews for the restaurant, each tuple consists of two values, rating and review by the customer
- menu_item: contains a list of menus available in the restaurant

- listed_in(type): type of meal
- listed_in(city): contains the neighborhood in which the restaurant is listed

2.1.2Input schema

Feature name	Null/Required
Online order	Required
Book Table	Required
Votes	Required
Rest Type	Required
Cuisine	Required
Cost	Required
location	Required
Listed_in(type)	Required

2.2 Predicting Rating

- The system presents the set of inputs required from the user.
- The user gives the required information.
- The system then predicts that the rating of the restaurant given the above inputs.

2.3 Logging

We should be able to log every activity done by the user.

- The System identifies at what step logging required
- The System should be able to log every system flow.
- Developers can choose logging methods. You can choose database logging/ File logging as well.
- The system should not be hung even after using so many loggings. Logging just because we can easily debug issues so logging is mandatory to do.

2.4 Deployment

✓ Streamlit

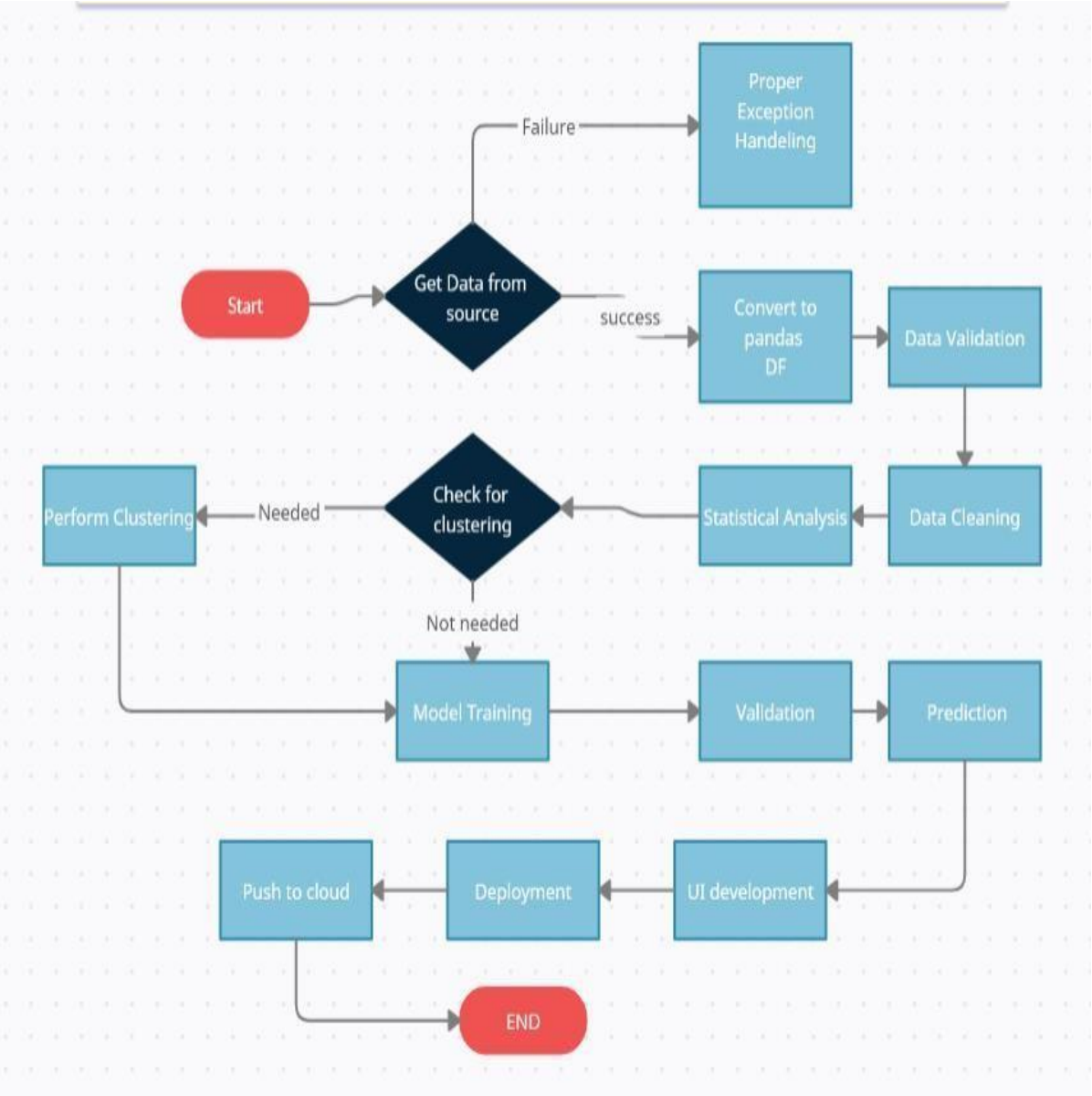
3 Technology stack

Front End	Streamlit
Backend	Python Streamlit
Deployment	Streamlit

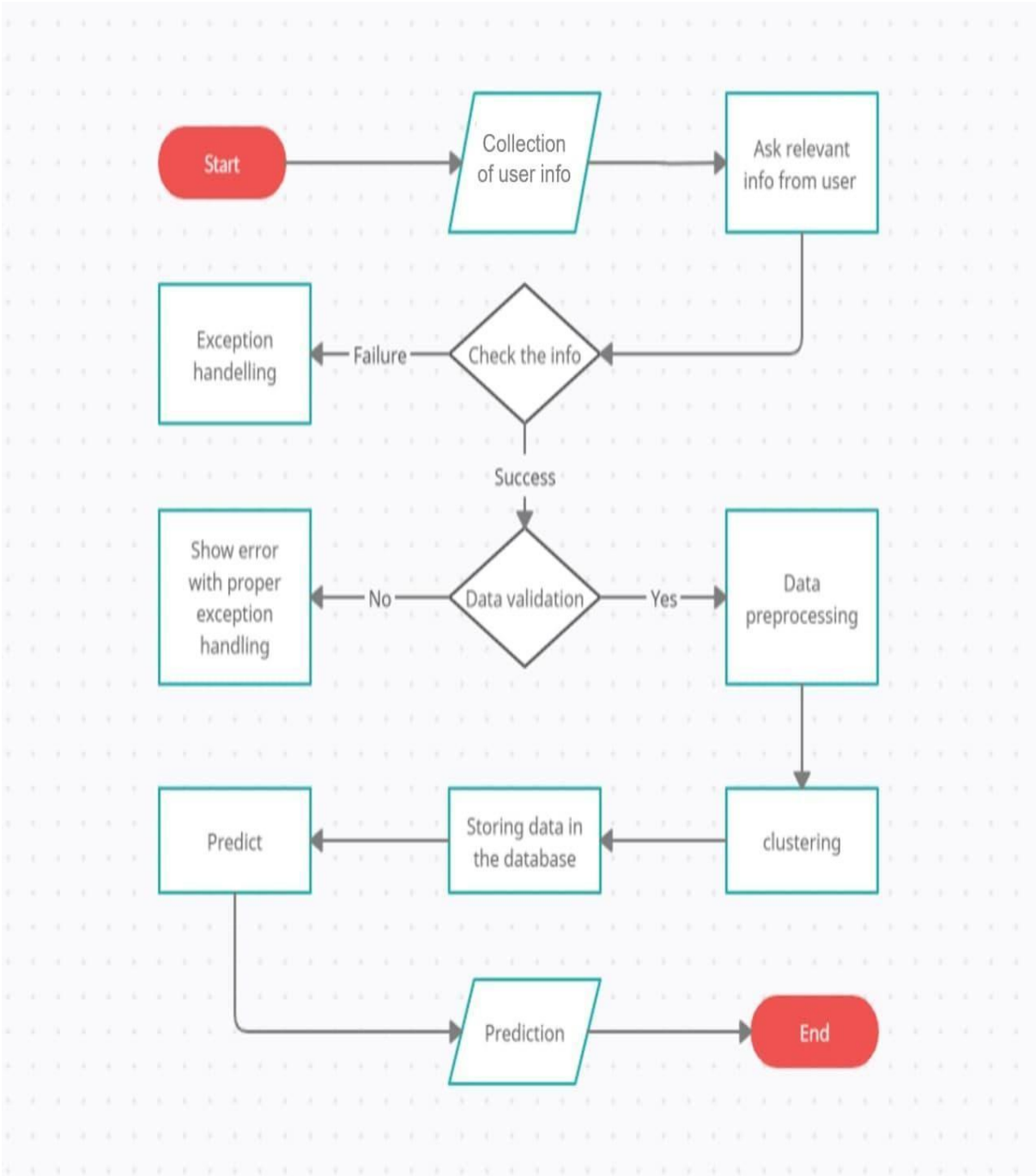
4 Proposed Solution

The proposed solution for this project is Machine learning algorithms that can be implemented to predict the rating of the restaurant. Considering various features like online order, book table, votes, rest type, cuisines, listed_in(type) as inputs from the web app, the implemented regression model will predict the output as a rating of the restaurant.
Here we tried different algorithms such as Random forest, Decision tree regressor, XGboost, The final model with the highest accuracy(93%) turns out to be an Random forest regressor.

5 Model training/validation workflow



6 User I/O workflow



7 Exceptional scenarios

Step	Exception	Mitigation	Module
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8 Performance

We can observe that the accuracy of the predicted output was seen at 93% using an Randomforest regressor.