Architecture Design
Flight Fare Prediction

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Abstract

The recent changes in the international market had a large impact on the Aviation sector because of several reasons. These impact the two class folks, the first is Business perspective and second is Customer perspective. The major reason for such an impact is the governments around the world amended totally different rules to their various Airline firms. Taking these factors into consideration, the value of the flight tickets has varied

from one place to another. Booking a flight ticket has its price tag split into two, one is online bookings and other is offline bookings. Each of these have their various criteria for value of the price, one such example is the server load and therefore the range of booking requests. During this machine learning implementation, we are going to see numerous factors that impact the price of the flight ticket and predict the acceptable price of the ticket.

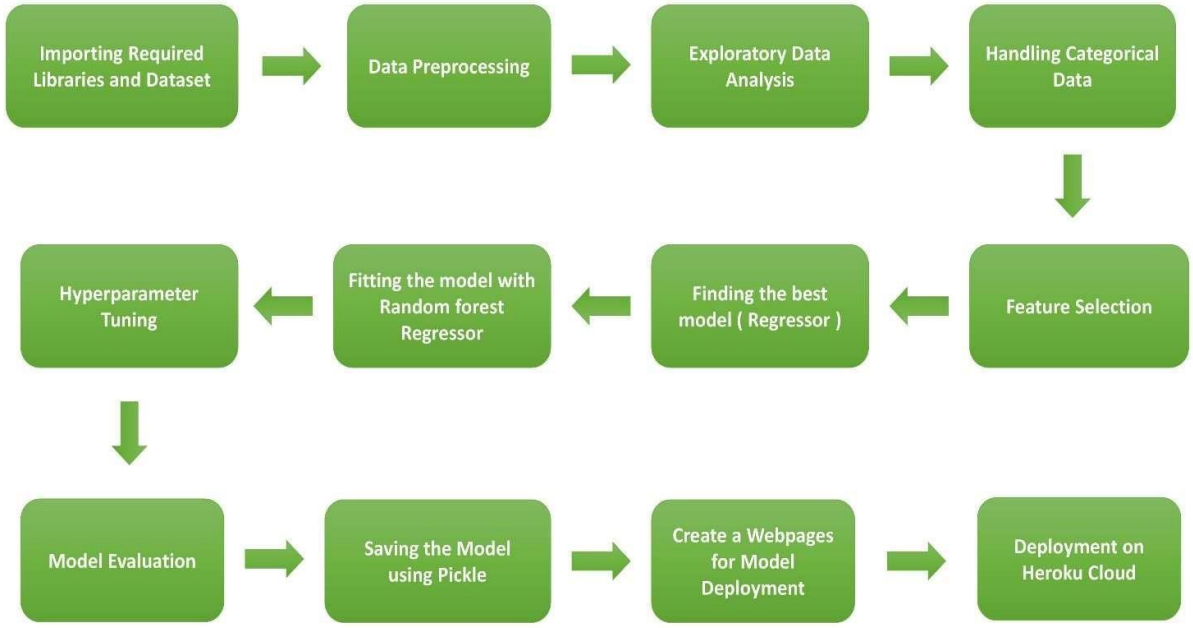
1. Introduction

1.1 Why this Architecture Design Document ?

The main objective of the Architecture design documentation is to provide the internal logic understanding of the flight fare prediction code. The Architecture

design documentation is designed in such a way that the programmer can directly code after reading each module description in the documentation.

2. Architecture



3. Architecture Design

3.1 Data Collection

The data for these project is collected from the Kaggle Dataset, the URL for the dataset is kaggle.com/datasets/nikhilmittal/flight-fare-prediction-mh

3.2 Data Description

Flight Fare Prediction is 10K+ dataset publicly available on Kaggle. The information in the dataset is present in two separate excel files named as train.xlsx and test.xlsx. Dataset contains 10683 rows which shows the information such Date of Journey, Source, Destination, Arrival Time, Departure Time, Total stops, Airlines, Additional Info and Price. The glance of the Dataset is :

Airline	Date_of_Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Duration	Total_Stops	Additional_Info	Price
IndiGo	24/03/2019	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 Mar	2h 50m	non-stop	No info	3897
Air India	1/05/2019	Kolkata	Banglore	CCU → IXR → BBI → BLR	05:50	13:15	7h 25m	2 stops	No info	7662
Jet Airways	9/06/2019	Delhi	Cochin	DEL → LKO → BOM → COK	09:25	04:25 10 Jun	19h	2 stops	No info	13882
IndiGo	12/05/2019	Kolkata	Banglore	CCU → NAG → BLR	18:05	23:30	5h 25m	1 stop	No info	6218
IndiGo	01/03/2019	Banglore	New Delhi	BLR → NAG → DEL	16:50	21:35	4h 45m	1 stop	No info	13302
SpiceJet	24/06/2019	Kolkata	Banglore	CCU → BLR	09:00	11:25	2h 25m	non-stop	No info	3873
Jet Airways	12/03/2019	Banglore	New Delhi	BLR → BOM → DEL	18:55	10:25 13 Mar	15h 30m	1 stop	In-flight meal not included	11087
Jet Airways	01/03/2019	Banglore	New Delhi	BLR → BOM → DEL	08:00	05:05 02 Mar	21h 5m	1 stop	No info	22270
Jet Airways	12/03/2019	Banglore	New Delhi	BLR → BOM → DEL	08:55	10:25 13 Mar	25h 30m	1 stop	In-flight meal not included	11087
Multiple carriers	27/05/2019	Delhi	Cochin	DEL → BOM → COK	11:25	19:15	7h 50m	1 stop	No info	8625
Air India	1/06/2019	Delhi	Cochin	DEL → BLR → COK	09:45	23:00	13h 15m	1 stop	No info	8907
IndiGo	18/04/2019	Kolkata	Banglore	CCU → BLR	20:20	22:55	2h 35m	non-stop	No info	4174
Air India	24/06/2019	Chennai	Kolkata	MAA → CCU	11:40	13:55	2h 15m	non-stop	No info	4667
Jet Airways	9/05/2019	Kolkata	Banglore	CCU → BOM → BLR	21:10	09:20 10 May	12h 10m	1 stop	In-flight meal not included	9663

3.3 Importing data into Database

Created associate API for the transfer of the info into the Cassandra info, steps performed are :

- Connection is created with the info.
- Created a info with name FlightInfo.
- cqlsh command is written for making the info table with needed parameters.
- And finally, a cqlsh command is written for uploading the Knowledge Set into data table by bulk insertion.

3.4 Exporting Data from Database

In the above created API, the download URL is also being created, which downloads the data into a csv file format.

3.5 Data Preprocessing

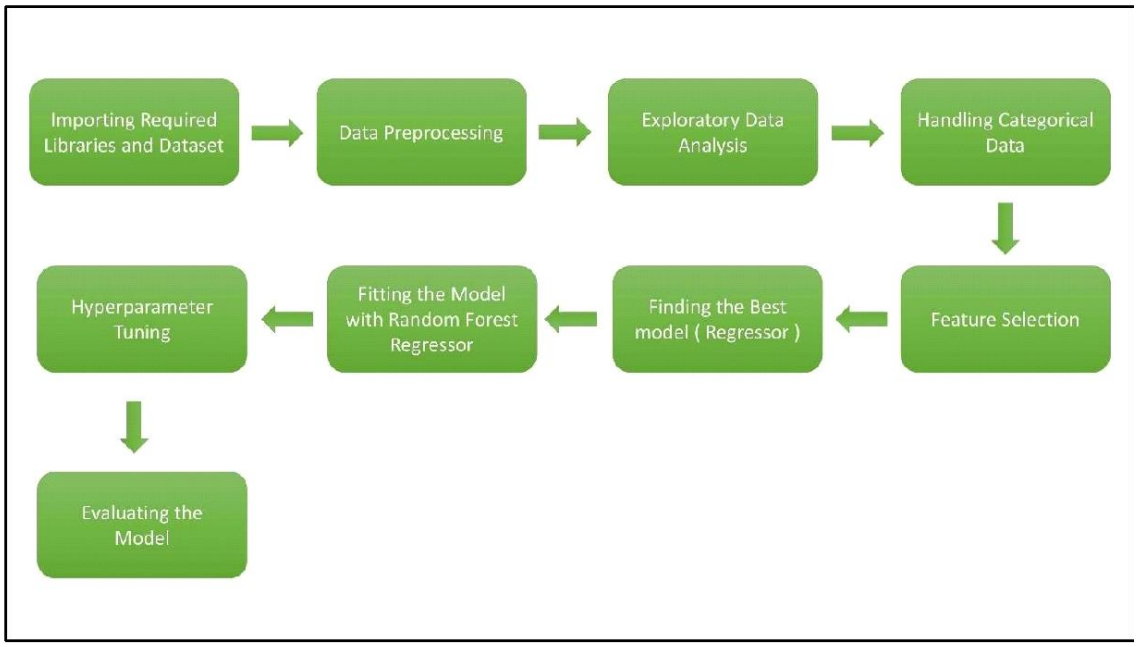
- Checked for info of the Dataset, to verify the correct datatype of the Columns.
- Checked for Null values, because the null values can affect the accuracy of the model.
- Converted all the desired columns into Datetime format.

- Performed One – Hot encoding on the desired columns.
- Checking the distribution of the columns to interpret its importance.

Now, the info is prepared to train a Machine Learning Model.

3.6 Modeling Process

After preprocessing the data, We visualize our data to gain insights and then these insights are randomly spread and split into two parts, train and test data. After splitting the data, we use Random Forest Regressor to model our data to predict the Flight Fare price.



3.7 UI Integration

Both CSS and HTML files are being created and are being integrated with the created machine learning model. All the required files are then integrated to the app.py file and tested locally.

3.8 Data from User

The data from the user is retrieved from the created HTML web page.

3.9 Data Validation

The data provided by the user is then being processed by app.py file and validated. The validated data is then sent to the prepared model for the prediction.

3.10 Rendering the Results

The data sent for the prediction is then rendered to the web page.

3.11 Deployment

The tested model is then deployed to Heroku. So, users can access the project from any internet device.