

FLIGHT FRARE PREDICTION ARCHITECTURE DESIGN

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Abstract

In the present day contemporary scenario, Airlines have become popular and affordable domestically at least, and these flight fare is a factor people consider to travel. All these fares aspect varies according to season, weather condition, availability of staff and so on. So here we are going to build ML model that predicts the price of an Airline which would be useful prior to bookings.

Introduction

1.1 Why this Low-Level Design Document?

The purpose of this document is to showcase a detailed working on how the flight fare prediction happens. Thus, explaining the features of the system, UI, what it does and so on. This document brings a clear clarity for the higher management and the developers to take further action.

1.2 Scope

This system is a web application which is used to predict the flight fare for any traveller. Mainly, this helps in getting to check various flights, departure date, arrival date, stoppages and so on at a go and predicts a fair price.

1.3 Constraints

The main constraint of this project is one cannot sort the prices according to their requirement and budget.

1.4 Risks

Document specific risks that should be identified.

1.5 Out of scope

Delineate specific activities and features that are out of scope.

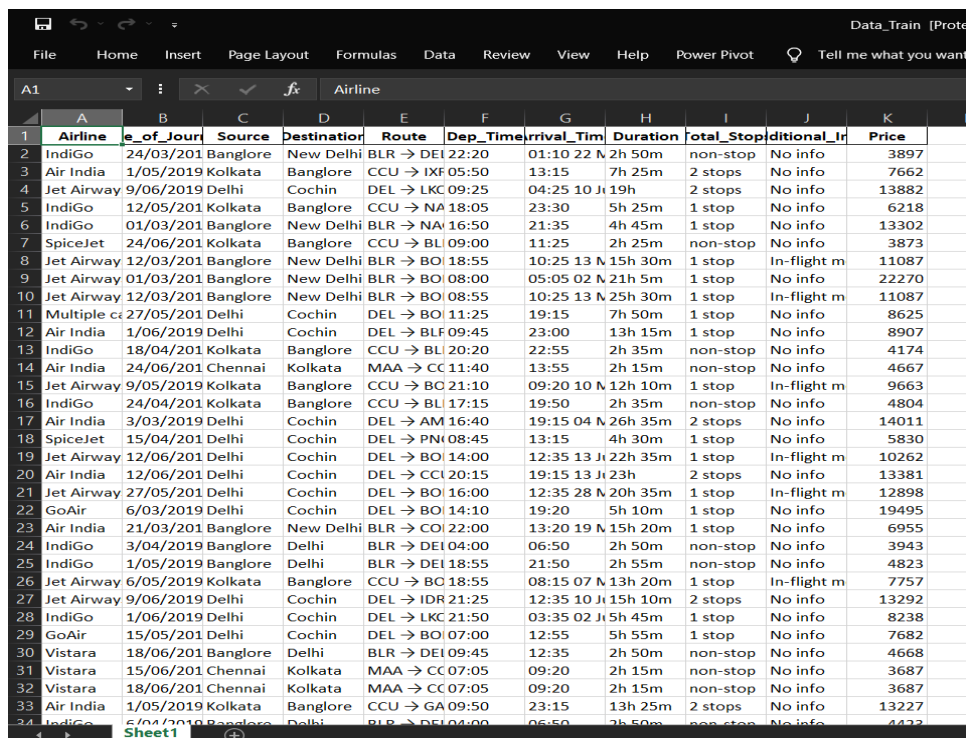
2 Technical Specifications

2.1Dataset

Feature	Outcome	Source
Price(training data)	yes	Git hub
Price(testing data)	yes	Git hub

2.2Dataset Overview

The Dataset contains close to 10600 records of information that has Airway carriers, routes, Source of boarding, destination, and additional info. Some of the columns has less or no information that's useful. It has train and test data in separate file.



	A	B	C	D	E	F	G	H	I	J	K
1	Airline	Date of Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Duration	Total_Stops	Additional_Info	Price
2	IndiGo	24/03/201	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 M	2h 50m	non-stop	No info	3897
3	Air India	1/05/2019	Kolkata	Banglore	CCU → IXF	05:50	13:15	7h 25m	2 stops	No info	7662
4	Jet Airway	9/06/2019	Delhi	Cochin	DEL → LKC	09:25	04:25 10 J	19h	2 stops	No info	13882
5	IndiGo	12/05/201	Kolkata	Banglore	CCU → NA	18:05	23:30	5h 25m	1 stop	No info	6218
6	IndiGo	01/03/201	Banglore	New Delhi	BLR → NA	16:50	21:35	4h 45m	1 stop	No info	13302
7	SpiceJet	24/06/201	Kolkata	Banglore	CCU → BL	09:00	11:25	2h 25m	non-stop	No info	3873
8	Jet Airway	12/03/201	Banglore	New Delhi	BLR → BO	18:55	10:25 13 M	15h 30m	1 stop	In-flight m	11087
9	Jet Airway	01/03/201	Banglore	New Delhi	BLR → BO	08:00	05:05 02 M	21h 5m	1 stop	No info	22270
10	Jet Airway	12/03/201	Banglore	New Delhi	BLR → BO	08:55	10:25 13 M	25h 30m	1 stop	In-flight m	11087
11	Multiple ci	27/05/201	Delhi	Cochin	DEL → BO	11:25	19:15	7h 50m	1 stop	No info	8625
12	Air India	1/06/2019	Delhi	Cochin	DEL → BLF	09:45	23:00	13h 15m	1 stop	No info	8907
13	IndiGo	18/06/201	Kolkata	Banglore	CCU → BL	20:20	22:55	2h 35m	non-stop	No info	4174
14	Air India	24/06/201	Chennai	Kolkata	MAA → CC	11:40	13:55	2h 15m	non-stop	No info	4667
15	Jet Airway	9/05/2019	Kolkata	Banglore	CCU → BC	21:10	09:20 10 M	12h 10m	1 stop	In-flight m	9663
16	IndiGo	24/04/201	Kolkata	Banglore	CCU → BL	17:15	19:50	2h 35m	non-stop	No info	4804
17	Air India	3/03/2019	Delhi	Cochin	DEL → AM	16:40	19:15 04 M	26h 35m	2 stops	No info	14011
18	SpiceJet	15/04/201	Delhi	Cochin	DEL → PNI	08:45	13:15	4h 30m	1 stop	No info	5830
19	Jet Airway	12/06/201	Delhi	Cochin	DEL → BO	14:00	12:35 13 J	22h 35m	1 stop	In-flight m	10262
20	Air India	12/06/201	Delhi	Cochin	DEL → CC	20:15	19:15 13 J	23h	2 stops	No info	13381
21	Jet Airway	27/05/201	Delhi	Cochin	DEL → BO	16:00	12:35 28 M	20h 35m	1 stop	In-flight m	12898
22	GoAir	6/03/2019	Delhi	Cochin	DEL → BO	14:10	19:20	5h 10m	1 stop	No info	19495
23	Air India	21/03/201	Banglore	New Delhi	BLR → CO	22:00	13:20 19 M	15h 20m	1 stop	No info	6955
24	IndiGo	3/04/2019	Banglore	Delhi	BLR → DE	10:00	06:50	2h 50m	non-stop	No info	3943
25	IndiGo	1/05/2019	Banglore	Delhi	BLR → DE	18:55	21:50	2h 55m	non-stop	No info	4823
26	Jet Airway	6/05/2019	Kolkata	Banglore	CCU → BC	18:55	08:15 07 M	13h 20m	1 stop	In-flight m	7757
27	Jet Airway	9/06/2019	Delhi	Cochin	DEL → IDR	21:25	12:35 10 J	15h 10m	2 stops	No info	13292
28	IndiGo	1/06/2019	Delhi	Cochin	DEL → LKC	21:50	03:35 02 J	5h 45m	1 stop	No info	8238
29	GoAir	15/05/201	Delhi	Cochin	DEL → BO	07:00	12:55	5h 55m	1 stop	No info	7682
30	Vistara	18/06/201	Banglore	Delhi	BLR → DE	09:45	12:35	2h 50m	non-stop	No info	4668
31	Vistara	15/06/201	Chennai	Kolkata	MAA → CC	07:05	09:20	2h 15m	non-stop	No info	3687
32	Vistara	18/06/201	Chennai	Kolkata	MAA → CC	07:05	09:20	2h 15m	non-stop	No info	3687
33	Air India	1/05/2019	Kolkata	Banglore	CCU → GA	09:50	23:15	13h 25m	2 stops	No info	13227
34	IndiGo	6/04/2019	Banglore	Delhi	BLR → DE	10:00	06:50	2h 50m	non-stop	No info	4432

	A	B	C	D	E	F	G	H	I	J	K	L
1	Airline	e_of_Jour	Source	Destination	Route	Dep_Time	Arrival_Time	Duration	Total_Stops	Additional_Info		
2	Jet Airway	6/06/2019	Delhi	Cochin	DEL → BOI	17:30	04:25 07 J	10h 55m	1 stop	No info		
3	IndiGo	12/05/201	Kolkata	Banglore	CCU → MA	06:20	10:20	4h	1 stop	No info		
4	Jet Airway	21/05/201	Delhi	Cochin	DEL → BOI	19:15	19:00 22 N	23h 45m	1 stop	In-flight meal not included		
5	Multiple c	21/05/201	Delhi	Cochin	DEL → BOI	08:00	21:00	13h	1 stop	No info		
6	Air Asia	24/06/201	Banglore	Delhi	BLR → DEI	23:55	02:45 25 J	2h 50m	non-stop	No info		
7	Jet Airway	12/06/201	Delhi	Cochin	DEL → BOI	18:15	12:35 13 J	18h 20m	1 stop	In-flight meal not included		
8	Air India	12/03/201	Banglore	New Delhi	BLR → TRV	07:30	22:35	15h 5m	1 stop	No info		
9	IndiGo	1/05/2019	Kolkata	Banglore	CCU → HY	15:15	20:30	5h 15m	1 stop	No info		
10	IndiGo	15/03/201	Kolkata	Banglore	CCU → BL	10:10	12:55	2h 45m	non-stop	No info		
11	Jet Airway	18/05/201	Kolkata	Banglore	CCU → BC	16:30	22:35	6h 5m	1 stop	No info		
12	Jet Airway	21/03/201	Delhi	Cochin	DEL → MA	13:55	18:50 22 N	28h 55m	2 stops	In-flight meal not included		
13	IndiGo	15/06/201	Delhi	Cochin	DEL → HYI	06:50	16:10	9h 20m	1 stop	No info		
14	Multiple c	15/05/201	Delhi	Cochin	DEL → BOI	09:00	19:15	10h 15m	1 stop	No info		
15	Jet Airway	24/03/201	Banglore	New Delhi	BLR → BOI	05:45	10:25	4h 40m	1 stop	No info		
16	Jet Airway	3/06/2019	Delhi	Cochin	DEL → BOI	19:15	12:35 04 J	17h 20m	1 stop	In-flight meal not included		
17	Jet Airway	06/03/201	Banglore	New Delhi	BLR → BOI	21:25	08:15 07 N	10h 50m	1 stop	No info		
18	Multiple c	6/06/2019	Delhi	Cochin	DEL → HYI	13:15	22:30	9h 15m	1 stop	No info		
19	Vistara	24/03/201	Kolkata	Banglore	CCU → DE	09:55	22:10	12h 15m	1 stop	No info		
20	Jet Airway	12/06/201	Delhi	Cochin	DEL → BOI	19:15	04:25 13 J	9h 10m	1 stop	In-flight meal not included		
21	Jet Airway	12/03/201	Banglore	New Delhi	BLR → BOI	22:55	08:15 13 N	9h 20m	1 stop	No info		
22	IndiGo	6/03/2019	Delhi	Cochin	DEL → BOI	10:45	01:35 07 N	14h 50m	1 stop	No info		
23	Jet Airway	9/05/2019	Kolkata	Banglore	CCU → BC	20:00	10:05 10 N	14h 5m	1 stop	In-flight meal not included		
24	Jet Airway	18/03/201	Banglore	New Delhi	BLR → BOI	21:25	09:00 16 N	11h 35m	1 stop	In-flight meal not included		
25	Jet Airway	9/05/2019	Delhi	Cochin	DEL → JAI	05:30	19:00	13h 30m	2 stops	In-flight meal not included		
26	Air India	6/04/2019	Banglore	Delhi	BLR → DEI	21:05	23:55	2h 50m	non-stop	No info		
27	Jet Airway	21/03/201	Delhi	Cochin	DEL → BOI	16:00	04:25 22 N	12h 25m	1 stop	In-flight meal not included		
28	IndiGo	15/05/201	Kolkata	Banglore	CCU → BL	15:15	17:45	2h 30m	non-stop	No info		
29	Jet Airway	21/05/201	Delhi	Cochin	DEL → BOI	17:30	19:00 22 N	25h 30m	1 stop	No info		
30	Jet Airway	6/06/2019	Delhi	Cochin	DEL → BOI	09:00	04:25 07 J	19h 25m	1 stop	In-flight meal not included		
31	Multiple c	1/06/2019	Delhi	Cochin	DEL → BOI	14:00	21:00	7h	1 stop	No info		
32	Air Asia	3/03/2019	Kolkata	Banglore	CCU → BL	22:50	01:20 04 N	2h 30m	non-stop	No info		

2.3 Predicting Fare

- System displays the features that are to be filled.
- User fills in the required details in the proper format.
- System displays the desired output.

2.4 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 each and every system flow.
- Developers can choose logging methods. You can choose database logging/

File logging as well.

- 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.

2.5 Database

We create an API for the upload of data into the Cassandra Database, steps performed are:

Connection is made with database

Created a database with name flight fare

Cqlsh command is given for creating data table with required parameters.

Cqlsh command is written for uploading the dataset into the table.

3. Technology Stack

Front End	HTML, CSS
Backend	Python Flask
Deployment	Render.com

4. Proposed Solution

Based on the trained model, if we were to look at the output we use Random Forest Regressor for the output prediction. Out of all the used and tested models we select the random forest regressor here.

Models used- Random forest, Linear regression, Gradient boosting, XG Boost regressor

Actual model – Random forest regressor

5. Model Training

- Importing the necessary Libraries
- read the data. (get insights on it).
- Check for null values. (Drop or use imputation)
- EDA
- Standardize the data set
- Encode the dataset (Label or One-Hot encoding upon requirement)
- Preprocessing
- Model Building
- Deploy using the Flask library
- Start the app (command is “python app.py”)
- Input from the user
- Get the Result.

6. User I/O workflow

