

DETAILED PROJECT REPORT

FLIGHT FARE PREDICTION

A Wizz Air airplane is shown in flight, angled upwards and to the right, against a backdrop of a bright blue sky filled with soft, white, wispy clouds. The aircraft is white with purple accents on the tail and engines. The text 'WIZZ' is visible on the side of the fuselage.

TARINI PRASAD DAS

ABSTRACT

Flight ticket fare is the most fluctuating data which varies every day. Depending on the various factors that affect it directly or indirectly, we cannot say that the price of flight ticket fare remains the same or not. It is quite a tough task to predict the flight ticket fare. It may change throughout the week, month or some days, but it can be predicted nearly accurate to the actual flight ticket fare.

The recent global situations had a huge impact on the aviation sector due to many reasons. This impact has two category people, the first is business perspective and the second is the customers perspective. As safety is the major reason for such impact on the aviation sector, the governments around the world amended different rules to their respective airlines companies. These restrictions had made the availability of the flights and their attendee capacity less.

Taking all these factors in consideration the cost of the flight tickets has increased and vary from one place to the other. Booking a flight ticket has split into two, one is the online and the other is the offline bookings. Both these have their respective criteria for cost of the ticket, one such example is the server load and the number of booking requests. In this machine learning implementation, we will see various factors that impact the cost of the flight ticket and predict the appropriate fare of the ticket.

INTRODUCTION

Problem Statement

- The aviation industry's dynamic pricing structure makes it challenging for travelers to budget their trips effectively. This project addresses this issue by leveraging machine learning techniques to predict flight fares accurately.

Objectives

- Develop a machine learning model to predict flight fares.
- Create a user-friendly web application for fare predictions.
- Enhance transparency in flight pricing for travelers.

APPROACH

- The proposed approach is using machine learning algorithm and we are using supervised learning.
- We are gathering our data from a site. The data is containing some of the details of Indian flight of a short duration.
- This project involves the feature engineering for processing the dataset(data) to convert it into dataframe. When we have the processed dataframe we move to normalizing the dataframe.
- The regression model which we have selected for our prediction is Extreme Gradient Boosting
- We are training the model with the normalized dataframe. After experimenting and tuning the hyper parameters we are obtaining the predicted results and the accuracy

SCOPE

- For purchasing an airplane ticket, the traditional purchase strategy is to buy a ticket far in advance of the flight's departure date to avoid the risk that the price may increase rapidly before the departure date. However, this is usually not always true, airplane companies can decrease the prices if they want to increase the sales.
- Airline companies use many different variables to determine the flight ticket price that indicates whether the travel is during the holidays, the number of free seats in the plane etc., or even in which month it is, some of the variables are observed, but some of them are hidden.
- In this context, buyers are trying to find the right day to buy the ticket, and on the contrary, the airplane companies are trying to keep the overall revenue as high as possible. Airline companies have the freedom to change the flight ticket prices at any moment. Travelers can save money if they choose to buy a ticket when its price is the lowest.

TECHNOLOGY STACK

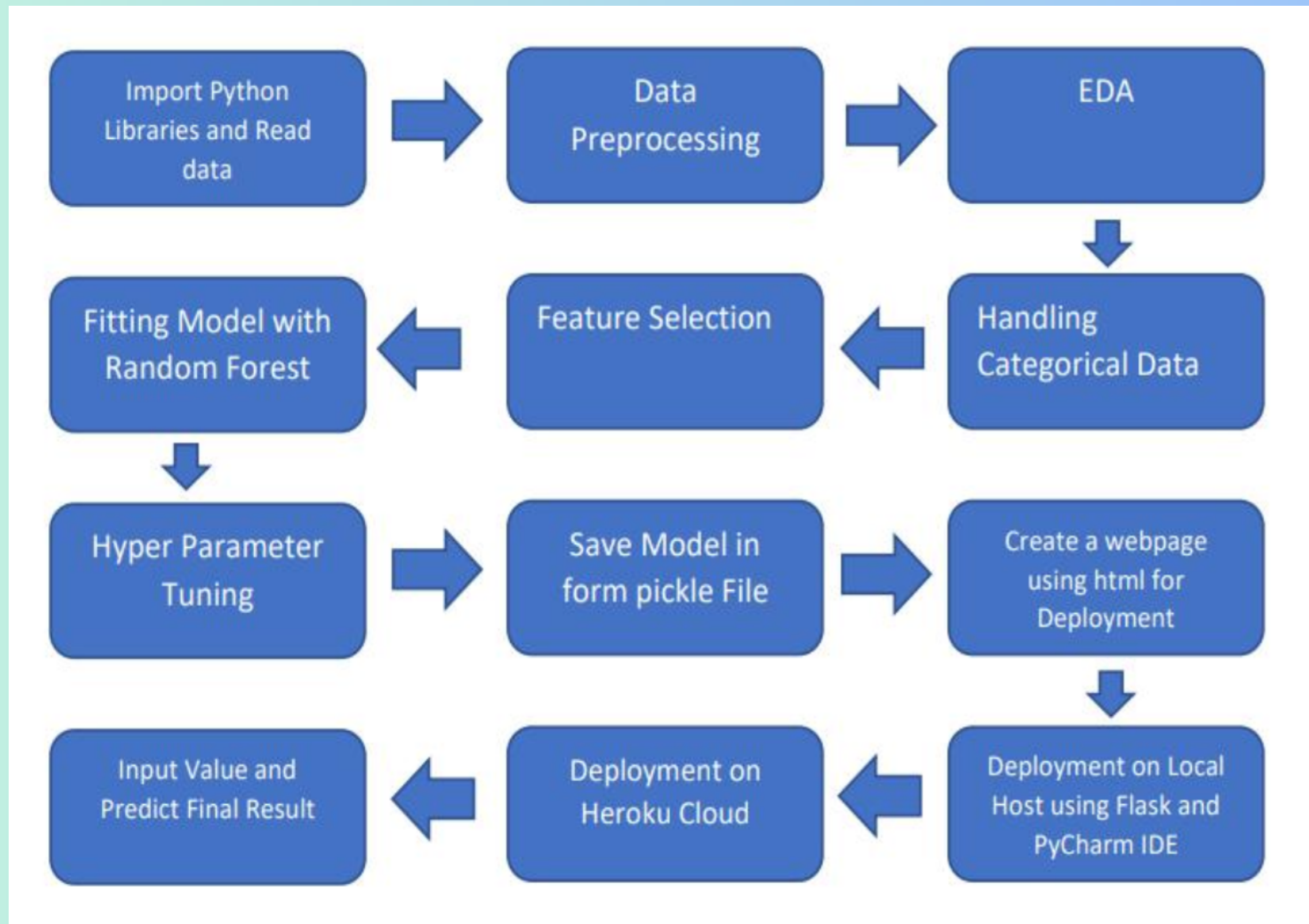
Technology

- Machine Learning
(Supervised learning)
- python
- Data Processing and Analysis
(Pandas ,Numpy)
- Data Visualization
(Matplotlib and Seaborn)
- Web Development (Flask)
- Cloud Services (AWS)

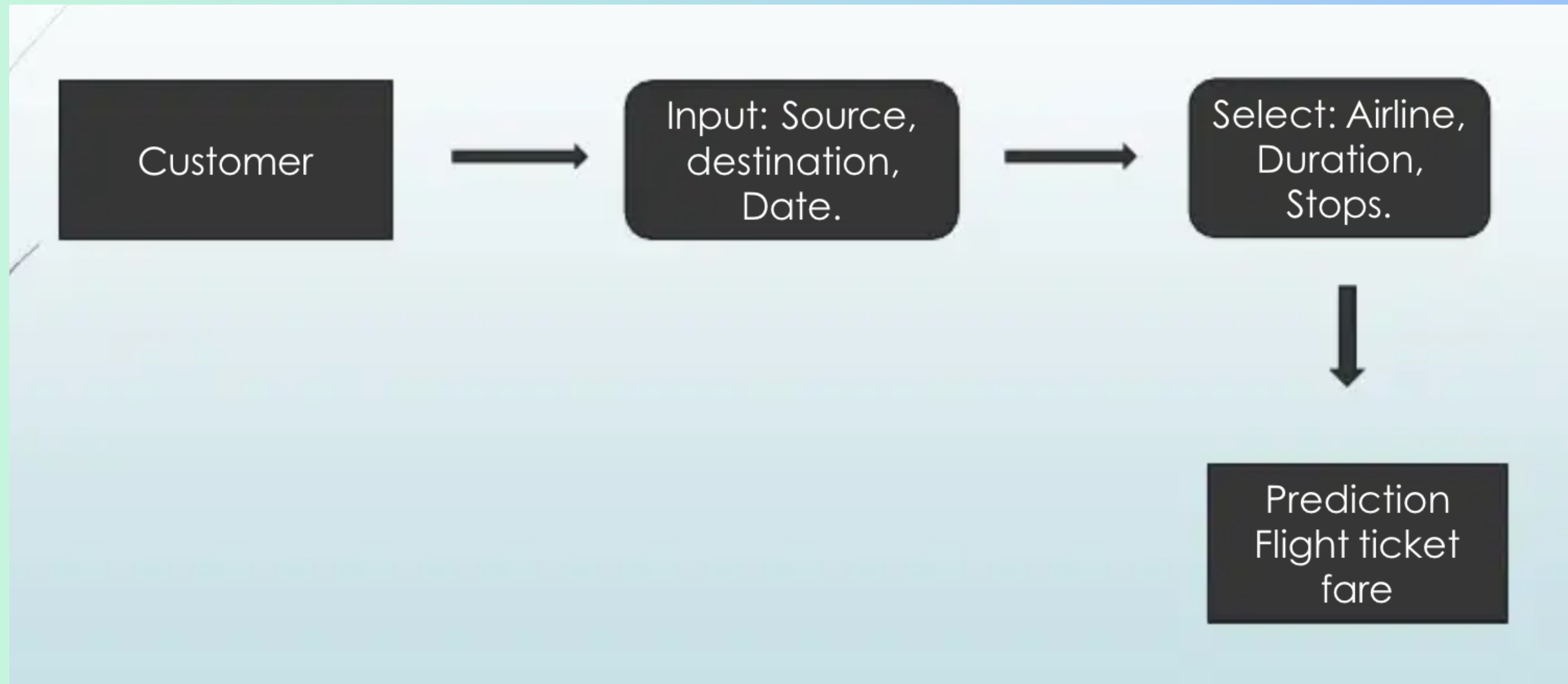
SOFTWARE

- Jupyter Notebook
- VS CODE

Architecture



Logical Data Flow Diagram(Web Page Interface)



Data Collection and Preprocessing

Data Sources

- We gathered historical flight data from various sources, including airline websites and third-party travel APIs.
- Data included attributes such as departure and arrival airports, airline carriers, flight duration, booking timestamps, and economic indicator.

Data Preprocessing

- Data cleaning, handling missing values, and outlier detection.
- Feature scaling, encoding categorical variables, and date-time feature extraction.
- Data split into training and testing sets.

Exploratory Data Analysis (EDA)

- Visualized data distributions, correlations, and trends.
- Identified key insights into how features influence fare prices.
- Discovered seasonality and demand patterns.

Feature Engineering

- Created additional relevant features, such as day of the week, time of the day, and route popularity.
- Feature selection techniques employed to optimize model performance.

Machine Learning Model Selection

- Explored various regression algorithms, including Linear Regression, Decision Trees, Random Forest, and Gradient Boosting.
- Evaluated models based on metrics like Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R-squared.
- Ensemble methods used for final model selection due to their superior performance.

Model Training and Evaluation

- The selected model trained on the training dataset.
- Model evaluated on the test dataset for accuracy and generalization.
- Cross-validation techniques used to validate performance.

Web Application Development

- Developed a user-friendly web application using Flask.
- Implemented an intuitive user interface for travelers to input flight details and receive fare predictions.
- Integrated the trained machine learning model into the application.

Deployment and Scalability

- Deployed the application on cloud platforms (e.g., AWS, GCP, or Heroku) for scalability.
- Utilized Docker containers for easy deployment and scaling.
- Implemented Continuous Integration/Continuous Deployment (CI/CD) for automatic updates.

OUTPUT SCREEN

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← → ↻ ⓘ 127.0.0.1:5000/predict ⏏ ☆ ☰ ⬇ 🗖 👤 ⋮

Find Your Flight Price!!

Departure Date

dd/mm/yyyy, --:-- -- 📅

Arrival Date

dd/mm/yyyy, --:-- -- 📅

Source

Delhi ▾

Destination

Cochin ▾

Stopage

Non-Stop ▾

Which Airline you want to travel?

Jet Airways ▾

Submit

Your Flight price is Rs. 7260.36

dastariniprasad7@gmail.com

Conclusion

- The project successfully developed a flight fare prediction model.
- The web application empowers travelers with accurate fare estimates.
- The project enhances transparency in flight pricing and assists both travelers and airlines in making informed decisions.