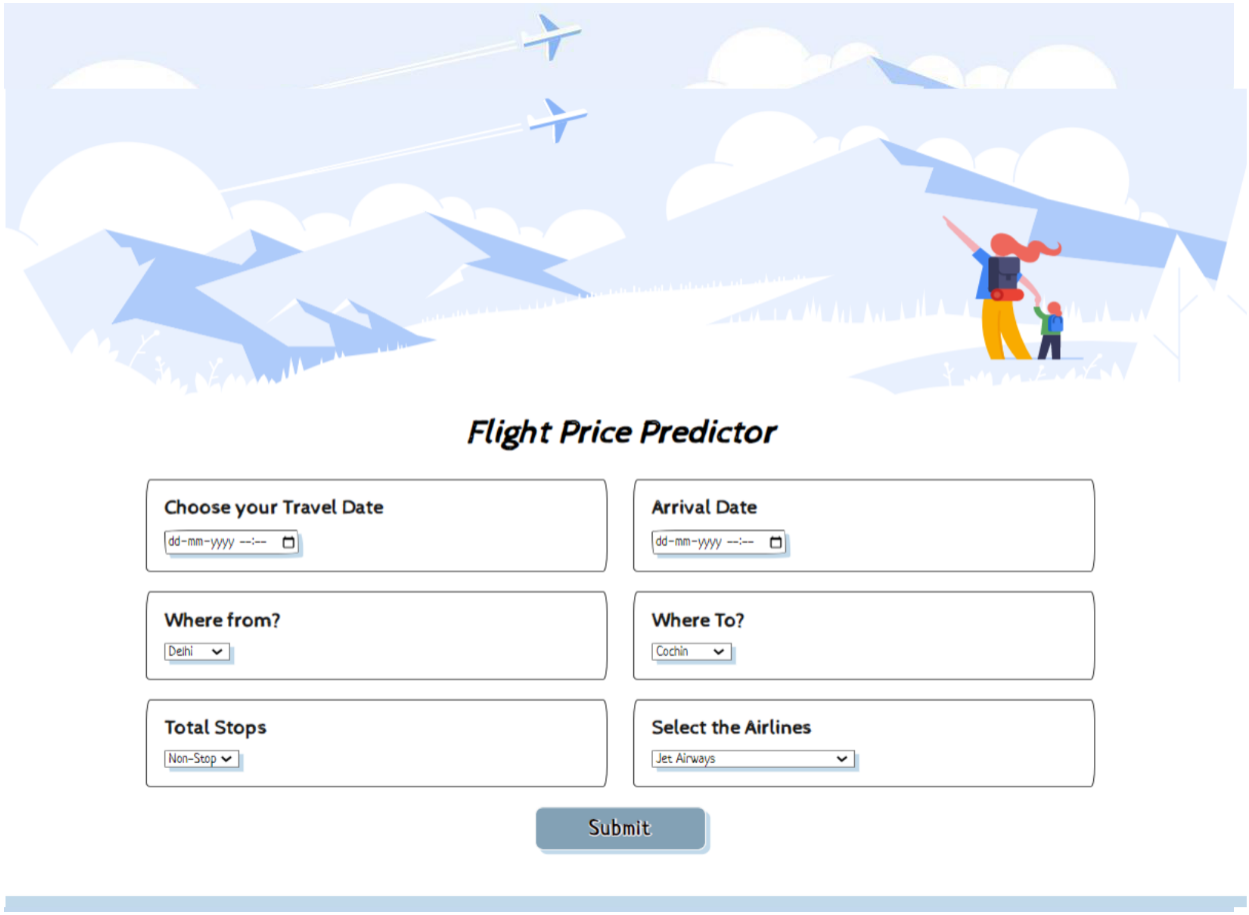
High Level Design (HLD)

FLIGHT FARE PREDICTION



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ABSTRACT

Pricing in the airline industry is often compared to a brain game between carriers and passengers where each party pursues the best rates. Carriers love selling tickets at the highest price possible — while still not losing consumers to competitors. Passengers are crazy about buying flights at the lowest cost available — while not missing the chance to get on board. All this makes flight prices fluctuant and hard to predict. Therefore, having some basic idea of the flight fares before planning the trip will surely help many people save money and time. In the proposed system a predictive model will be created by applying machine learning algorithms to the collected historical data of flights. This system will give people the idea about the trends that prices follow and also provide a predicted price value which they can refer to before booking their flight tickets to save money. This kind of system or service can be provided to the customers by flight booking companies which will help the customers to book their tickets accordingly.

1. INTRODUCTION

1.1 Purpose of this High Level Document

The main purpose of this HLD documentation is to feature the required details of the project and supply the outline of the machine learning model and also the written code. This additionally provides a careful description on how the complete project has been designed end-to-end.

1.2 Problem Statement

The objective of this project is to predict flight prices given the various parameters. Data used in this project is publicly available at Kaggle. Dataset link:

https://www.kaggle.com/datasets/nikhilmittal/flight-fare-prediction-mh

This will be a regression problem since the target or dependent variable is the price (continuous numeric value).

1.3 Problem Solution

This project aims to develop an application which will predict the flight prices for various flights using a machine learning model. The user will get the predicted values and with its reference the user can decide to book their tickets accordingly. In the current day scenario flight companies try to manipulate the flight ticket prices to maximize their profits. There are many people who travel regularly through flights. But there are also many people who are inexperienced in booking tickets and end up falling into discount traps made by the companies where actually they end up spending more than they should have. The proposed system can help save millions of rupees of customers by providing them the information to book tickets at the right time.

There are two main use cases of flight price prediction in the travel industry. OTAs and other travel platforms integrate this feature to attract more visitors looking for the best rates. Airlines employ the technology to forecast rates of competitors and adjust their pricing strategies accordingly.

2. TECHNICAL REQUIREMENTS TO RUN THIS APP

There are not any hardware needs needed for victimization of this application, the user should have an interactive device that has access to the web and should have the fundamental understanding of providing the input.

3. STEPS INVOLVED IN CREATING THIS PROJECT

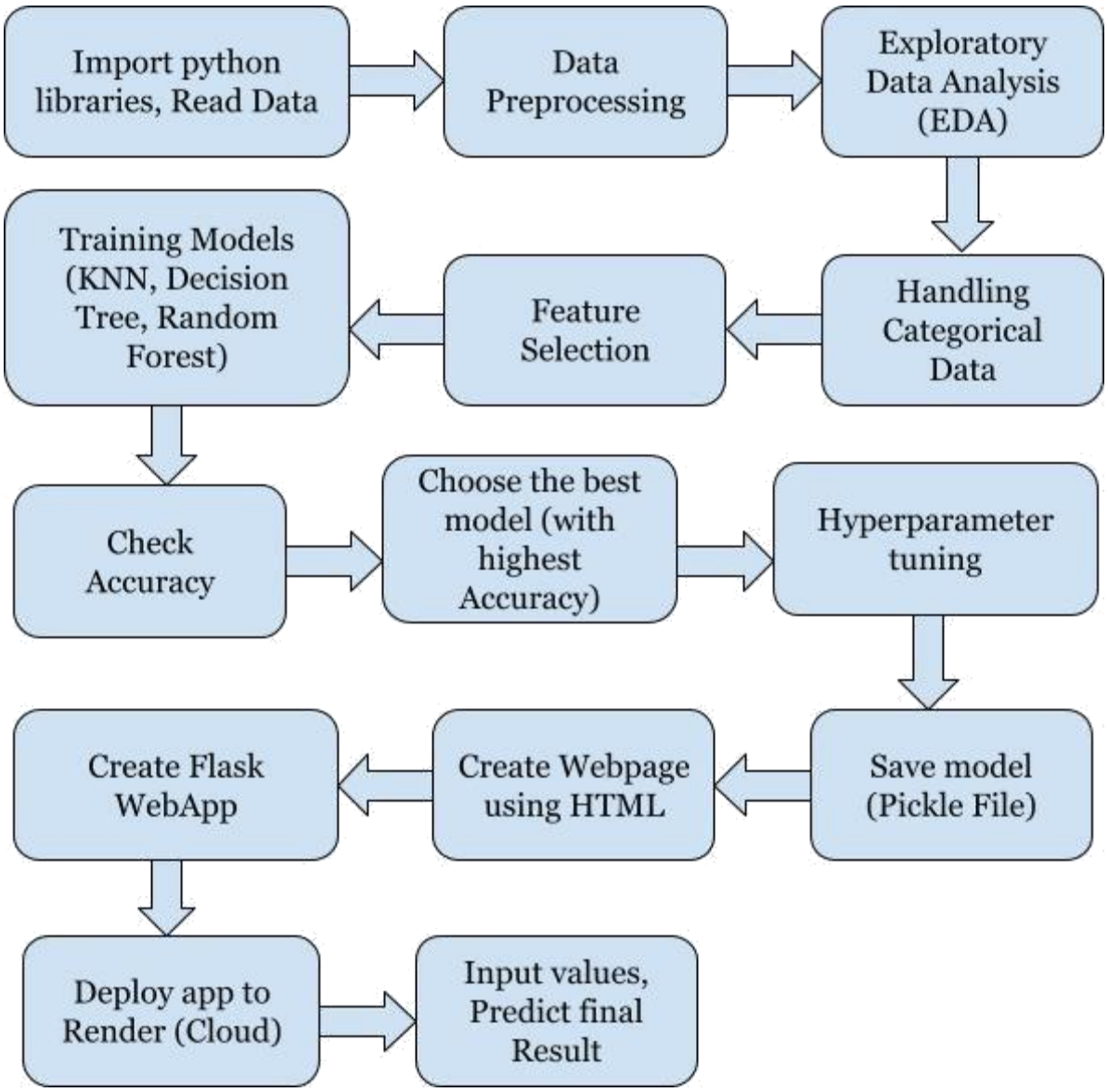
1. Data Selection
2. Exploratory Data Analysis (EDA)
3. Data pre-processing
4. Feature selection
5. Applying ML algorithms
6. Saving the model to a pickle file
7. Creating flask app
8. Deploying on Render.

4. TOOLS USED

- Python is used as the programming language and frameworks like pandas, scikit-learn for building the model.
- Jupyter notebook and Visual Studio Code is used as IDE.
- Seaborn, Matplotlib are used for visualization.
- HTML, CSS are used for front end development.
- Flask is used as a backend.
- Render is used for Deployment.

5. DESIGN FLOW

This project implements the machine learning life cycle to create a basic web application which will predict the flight prices by applying machine learning algorithms to historical flight data. The below diagram shows the steps and design process followed in implementing the model.



6. Deployment

The project is deployed on Render.

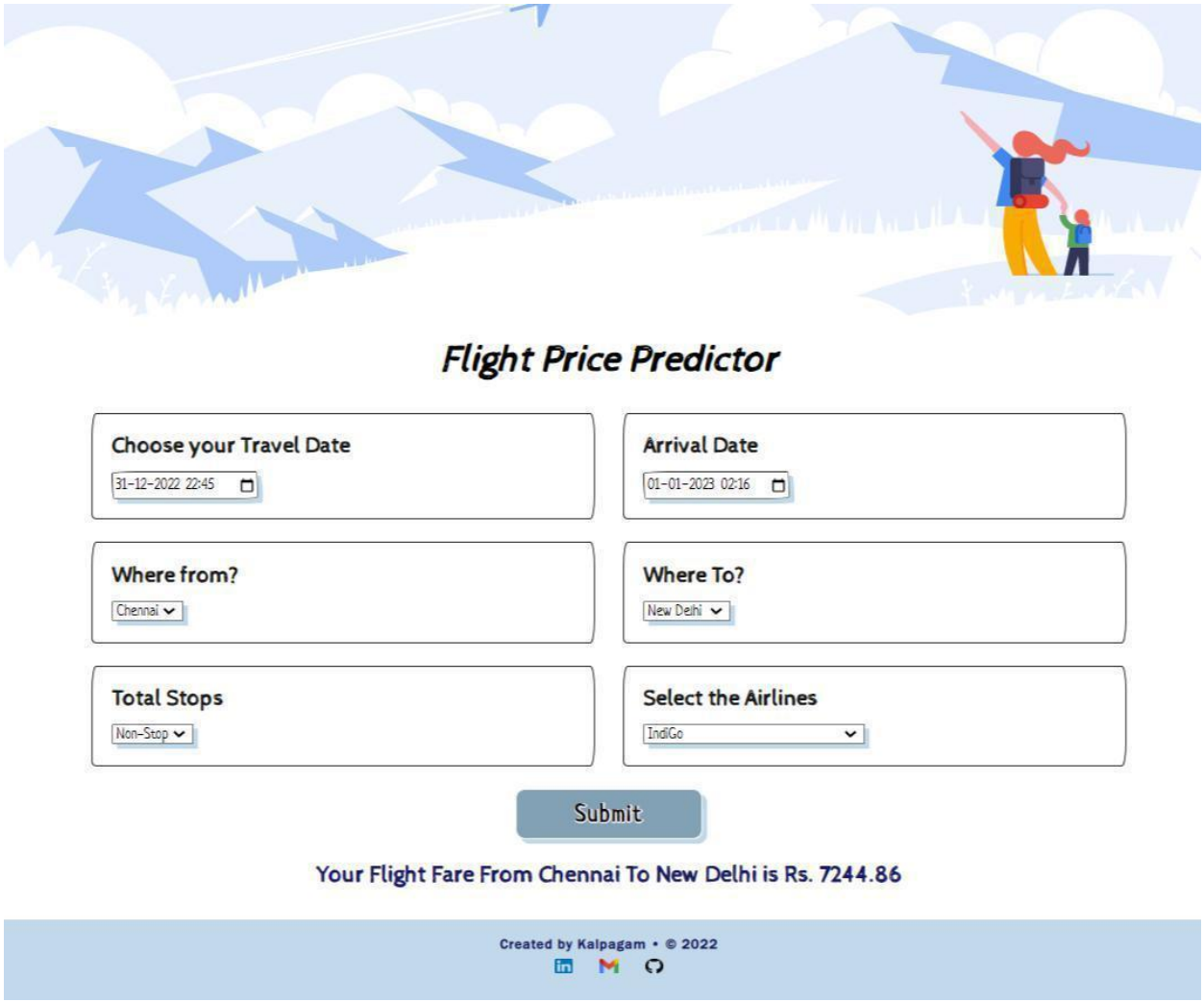
Link to access the app: https://test3-lr78.onrender.com

The app takes in input values like

- Travel Date
- Source Location

- Destination Location
- Airlines

On clicking Submit, the predicted price is displayed on the screen as follows:



7. Conclusion

Flight Prediction Service in the aviation industry can help customers in booking tickets. This system will give an idea about the price trends and also provide a predicted price value which travelers can refer to before booking their flight tickets to save money.