DETAILED PROJECT REPORT

FLIGHT FARE PREDICTION

DOCUMENT VERSION CONTROL

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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 the Business perspective and the second is Customer perspective. The major reason for such an impact is that 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.

1.0   Introduction

1.1 Why this DPR Document ?

The main purpose of this DPR documentation is to add the necessary details of the project and provide the description of the machine learning model and the written code. This also provides the detailed description on how the entire project has been designed end-to-end.

Key points :
- Describes the design flow
- Implementations
- Software requirements
- Architecture of the project

Non-functional attributes like:
- Reusability
- Portability
- Resource utilization

1.2 Scope

The DPR document presents the structure of the system, such as the database architecture, application architecture, and technology architecture. The DPR uses non-technical to middle-technical terms which should be understandable to the administrators of the system.

1.3 Definitions

TERM	DESCRIPTION
DATBASE	Collection of information
IDE	Integrated Development Environment
EDA	Exploratory Data Analysis
API	Application programming interface
KPI	Key Performance Indicator
VS	Visual Studio
AWS	Amazon web services
GCP	Google Cloud Platform
ML	Machine Leaning

2.0 General Description

2.1 Product Perspective

The flight fare prediction may be a machine learning model that helps users to predict the price of the flight tickets and help them to understand the price of their journey. .

2.2 Problem Statement

After amendment of the new rules, there are changes in the flight fare price from one location to another. The main goal of the system is to create a model to predict the price of their flight fare on the basis of bound input provided by users like date of journey, Source, Destination and many more.

2.3 Proposed Solution

The solution of the this problem statement if perform EDA on the dataset to generate meaningful insights from the data and use this data to hyper tune with appropriate machine learning algorithms which will have the maximum accuracy in predicting the flight fare. Thus creating a user interface where a user can put in the various features of the data which will in return give the flight fare.

2.4 Technical Requirements

Thesolutioncanbeacloud-basedorapplicationhostedonaninternalserver or even be hosted on a local machine. For accessing this application below are the minimum requirements:

- Good internet connection.
- Web Browser.

For training model, the system requirements are as follows:

- +4GBRAMpreferred

- Operation System: Windows, Linux, Mac

- VisualStudioCode/Jupyternotebook/Pycharm

2.5 Data Requirements

Data requirements completely depends on our problem statement.

- Comma separated values(CSV)file.
- Inputfilefeature/fieldnamesanditssequenceshouldbefollowedasperd ecided.

2.6 Tools Used

Python programming language and frameworks such as NumPy,Pandas,Scikit-learn,Matplotlib, Seaborn and Flask areusedtobuildthewholemodel.

- Pandas is an open-source Python package that is widely used for data analysis and machine learning tasks.
- NumPy is most commonly used package for scientific computing in Python.
- Matplotlib and Seaborn are an open source data

visualization library used to create interactive and quality charts/graphs.
- Scikit-learn is used for a machine learning.
- Flask is used to build an API.
- VSCode and Pycharm are used as IDE(Integrated Development Environment)
- GitHub is used as version control system.
- Front end development is done using HTML/CSS.
- Heroku, GCP, Azure, AWS are used for deployment of the model.

2. 7 Constraints

This model must be user friendly, as automated as possible and users should not be required to know any of the workings.

2.8 Assumptions

The main objective of the project is to develop an API to predict Flight Fare. Machine learning based classification models are used for predicting above mentioned cases on the input data.

⬜⬜⬜⬜Design Details

3.1 ProcessFlow
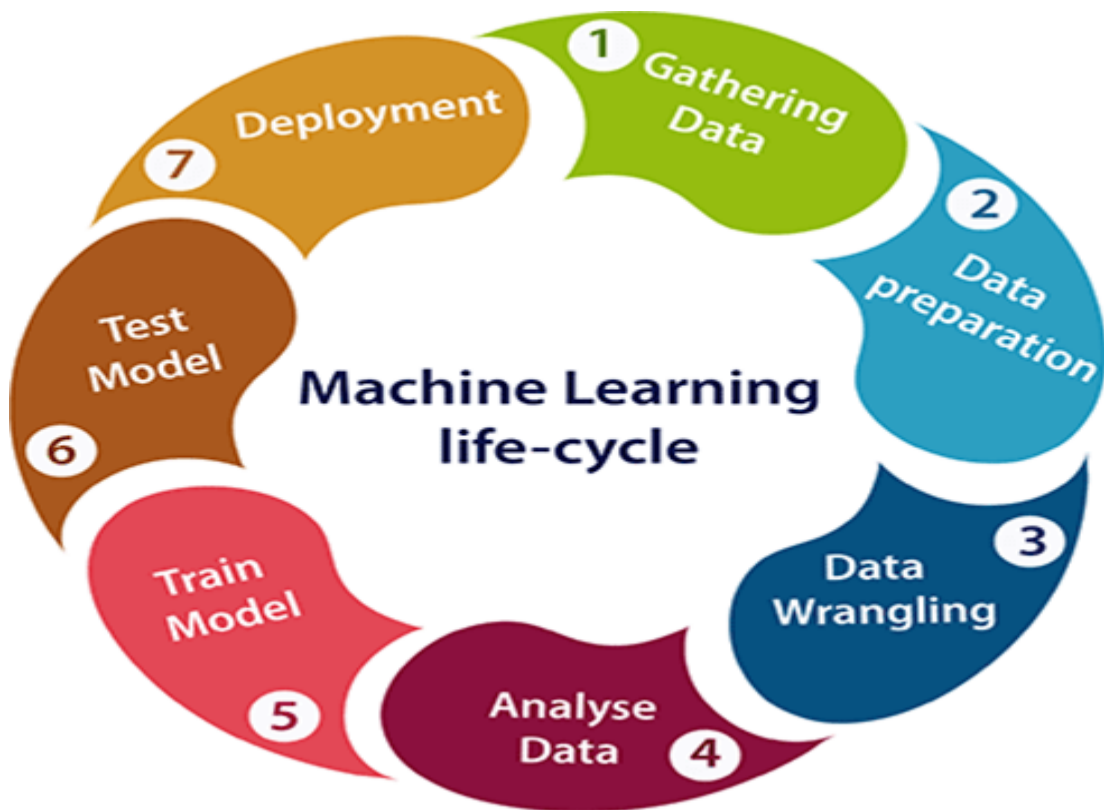
3.2   Event Log

The system should log every event so that the user will know what process is running internally.

Initial Step-By-Step Description:

- The system identifies at what step logging required.
- The system should be able to log each and every system flow.
- Developer can choose logging method. You can choose database logging.

4.0 Performance

4.1 Reusability

The entire solution will be done in modular fashion and will be API oriented. So, in the case of the scaling the application, the components are completely reusable.

4.2 Application Compatibility

The interaction with the application is done through the designed user interface, which the end user can access through any web browser.

4.3 Deployment

6.0Conclusion

In conclusion, the use of machine learning algorithms to predict Flight Fare has shown promising results. By analyzing various factors such as credit history, income, employment status, and others, these models can accurately predict the likelihood of a borrower defaulting on a loan.

This project has demonstrated the effectiveness of using XGBoost and Random Forest algorithms to predict Flight Fare with high accuracy. The feature importance analysis has also provided valuable insights into the most important factors affecting Flight Fare.

However, it is important to note that the accuracy of these models can be affected by various factors such as the quality and quantity of data, feature engineering, and model selection. Thus, ongoing monitoring and refinement of these models are crucial to ensure their effectiveness and reliability in predicting Flight Fare.