# Architecture Design
# Flight Price Prediction

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|---|---|---|---|
| 28-06-2023 | 1.0 | Abstract<br>Introduction<br>Architecture | ANISH MAURYA |
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# Contents

# Abstract

Flight price prediction is a challenging task that involves forecasting the prices of airline tickets based on various factors such as historical data, seasonality, demand, and other external factors. Accurate price prediction can be beneficial for travelers, airlines, and travel agencies in making informed decisions related to ticket purchasing, revenue management, and pricing strategies.

This project aims to develop a flight price prediction model using machine learning techniques. The dataset used for training and testing the model consists of historical flight data, including features such as departure and arrival locations, date and time of travel, airline carrier, and other relevant information. The dataset is preprocessed to handle missing values, outliers, and feature engineering to extract useful insights.

Different machine learning algorithms such as regression, time series analysis, and ensemble methods are implemented and evaluated to identify the most suitable approach for flight price prediction. The models are trained on a subset of the dataset and evaluated using appropriate evaluation metrics such as Accuracy Score

In addition to traditional machine learning techniques, advanced methods like deep learning and neural networks may also be explored to capture complex patterns and dependencies in the data. Transfer learning and feature selection techniques can be employed to enhance the model's performance and reduce computational complexity.

The trained flight price prediction model can be integrated into a user-friendly application or website where travelers can input their desired travel details and receive accurate price estimates. The model's performance can be continuously monitored and refined using additional data to improve its accuracy over time.

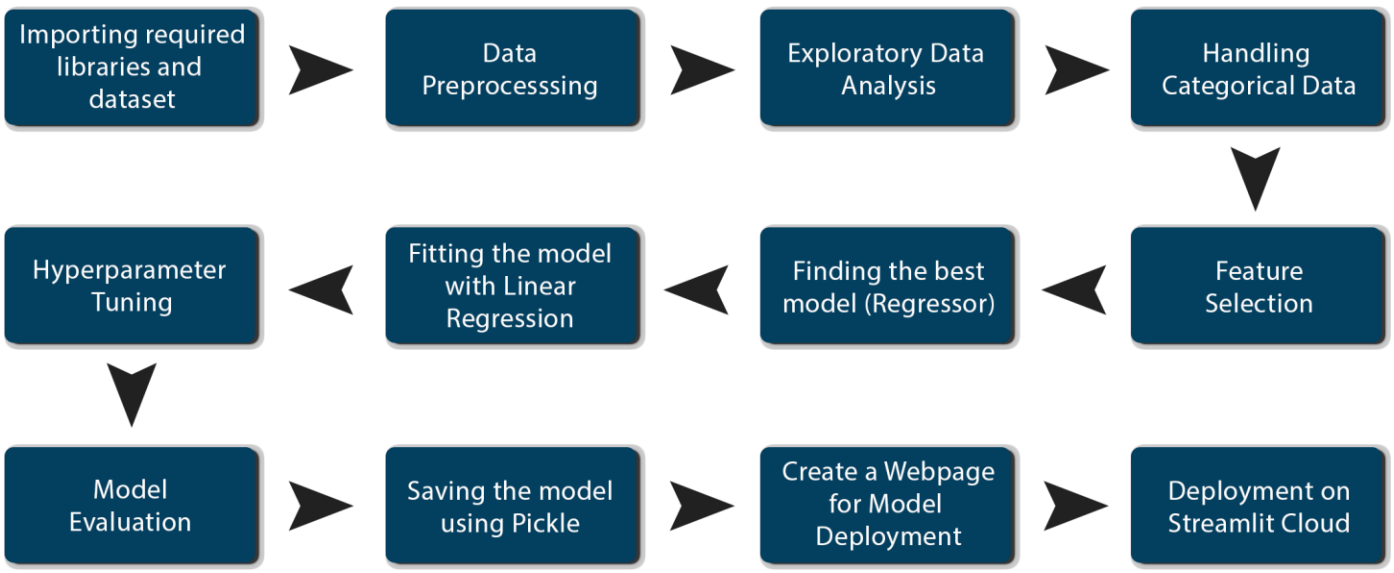
Overall, this project aims to contribute to the field of travel and tourism by developing a reliable and accurate flight price prediction model that can assist travelers and industry professionals in making informed decisions related to flight bookings and pricing strategies.

# 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 Flight Price Prediction. The Architecture design documentation is designed in such a way that the programmer can directly code after reading each moduledescription in the documentation.

# 2. Architecture



# 3. Architecture Design

## 3.1 Data Collection

The data for this project is collected from Kaggle.

## 3.2 Data Description

The flight price dataset used in this project contains historical data related to airline flights and their corresponding prices. The dataset includes various features that are used for predicting flight prices. Here is a description of the common features found in a flight price dataset. Row 10683 and Columns 11 columns name is Airline name, Date of journey, Source, Destination, Stops, Dep_time , Arrival_time, Price.

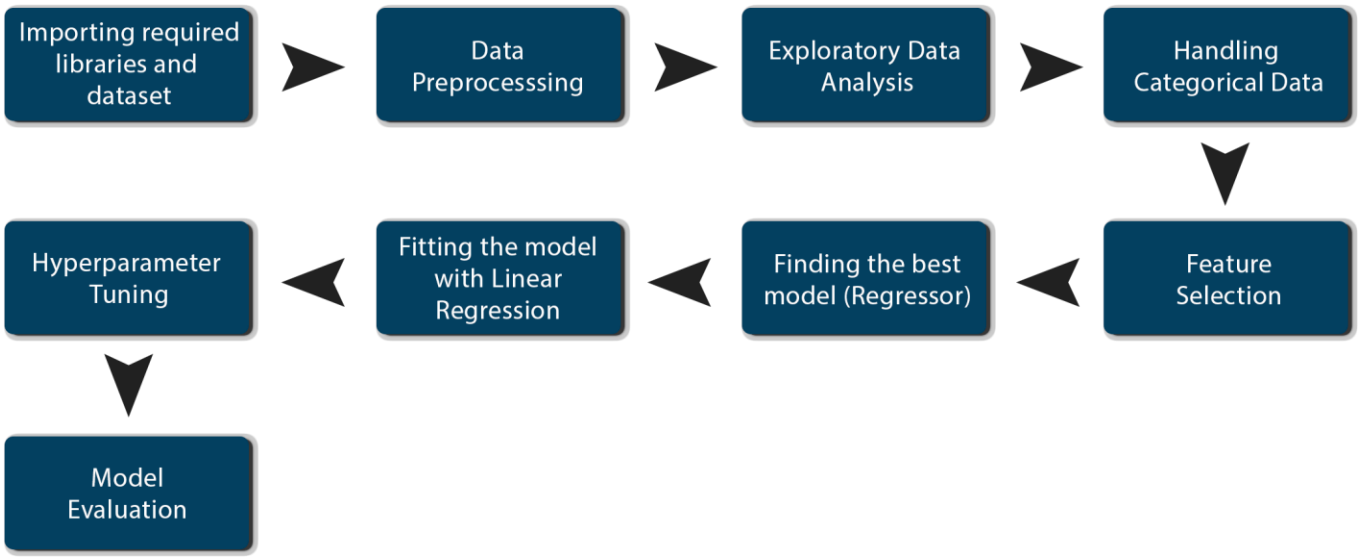
## 3.3 Data Pre-processing

- Checked the datatype of features in dataset using df.info()
- Checked for Null values, because the null values can affect the accuracy of the model.
- Perform Label Encoding for the features that have categorical data.
- Checked the distribution of the features to interpret its importance.

Now, the data is prepared to train a machine learning model.

## 3.4 Modelling Process

After pre-processing the data, we visualize our data to gain insights and split into two parts, train and test data. After Splitting the data, we use different machine learning algorithms like – Random Forest Regressor,




### 3.5 UI Integration

Azure files are being created and are being integrated with the created machine learning model. All the required files are then integrated to the appliction.py file and testedlocally.

### 3.6 Data from user

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

### 3.7 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.

### 3.8 Rendering the results

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

### 3.8 Deployment

The tested model is then deployed to Azure cloud. So, user can access the project from any internet device.