

Flight Fare Prices Prediction



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Abstract

Traditionally, buying tickets well in advance is recommended to avoid last-minute price hikes. However, airlines may lower prices to boost sales. Numerous factors affect pricing, including holidays, seat availability, and seasonal trends. Some of these factors are visible, while others are internal to airlines. This document provides a comprehensive design structure for a model that helps users identify the optimal time to book tickets.

Introduction

Why this High-Level Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions before coding and can be used as a reference manual for how the modules interact at a high level.

The HLD will:

- ☐ Present all of the design aspects and define them in detail
- ☐ Describe the user interface being implemented
- ☐ Describe the hardware and software interfaces
- ☐ Describe the performance requirements
- ☐ Include design features and the architecture of the project
- ☐ List and describe the non-functional attributes like:
 1. Security
 2. Reliability
 3. Maintainability
 4. Portability
 5. Reusability
 6. Application compatibility
 7. Resource utilization
 8. Serviceability

Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

General Description

Product Perspective & Problem Statement

Airline companies use many different variables to determine the flight ticket prices: indicator whether the travel is during the holidays, the number of free seats in the plane etc. Some of the variables are observed, but some of them are hidden. The problem is how to determine when is the best time to buy flight ticket for the desired destination and period. In other word, when given the historical price and the current price of a flight for a specific departure date, algorithms need to determine whether it is suitable to buy or wait. 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.

Tools used

Business Intelligence tools and libraries works such as NumPy, Pandas, Seaborn, Matplotlib, MS-Excel, MS-Power, Jupyter Notebook and Python Programming Language are used to build the whole framework.

The Seaborn logo, featuring the word "seaborn" in a dark blue, lowercase sans-serif font. The letter "o" is replaced by a circular icon containing a stylized blue and white bar chart.The Pandas logo, consisting of a colorful icon of four vertical bars (yellow, red, blue, green) followed by the word "pandas" in a dark blue, lowercase sans-serif font.The Python logo, which is a blue and yellow icon of two interlocking snakes, followed by the word "python" in a dark blue, lowercase sans-serif font.The Matplotlib logo, featuring the word "matplotlib" in a dark blue, lowercase sans-serif font. The letter "o" is replaced by a circular icon containing a stylized orange and white bar chart.The NumPy logo, which is a blue cube icon with a white "N" inside, followed by the word "NumPy" in a dark blue, uppercase sans-serif font.

Design Details

Process Flow



- **Data Collection:** Acquiring and cleaning the dataset
- **Training/Validation:** Preparing data for modelling
- **Model Training:** Using algorithms to predict fares
- **Prediction:** Generating price forecasts
- **Action:** Displaying results to users

Model Training and Evaluation

