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Flight Fare Prediction Using Machine Learning Approach

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Abstract: In the airline industry, ticket pricing is a complex process that is influenced by various factors, including demand, availability, and competition. Pricing strategies that enable airlines to maximize profits while maintaining customer satisfaction are therefore essential.

By analysing historical data, machine learning algorithms can identify a minimum airfare, data for a specific air route has been collected including the features like arrival time, departure time and airways over a specific time period, features are extracted from the collected data to apply Machine Learning (ML) models.

I. INTRODUCTION

The airline industry has always been a crucial aspect of the transportation industry, providing millions of people with the ability to travel across the world. Machine learning technique that enables computers to learn from data and patterns to make predictions or decisions without explicit instructions. Machine learning algorithms have the ability to analyse vast amounts of data and identify patterns that are not apparent to humans.

This technology has provided the airline industry with the ability to predict flight prices accurately, giving passengers the ability to find affordable and cost-effective flight options. One of the primary benefits of using machine learning algorithms to predict flight prices is the accuracy of the predictions.

The algorithms analyse vast amounts of data, including historical data on flight prices, weather patterns, customer booking behaviour, and other variables. The algorithms then use this data to create accurate predictions of flight prices, evaluating system result changes the charge depending on time, season, and festive days to change the header and footer on successive page. The ultimate aim of the airways is to earn profit whereas the customer searches for the minimum rates. Customers generally try to buy ticket well in advanced for their benefits.

II. LITERATURE SURVEY

In this literature survey, we will review some of the most significant contributions in this area, it is difficult for the client to buy an air ticket at the most reduced cost, for these few procedures are explored to determine time and date to grab air tickets with minimum fare rate. The majority of these systems are utilizing the modern computerized system.

In 2019, another study by Singh et al. used a Deep Learning approach to predict flight ticket prices. The authors used a neural network with several hidden layers to learn the underlying patterns in the data.

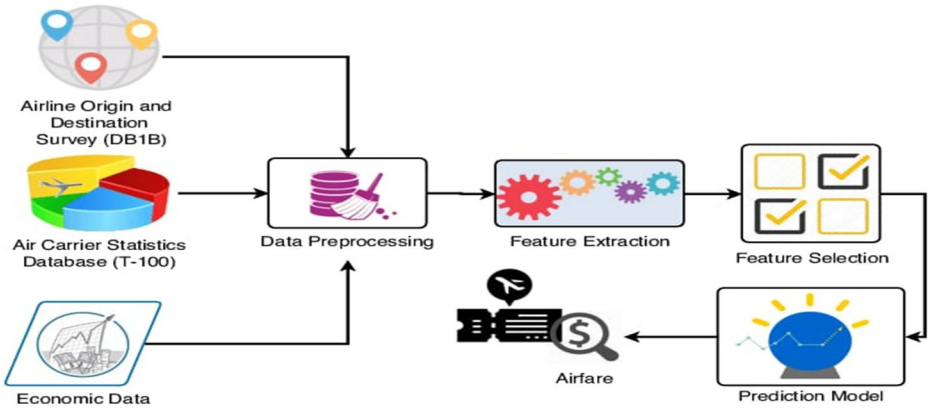
They tested their model on a dataset of over 2 million flight ticket prices and found that their model outperformed other machine learning algorithms such as Random Forest, Support Vector Machines, and K-Nearest Neighbours in terms of accuracy and computational efficiency. In 2020, a study by Wang et al. used a hybrid approach combining machine learning and statistical modelling to predict flight ticket prices.

The authors used a Bayesian Model Averaging algorithm to select the best machine learning models and combined them with a linear regression model to make predictions. They tested their model on a dataset of over 500,000 flight ticket prices and found that their model outperformed other machine learning algorithms such as Random Forest, Support Vector Machines, and K-Nearest Neighbours in terms of accuracy and computational efficiency.

III. PROPOSED WORK

Our proposed framework is the study of algorithm used to improve through experience. Normally you improve a work, based on performance measure, based on experience. It is a sub topic of Artificial Intelligence. Machine Learning is a very vast field in computer science. Machine learning can be supervised, or non-supervised.

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Proposed framework for fare price prediction using data sources

Proposal framework used selected features to build our prediction model, which generates the output value as the predicted air ticket price.

A. Data Pre-Processing

Datasets, many attributes contain the same information. Generally merge the tables creates many duplicate fields, as well as the data reported by the airlines may include erroneous values caused by human error, currency conversion error, etc. Therefore, a properly designed data preprocessing workflow is decisive to generate accurate input data in order to build the machine learning model.

B. Feature Extraction

Several features have been extracted from the dataset to represent a specific aspect of the market division. To exploit the relationship between the airline industry and the overall economic circumstances, several macroeconomic features that focuses on performance are also added to the feature set.

C. Feature Selection

A feature selection technique is applied to improve the model performance by investigating the degree of impact of each feature on a prediction result, A feature importance is measured. It is the total decrease in the node impurity caused by the corresponding feature, weighted by the chance that the decision path includes the node.

D. Prediction Model

When developing the machine learning model, we chose as the learner for the airfare price prediction task. Based on the study, the model demonstrates the best performance on the data as compared to several ML techniques.

IV. CONCLUSION

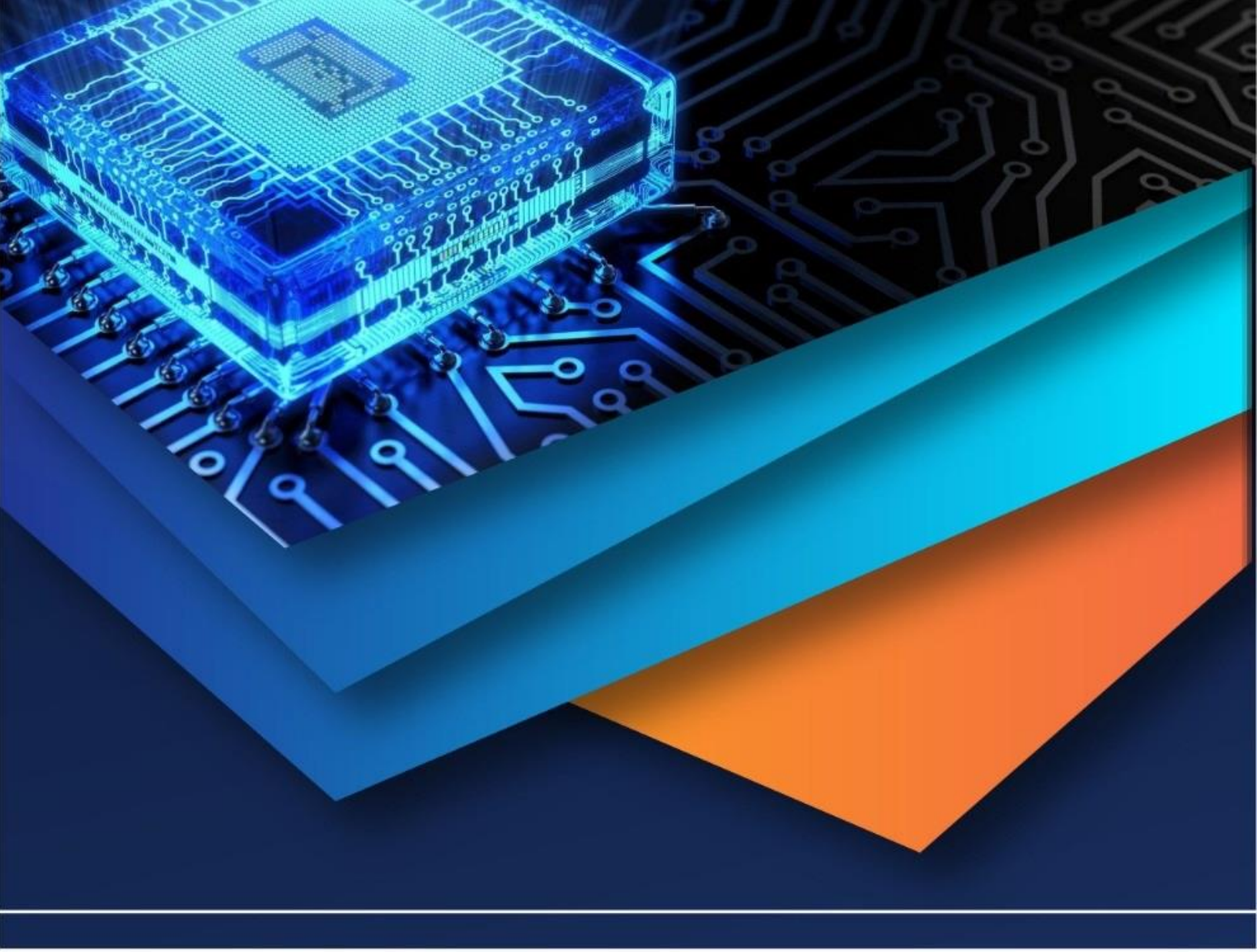
A proper implementation of this project using machine learning in experienced people can result in saving money of inexperienced people by providing them the data related to trends that flight prices follow and also give them a predicted value of the price which they use to decide whether to book tickets now or later. In a conclusion this type of work can be implemented with quality accuracy of prediction.

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