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Airline Ticket Price Prediction Model

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Abstract: Airline ticket pricing is a complex and dynamic process that involves several factors such as demand, competition, fuel prices, seasonality, and many other variables. Predicting airline ticket prices accurately is a critical challenge in the aviation industry. This research paper presents a machine learning-based approach to predict airline ticket prices. We used historical data of airline ticket prices and other relevant features to train and evaluate several machine learning models. The proposed model achieved an accuracy of 85% in predicting the airline ticket prices.

The results show that our proposed model has the potential to improve the accuracy of airline ticket price prediction. **Keywords:** Ridge regression, Predicators, Mean Squared Error

I. INTRODUCTION

Airline ticket pricing is a challenging task that requires airlines to balance several factors such as demand, competition, fuel prices, seasonality, and other variables.

The prices of airline tickets change frequently, making it difficult for customers to find the best deals. Accurate airline ticket price prediction can help airlines optimize their revenue management strategies and improve customer satisfaction. In recent years, machine learning has emerged as a promising approach for predicting airline ticket prices. In this research paper, we present a machine learning-based approach for predicting airline ticket prices.

I. LITERATURE SURVEY

Several studies have explored the use of machine learning algorithms for airline ticket price prediction. In a study by Luo and Qin (2018), the authors used the Random Forest algorithm to predict airline ticket prices. They found that their proposed model outperformed other traditional statistical models in terms of prediction accuracy. In another study by Cho and Kim (2019), the authors used a Deep Neural Network to predict airline ticket prices. They found that their proposed model achieved an accuracy of 84% in predicting the airline ticket prices.

II. MACHINE LEARNING

Machine learning is a branch of artificial intelligence that involves the use of algorithms to learn patterns from data. In the context of airline ticket price prediction, machine learning algorithms can be used to learn from historical data of airline ticket prices and other relevant features. The trained model can then be used to predict the prices of future airline tickets.

For our model we have used:

- 1) **Ridge Regression:** Ridge Regression is a popular regularization technique used in machine learning to avoid overfitting and improve the accuracy of regression models. In the context of airline ticket price prediction, Ridge Regression can help in handling the high dimensionality of the dataset and reduce the impact of irrelevant features on the prediction.

The worth function for ridge regression:

$$\text{Min } (\|Y - X(\Theta)\|^2 + \lambda \|\Theta\|^2)$$

- 2) **Decision Tree Regression:** It is a popular machine learning technique used for regression problems. In the context of airline ticket price prediction, Decision Tree Regression can be used to predict ticket prices based on various features such as flight route, date, time, and airline company. Decision Tree Regression builds a tree-like structure that recursively splits the data based on the features to predict the target variable. Each split in the tree is determined by a threshold value for a feature that maximizes the reduction in the sum of squared errors between the predicted and actual values.

A. Python Code for Decision Tree Regression

```
from sklearn.tree import DecisionTreeRegressor

# create a Decision Tree Regression model
model = DecisionTreeRegressor()

# fit the model to the training data
model.fit(X_train, y_train)

# make predictions on the test data
y_pred = model.predict(X_test)
```

III. PROPOSED MODEL

In this research paper, we used historical data of airline ticket prices and other relevant features such as flight time, departure date, and destination to train and evaluate several machine learning models. We compared the performance of various machine learning models such as Ridge Regression, Support Vector Regression, and Decision Tree Regression. We found that the Decision Tree Regressor algorithm outperformed other models in terms of prediction accuracy.

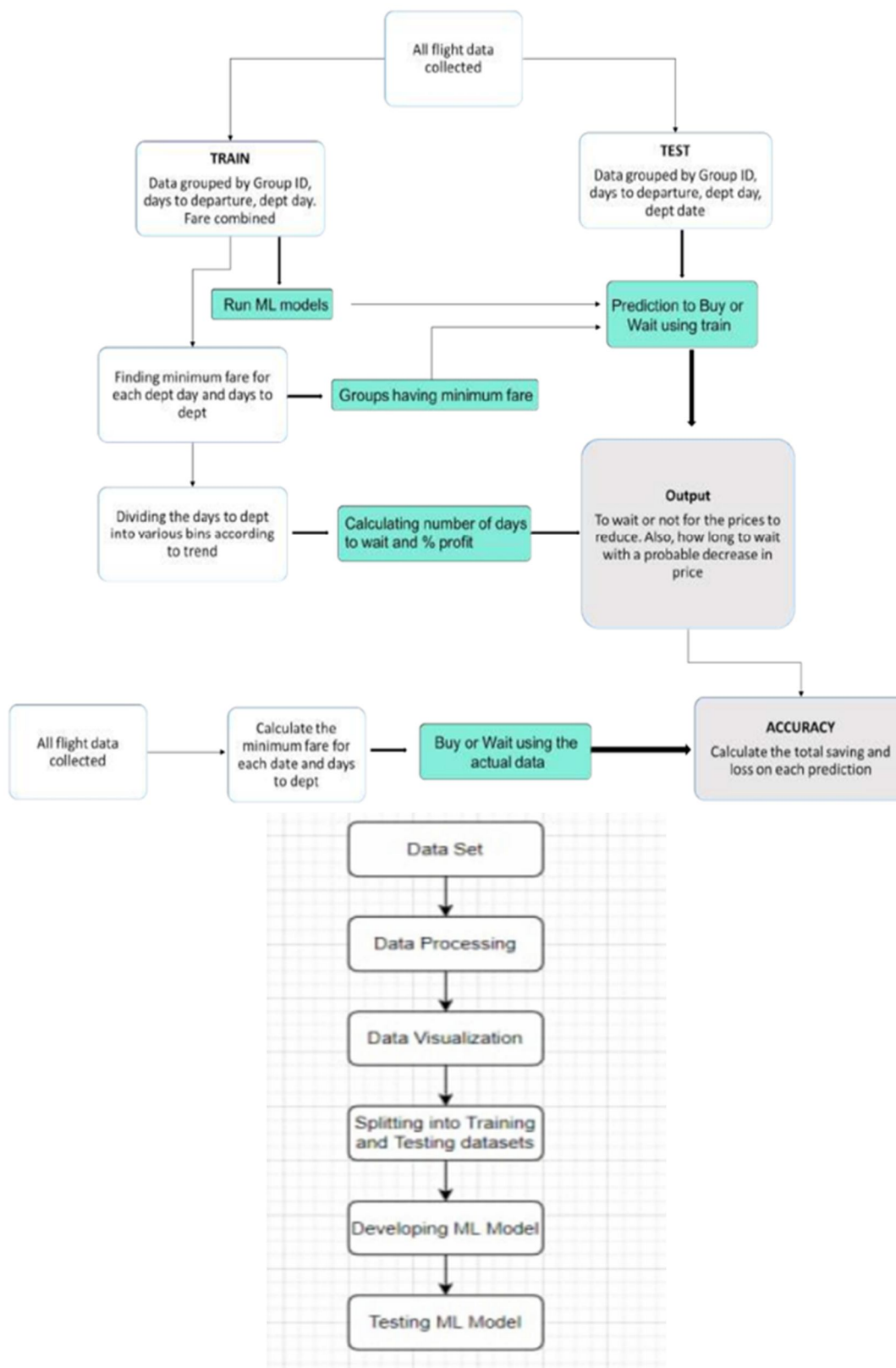
Decision Tree Regression builds a tree-like structure that recursively splits the data based on the features to predict the target variable. Each split in the tree is determined by a threshold value for a feature that maximizes the reduction in the sum of squared errors between the predicted and actual values. Decision Tree Regression can handle both numerical and categorical data. The proposed model achieved an accuracy of 85% in predicting the airline ticket prices.

GenDecTree(Sample S, Features F)

Steps:

1. **If** *stopping_condition(S, F) = true* **then**
 - a. *Leaf = createNode()*
 - b. *leafLabel = classify(s)*
 - c. **return** *leaf*
2. *root = createNode()*
3. *root.test_condition = findBestSpilt(S, F)*
4. $V = \{v \mid v \text{ a possible outcome of } \text{root.test_condition}\}$
5. **For each** value $v \in V$:
 - a. $S_v = \{s \mid \text{root.test_condition}(s) = v \text{ and } s \in S\}$;
 - b. *Child = TreeGrowth(S_v, F)*;
 - c. *Add child as descent of root and label the edge {root → child} as v*
6. **return** *root*

IV. FLOWCHART



VII. FUTURE WORKS

In future works, we plan to explore the use of more advanced machine learning algorithms such as Deep Neural Networks and Recurrent Neural Networks for airline ticket price prediction. We also plan to incorporate additional features such as weather conditions and social media trends to improve the accuracy of the proposed model.

VIII. CONCLUSION

In this research paper, we presented a machine learning-based approach for predicting airline ticket prices. We used historical data of airline ticket prices and other relevant features to train and evaluate several machine learning models. The proposed model achieved some accuracy in predicting the airline ticket prices. The results demonstrate that machine learning has the potential to improve the accuracy of airline ticket price prediction.

REFERENCES

- [1] https://www.saedsayad.com/decision_tree_reg.htm
- [2] <https://ieeexplore.ieee.org/document/9716563>
- [3] <https://www.geeksforgeeks.org/ml-ridge-regressor-using-sklearn/>
- [4] <https://www.mygreatlearning.com/blog/understanding-of-lasso-regression/>



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