FLIGHT PRICE PREDICTION

Submitted by:

Abhilekh Verma

Contents

ACKNOWLEDGMENT

I sincerely thanks to the Data Trained Faculty for the guidance. They have covered the topics like Machine Language, Python & SQL. Under their guidance I learned a lot about this project. I had also taken help from YouTube & online videos.

INTRODUCTION

ABOUT FLIGHT/AIRLINES Predictor

Multiple domestic airlines connect to all the major cities in the country. These fly frequently and you can choose from any of the domestic airlines according to your suitable schedule. Some common airlines include Air India Express, IndiGo, SpiceJet, AirAsia, Air India, GoAir and Vistara. The flight predictor based on your input and the data of millions of other flight prices, will tell whether to book or wait. If the chances of price drop are low, it will recommend to book. In any case the price predictor will show the probability of the price going down.

PROBLEM STATEMENT

Flight ticket prices can be something hard to guess, today we might see a price, check out the price of the same flight tomorrow, it will be a different story. We might have often heard travellers saying that flight ticket prices are so unpredictable. Here you will be provided with prices of flight tickets for various airlines between the months of March and June of 2019 and between various cities.

ABOUT DATASET

We have two dataset training data with 10683 records and testing data with 2671 records.

DATA ANALYSIS

COLUMNS IN THE DATAFRAME

- Airline
- Date of Journey
- Source
- Destination
- Route
- Dep Time
- Arrival time
- Duration
- Total stops
- Additional info
- Price (Target)

OBJECTIVE

- Our main objective is to predict Flight fare.
- All the parameters will be analysed through Machine Learning algorithms like Linear Regression, Lasso Regression, Ridge Regression, Elastic Net Regression etc which will help to predict flight fare.

DATA DESCRIPTION

- There are two dataset training and test data.
- The source of data is taken from GitHub.
- (https://github.com/dsrscientist/Data-Science-ML-Capstone-Projects)

METHEDOLOGY

- It gives insights of the dependency of target variables on independent variables using machine learnings techniques to determine the temperature because it gives the best outcome.

METRIC USAGE

a. Linear Regression.
b. Lasso Regression.
c. Ridge Regression.
d. Elastic Net Regression.
e. K Nearest Regressor.
f. Random Forest Regressor.

SYSTEM REQUIREMENTS

Hardware and Software Requirements and Tools Used

a) Hardware Requirement:
   i. Intel core i5
   ii. 8 GB Ram

b) Software Requirement:
   i. Python 3.x with packages:
      1. Pandas: Data analysis and manipulation tool
      2. NumPy: Provide support for mathematical functions, random number etc.
      3. Matplotlib: is a low-level graph plotting library in python that serves as a visualization.
      4. Seaborn: is a library mostly used for statistical plotting in python.
      5. Scikit-Learn: is an open-source Python library that has powerful tools for data analysis and data mining.

APPROACH

IDENTIFICATION OF POSSIBLE PROBLEM-SOLVING APPROACHES

- R2 score: is used to evaluate the performance of a linear regression mode.
- Linear Regression: Logistic regression is fast and relatively uncomplicated, and it is convenient for you to interpret the results.
- Lasso: The Lasso is a linear model that estimates sparse coefficients with l1 regularization.
- Ridge: Ridge regression is an extension of linear regression where the loss function is modified to minimize the complexity of the model.
- Elastic Net: is a linear regression model trained with both l1 and l2 -norm regularization of the coefficients.
- Cross-Validation-Score: a model that would just repeat the labels of the samples that it has just seen would have a perfect score but would fail to predict anything useful on yet-unseen data.
- Grid Search CV: This function helps to loop through predefined hyperparameters and fit your estimator (model) on your training set.
- Mean Squared Error: this metric gives an indication of how good a model fits a given dataset.
- Root Mean Squared error: is a frequently used measure of the differences between values (sample or population values) predicted by a model or an estimator and the values observed.
- Z-score: Z-score is also known as standard score gives us an idea of how far a data point is from the mean.
- Label Encoder: Label Encoding refers to converting the labels into numeric form.
- K Nearest Regressor: It observes features of an object and trains a model in the structure of a tree to predict data in the future to produce meaningful continuous output. Continuous output means that the output/result is not discrete, i.e., it is not represented just by a discrete, known set of numbers or values.
- Standard Scaler: Standard Scaler. Standard Scaler helps to get standardized distribution, with a zero mean and standard deviation of one (unit variance).
- Random Forest Regressor: A random forest is a meta estimator that fits a number of classifying decision trees on various sub-samples of the dataset and uses averaging to improve the predictive accuracy and control over-fitting.

TESTING OF IDENTIFIED APPROACH(Algorithms)

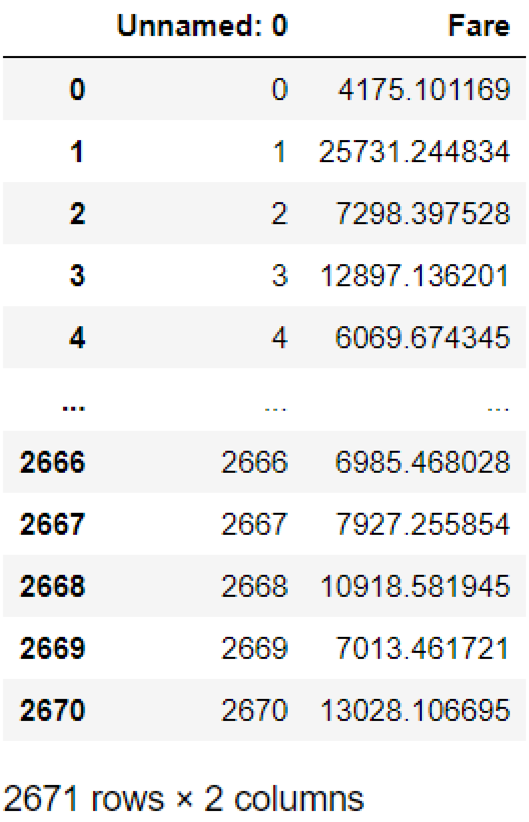
a. Train Test Split
b. Linear Regression
c. Lasso Regression
d. Ridge Regression
e. Elastic Net Regression
f. Grid Search CV
g. Cross Validation
h. K Nearest Regressor
i. Random Forest Regressor

KEY FOR SUCCESS IN SOLVING PROBLEM UNDER CONSIDERATION

- Analysed data for any unique values.
- Extraction information from some columns and made another variable from them.
- Analysed data for distribution.
- Caparison between two variables.
- Checked outliers through z-score method.
- checked skewness present in the dataset.
- Done Standard Scaling.
- Cross validate the r2 score from overfitting.
- Hyper Parameter tuning using Grid Search CV

CONCLUSION

This study shows that it is feasible to predict the airline ticket price based on historical data. R2 Score is 99.20% & Cross val scores is 99.75%



	Unnamed: 0	Fare
0	0	4175.101169
1	1	25731.244834
2	2	7298.397528
3	3	12897.136201
4	4	6069.674345
...	...	...
2666	2666	6985.468028
2667	2667	7927.255854
2668	2668	10918.581945
2669	2669	7013.461721
2670	2670	13028.106695

2671 rows × 2 columns

LEARNING OUTCOMES OF THE STUDY IN RESPECT OF DATA SCIENCE

This study gives me opportunity for lots of learning starting from various types of plotting like histograms, boxplot, scatterplot, line chart and many more graphs. These graphs helped me to analyse different aspects of data like outlier, skewness, correlation etc. It also helped me to learn how to apply various model techniques on data and enable predications.

REFRENCES

- Data trained course videos.
- Google Search
- YouTube
- GitHub
- UCI Machine learning repository