

Literature Survey

KARISHMA BEGUM M 813819104041

Name of the paper:

Flight delay prediction based on deep learning and Levenberg-Marquart algorithm

Year of publication : 26 November 2020

Journal Name : Springer

Author:

Maryam Farshchian Yazdi , Seyed Reza Kamel , Seyyed Javad Mahdavi Chabok and Maryam Kheirabadi

Topic:

Developing a Flight Delay Prediction Model using Machine Learning

Theme:

Over the last twenty years, air travel has been increasingly preferred among travelers, mainly because of its speed and in some cases comfort. This has led to phenomenal growth in air traffic and on the ground. An increase in air traffic growth has also resulted in massive levels of aircraft delays on the ground and in the air. These delays are responsible for large economic and environmental losses. The main objective of the model is to predict flight delays accurately in order to optimize flight operations and minimize delays.

Using a machine learning model, we can predict flight arrival delays. The input to our algorithm is rows of feature vectors like departure date, departure delay, distance between the two airports, scheduled arrival time etc. We then use a decision tree classifier to predict if the flight arrival will be delayed or not. A flight is considered to be delayed when the difference between scheduled and actual

arrival times is greater than 15 minutes. Furthermore, we compare decision tree classifiers with logistic regression and a simple neural network for various figures of merit.

Inference:

Flight delays are unavoidable, and they significantly affect the carriers' profits and losses. For airlines, estimating flight delays correctly is essential since the data may be used to boost client happiness and revenue for airline agencies. There have been several studies on modeling and predicting flight delays, and the majority of them have sought to do so by identifying key traits and closely related elements. However, due to the vast amounts of data, dependencies, and factors, the majority of the offered approaches are not precise enough. This study suggests a Deep Learning-based strategy for anticipating aircraft delays (DL).

Since on-time arrival of airplanes is a major concern, flight delay prediction algorithms must be highly precise and accurate. In this paper, they suggested a unique deep learning-based optimized forecasting model that uses the LM method. Then, two more structures are developed, one without the denoising autoencoder and the other without the LM method, to examine and confirm the beneficial effects of these two algorithms. Furthermore, our dataset is unbalanced and needs to be. To balance the data, we employed an undersampling and an upsampling approach. Results, however, demonstrate that upsampling causes overfitting. In order to balance, under sampling is employed.

KAREESHINI S 813819104040

Name of the paper :

Predicting Flight Delays with Error Calculation using Machine Learning Models

Year of publication : September-2021

Journal Name : IJ Publication

Author: D Sirisha

Topic :

Developing a Flight Delay Prediction Model using Machine Learning

Theme :

Over the last twenty years, air travel has been increasingly preferred among travelers, mainly because of its speed and in some cases comfort. This has led to phenomenal growth in air traffic and on the ground. An increase in air traffic growth has also resulted in massive levels of aircraft delays on the ground and in the air. These delays are responsible for large economic and environmental losses. The main objective of the model is to predict flight delays accurately in order to optimize flight operations and minimize delays.

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Inference :

Machine learning algorithms are employed progressively and successively to predict flight arrival and delay. Five models are build based upon the algorithms employed. For comparing the performance of the algorithms, experimentations are conducted to study the performance of the machine learning algorithms with respect to the evaluation metrics considered. The experimental results reveal that in Departure Delay, Random Forest Regressor was observed to be the best model with Mean Squared Error and Mean Absolute Error, which are the minimum value found in these respective metrics. In maximum metrics, it can be manifested that Random Forest Regressor gives us the best value and thus should be the model selected. The future scope of this paper can include the application of more advanced, modern and innovative preprocessing techniques, automated hybrid learning and sampling algorithms, and deep learning models adjusted to achieve better performance. To evolve a predictive model, additional variables can be introduced. e.g., a model where meteorological statistics are utilized in developing error-free models for flight delays. In this paper we used data from the US only, therefore in future, the model can be trained with data from other countries as well. With the use of models that are complex and hybrid of many other models provided with appropriate processing power and with the use of larger detailed datasets, more accurate predictive models can be developed. Additionally, the model can be configured for other airports to predict their flight delays as well and for that data from these airports would be required to incorporate into this research.

Name of the paper:

Airline Flight Delay Prediction Using Machine Learning Models.

Year of publication : October 2021

Journal Name : Acm journals.

Author: Yuemin Tang

Topic:

Developing a Flight Delay Prediction Model using Machine Learning

Theme:

Over the last twenty years, air travel has been increasingly preferred among travelers, mainly because of its speed and in some cases comfort. This has led to phenomenal growth in air traffic and on the ground. An increase in air traffic growth has also resulted in massive levels of aircraft delays on the ground and in the air. These delays are responsible for large economic and environmental losses. The main objective of the model is to predict flight delays accurately in order to optimize flight operations and minimize delays.

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Inference:

A supervised machine learning approach in the form of binary classification was used for the prediction. Seven algorithms were used for delay prediction. The result

shows that the highest values of accuracy, precision, recall, and f1-score are generated by the Decision Tree model. Other tree-based ensemble classifiers also show good performance. Random Forest and Gradient Boosted Tree have an accuracy significantly higher than the rest of the models. The base classifiers Logistic Regression, KNN, Gaussian Naïve Bayes, and SVM, are not tree-based and did not show good performance. The KNN model is the worst performed since its precision and f1-score are the lowest among the seven models.

MAYURI K B 813819104053

Title of the Paper:

Airline Delay Predictions Using Supervised Machine Learning.

Year of publication: February 2018

Journal name:

International Journal of Pure and Applied Mathematics.

Authors:

Prabakaran.N.,Rajendran Kannadasan

Theme:

Over the last twenty years, air travel has been increasingly preferred among travelers, mainly because of its speed and in some cases comfort. This has led to phenomenal growth in air traffic and on the ground. An increase in air traffic growth has also resulted in massive levels of aircraft delays on the ground and in the air. These delays are responsible for large economic and environmental losses. The main objective of the model is to predict flight delays accurately in order to optimize flight operations and minimize delays.

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Inference:

With rapid growth of air traffic, flight delays have become a serious and prominent problem. It can even cause environmental harm by the rise in fuel consumption and gas emissions. Hence, it is necessary to predict the delays no matter the wide-range of airline meshes. The analysis carried here not only predicts delays based on the previous available data, but also gives statistical descriptions of airlines. It also gives rankings based on their on-time performance and delays with respect to time, showing the peak hours of delay.

In this project, studies on airport and individual airlines delay behavior analysis are carried out, using linear regression model, polynomial regression models, and regularization. The performances of the models are tested using various metrics, e.g., CV Method, MSE/RMSE Scores, etc. This project will be able to complete several objectives like the statistical description of airlines, temporal variability of delays, relation of delays with the origin airports etc., along with the main prediction analysis .