LITERATURE SURVEY

1.Flight Delay Prediction System

Authors: Mrs Yogita Borse , Dhruvin Jain, Shreyash Sharma, Viral Vora, Aakash Zaveri

Year: 2020

One of the key business issues that airlines face is that the vital prices that are related to flights being delayed because of natural occurrences and operational shortcomings. Delays in departure can occur due to bad weather conditions, seasonal and holiday demands, airline policies, technical issue such as problems in airport facilities, luggage handling and mechanical apparatus, and accumulation of delays from preceding flights.

The models developed during this system may be applied to predict the incidence of flight delay at airports. This issue can be reduced by developing the flight delay prediction tool which can be developed using statistical analysis, probabilistic models and classification approach or methods like Naïve Bayes Classification , Bayesian Network Algorithm, decision tree, logistic regression etc. We propose a flight delay prediction system which focuses mainly on predicting delay of a flight based on the weather situation .This paper presented the need to develop a system to predict the delay in flights along with its methodology.

The paper gives details about the range of different methodology that is used or can be used to find out the delay in flights. As flight delay cost a lot to the airlines as well as passangers in financial and environmental terms, flight delay is the talk of the hour.

2. Flight Delay Prediction Based with Machine Learning.

Authors: Irmak Hatipoglu, Omur Tosun, Nedret Tosun

Year: 2022

The delay of a planned flight causes many undesirable situations such as cost, customer satisfaction, environmental pollution. There is only one way to prevent these problems before they occur, and that is to know which flights will be delayed. The aim of this study is to predict delayed flights. For this, the use of machine learning techniques, which have become widespread with the development of computer capacities and data storage systems, is preferred.

Estimations are made with three up-to-date techniques XGBoost, LightGBM, and CatBoost techniques based on Gradient Boosting from machine learning techniques. The bayesian technique is used for hyper-parameter settings.The results are analyzed and shared with and without SMOTE. Hence, these are the following methods we use in this paper.

The application of machine learning techniques to anticipate flight delays is new, but it has a lot of potential. Companies will be able to avert problems before they develop if delays are correctly estimated, which can generate plenty of issues. As a result, concrete advantages such as lower costs and higher customer satisfaction will emerge. Improvements will be made at the most vulnerable place in the aviation business. This paper has developed a new approach for airline companies to detect delayed flights. In order to achieve these different approaches, which are XGBoost, LightGBM, and CatBoost, were used.

3.Flight Delay Predictions and The Study of Its Casual Factors Using Machine Learning Algorithms.

Authors: Cho Yin Yiu, Kam K.H. Ng, Kin Chung Kwok, Wing Tung Lee, Ho Tung Mo

Year: 2021

The term 'flight delay' is the measure of actual arrival/departure time compared to the scheduled arrival/departure time, while the actual time is later than the scheduled time. However, different stakeholders may have different interpretations. The Federal Aviation Administration defines a flight delay as having an actual arrival/departure time that is 15 minutes later than the scheduled arrival/departure time. Much research attempted to deal with flight delay issue by formulating various models to predict their occurrence.

In this paper we adopted several machine learning algorithms to predict flight delay and compared their performances in the case of the HKIA. The analysis concluded that the ANNs algorithm is the most effective in predicting flight delay. During flight planning, these important contributing factors could be emphasized.

A dataset with a longer duration might aid in further development. Some datais also missing due to flight cancellation, etc., causing reduction in accuracy. the current model could beimproved to provide a comprehensive analysis and accurate prediction of flight delay. The number of take-off and landing flights shall also be further balanced to enhance the robustness of the results.

4. Machine Learning Model – Based Prediction of Flight Delay.

Authors: N Lakshmi Kalyani, Jeshmitha G, Bindu Sri Sai U, Samanvitha M, Mahesh J, Dr B.V. Kiranmayee

Year: 2019

With the air travel increasing rapidly there is a serious problem of flight delays for both airlines and passengers. Passengers not only lose their time but also their trust in airlines. This will result in a huge economic loss to the airline companies and Airlines lose their reputation as well. Thus, proper monitoring and prediction of flight delays are very important.

A more precise prediction model can aid in optimizing flight operations which benefit both passengers and airlines equally. Considering all the parameters that are the cause for the delay, weather found to affects the delay to a great extent and hence used it as a contributing aspect to predict the delay of the flight.

The algorithm that was used here was XGBoost classification algorithm as its speed of execution and model performance are very good. For knowing the delay time, domestic flight data is trained using Linear Regression algorithm which then predicts by how much time the flight will get delayed.

In This paper the aims are to predict the flight's delay along with the estimation of delay time in minutes using machine learning algorithms namely Decision Tree Algorithm (XGBoost) and Linear regression. Data set of both flights and weather will be taken to compare with the given inputs and validate them by applying classification and Regression concepts of Machine Learning.

5.Applying Machine Learning To Aviation Big Data For Flight Delay Prediction.

Authors: Yushan Jiang , Yongxin Liu ,Dahai Liu ,Houbing Song

Year: 2020

Nowadays big data analytics and machine learning have been applied successfully in many domains, their applications in aviation are limited. This paper presents a comprehensive study of flight delay spanning data pre-processing, data visualization and data mining, in which we develop several machine learning models to predict flight arrival delays. Two data sets were used, namely Airline OnTime Performance (AOTP) Data and Quality Controlled Local Climatological Data (QCLCD). Data visualization is a process which is used to communicate information clearly and efficiently to users by the usage of information graphics such as tables and charts. It helps users in analyzing a large amount of data in a simpler way. It makes complex data more accessible, understandable, and usable.This paper aims to recognize useful patterns of the flight delay from aviation data and perform accurate delay prediction. The best result for flight delay prediction (five classes) using machine learning models is 89.07% (Multilayer Perceptron). A Convolution neural network model is also built which is enlightened by the idea of pattern recognition and success of neural network method, showing a slightly better result with 89.32% prediction accuracy. This paper provides a comprehensive aviation data analytic regarding flight delay. QCLCD and AOTP data are used to construct a new dataset with both flight information and weather condition. Then this dataset is further explored and some useful pattern toward flight delay is shown.

6. A Novel Integration Platform to Reduce Flight Delays in The National Airspace System.

Authors: Chuyang Yang, Zachary A. John H. Mott

Year: 2021

Roughly 20% of passengers' total travel time is due to such delays, causing $35 billion annually in lost revenue and impacting not only the airline industry, but the retail, lodging, restaurant, and tourism industries, as well. The Federal Aviation Administration's effort in aiding decision-making at airports is readily apparent in the Next Generation Air Traffic Control (NextGen) System's System-Wide Information Management (SWIM) program, and in-flight delay information from the FAA Air Traffic Control System Command Center (ATCSCC), Artificial Neural Networks (ANN), Cloud Computing The term "cloud" was used to refer to the platform for distributed computing which allows users to minimize up-front information technology (IT) infrastructure costs but also get their applications up and running faster. . By integrating various databases with existing NextGen's SWIM and FAA CDM and GDP programs and harnessing remote cloud computing of deep learning algorithms, precise and accurate flight delay forecasts are generated. Allowing for the full realization of potentials in schedule optimization, emission reduction, and resource utilization, the delay predictions provided by the proposed system could significantly grow airports' capabilities through improved operational efficiency.

7. Airline Delay Prediction Using Machine Learning and Deep Learning Techniques.

Authors: Devansh Shah, Ayushi Lodaria, Danish Jain, Lynette D'Mello.

Year: 2020

In this paper, they have tried to predict flight delays using different machine learning and deep learning techniques. By using such a model, it can be easier to predict whether the flight will be delayed or not. Factors like 'WeatherDelay', 'NASDelay', 'Destination', 'Origin' play a vital role in this model. Using machine learning algorithms like Random Forest, Support Vector Machine (SVM) and K-Nearest Neighbors (KNN), the f1-score, precision, recall, support and accuracy have been predicted. They have employed Long Short-Term Memory RNN architecture trying to prove that the accuracy increases with deeper architectures. To train the model, stochastic gradient descent (SGD) algorithm is utilized.

In this paper they have shown that machine learning and deep learning algorithms can be efficaciously used to predict flight delays. Therefore, in this paper, by using Random Forest based model the flight delay can be predicted, which will be beneficial for all the entities involved i.e., airport, airline and passengers. Therefore, the analysis of flight delay carried out through this paper is based solely on scientific parameters and is of paramount importance in the aviation industry.

8. Airline delay prediction by machine learning algorithms.

Authors: H. Khaksar, A. Sheikholeslami

Year: 2019

In this paper, they have implemented fight delay prediction through the proposed approaches that were based on machine learning algorithms. The parameters that enabled effective estimation of delay were identified and then, Bayesian modeling, decision tree, cluster classification, random forest, and hybrid method were applied to estimate the occurrences and magnitude of delay in a network. These methods were tested on a US fight dataset and then, referred for a large Iranian airline network. Results showed that the parameters affecting delay in US networks were visibility, wind, and departure time, whereas those affecting delay in the Iranian airline flights were f eet age and aircraft type.

The analysis and design of complicated and large-scale systems with many variables require new methods that can identify, classify, and analyze voluminous data. Accordingly, researchers put forward data mining approaches to identifying, collecting, classifying, and ranking or generating and storing valuable information from such databases. FDP methods, namely decision tree, cluster, Bayesian, random forest, and hybrid classification, were proposed in this research. These approaches were examined on the basis of real datasets on US and Iranian flight networks. The results indicated that the hybrid approach exhibited a performance superior to those of the other methods and was therefore adopted as the FDP model.