Flight Delay Prediction for Aviation Industry using Machine Learning

Milestone 1: define problem / problem understanding

Activity 1: specify the business problem

Nowadays, the aviation industry plays a crucial role in the world's transportation sector, and a lot of businesses rely on various airlines to connect them with other parts of the world. But, extreme weather conditions may directly affect the airline services by means of flight delays. To solve this issue, accurately predicting these flight delays allows passengers to be well prepared for the deterrent caused to their journey and enables airlines to respond to the potential causes of the flight delays in advance to diminish the negative impact. The purpose of this project is to build a web app powered by Machine Learning Algorithm to predict flight delays. We look upon implementing Random Forest Regression algorithm for the prediction model. Also the main idea behind it being a web app is to enable the public interactions with the platform for retrieving the predicted delays for their flights

Keywords: Flight delay prediction, machine learning, random forest, web app.

Activity 2: Business requirements

. Data Collection: The first and foremost requirement is to collect data from various sources such as weather reports, airline schedules, airport operations, and any other relevant sources. This data is necessary to train machine learning models to predict flight delays accurately. Data Preparation and Preprocessing: Once the data is collected, it must be cleaned and pre-processed to remove any errors or inconsistencies. This process involves analyzing the data, identifying

outliers, missing values, and correcting them. Also, the data must be transformed into a suitable format to fit into the machine learning model.

Activity 3: Literature Survey

"Predicting Flight Delays with Machine Learning" by Rafael Boza, Alberto Suarez and Antonio Gonzalez-Tobon.

"Flight Delay Prediction Using Machine Learning: A Review" by Ajinkya Kadu, Vaishnavi Limaye and Prashant Shinde.

"A Machine Learning Approach for Predicting Flight Delays" by Yingjie Hu, Wenjie Zhang and Qun Wang.

"Predicting Flight Delays with Machine Learning: A Comparative Study" by Tugce Vural, Gokhan Incekara and Aysenur Birturk.

"Flight Delay Prediction Using Machine Learning Methods" by Shashi Shekhar Jha, Aradana Bhatia and Sandeep Kumar.

A study used decision trees and logistic regression to predict flight delays. The model achieved an accuracy of 78% in predicting delays.

A deep learning model combining convolutional and recurrent neural networks was used to predict flight delays. The model outperformed traditional machine learning methods with an accuracy of 91%.

A study proposed a hybrid model combining random forests, artificial neural networks, and support vector machines. The model achieved an accuracy of 85% in predicting flight delays.

A study used a support vector machine model with a hybrid kernel function to predict flight delays. The model achieved an accuracy of 80% in predicting delays.

5. A Bayesian network model was used to predict flight delays based on weather conditions. The model achieved an accuracy of 85% in predicting delays.

Machine learning techniques have shown promising results in predicting flight delays.

Deep learning models have outperformed traditional machine learning methods in predicting delays.

-Combining multiple machine learning techniques in ensemble models has also shown good results.

Activity 4: Social or Business Impact.

Furthermore, flight delay prediction can also benefit airline operations by allowing them to adjust schedules or allocate resources accordingly. This can help reduce the number of flight cancellations and overbooking, which can also increase customer satisfaction. Moreover, by predicting flight delays, airlines can improve their safety measures by ensuring that flights are not delayed due to

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Overall, flight delay prediction using machine learning can provide a positive social impact by increasing customer satisfaction, enhancing airline reputation, improving airline operations, and enhancing safety measures.