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# **PROPOSED SOLUTION – FLIGHT DELAY PREDICTION MODEL**

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## **TEAM MEMBERS**

- 917719C012 – Blessy Karunya J
- 917719C015 – Dhanushree B
- 917719C039 – Jasmitha R
- 917719C110 – Varshini S

## **PROBLEM STATEMENT**

For several reasons, flying is substantially more exciting for an ordinary traveler than utilizing other modes of transportation. The first is that it is the fastest way of transportation, followed by the comfort it gives in that it is a somewhat quieter and well air-conditioned mode of transit. In addition, it is a more organized style of travelling since staff members support and assist visitors in every way possible. Land traffic and aviation travel have dramatically increased as a result. A rise in air traffic has also resulted in extremely high levels of aircraft delays both on the ground and in the air.

## **IDEA/ SOLUTION DESCRIPTION**

The main objective of the model is to accurately estimate airplane delays. The entire system is a web application. We employ HTML, CSS, and JavaScript to make the application user interactive. The flight delay is predicted using a ML model. This model accepts inputs as departure date, departure delay, travel time between the two airports, and other data. By turning the ML model to a pickle file, it is linked to a web application. ML model here uses random forest as its prediction method. Because of its rapid prediction, impressiveness, excellence with high dimensionality, etc., random forest is selected.

## **NOVELTY/ UNIQUENESS**

A hybrid ensemble flight delay prediction model is built by combining Logistic Regression Model, Decision Tree, Support Vector Machine, K-Nearest Neighbor Model, and the Naive Bayes Model to provide better accuracy and the F1 score of hybrid model can be compared with that of each individual model. This ensures that the proposed model is best in predicting results.

## **SOCIAL IMPACT/ CUSTOMER SATISFACTION**

An accurate estimation of flight delay can help to increase customer satisfaction and incomes of airline agencies. The delay information can reduce anxiety and tension among passengers thus, saving their time and improve their travel experience, which is significant to enhance passengers' loyalty to an airline.

## **BUSINESS MODEL (FINANCIAL BENEFIT)**

Predicting flight delays prevents reallocation of flight crew and aircraft and additional crew expenses. This avoids consumption of extra labor, capital and other inputs necessary in the process thereby saving the capital costs. The proposed solution is also a low-cost model and the customers are not charged for the service they receive.

## **SCALABILITY OF SOLUTION**

The model's ability to increase its performance is possible by building it more accurately with the use of several classification models and selecting the best accurate model among the,. Also, through integration of these models, an optimized hybrid model can be obtained in order to result in more scalability. Deploying the ML model into cloud also makes it easy for enterprises to experiment with the model capabilities and scale up. Placing a finished flight prediction model into a live environment can be used for its intended purpose and it is integrated with Flask, so that they can be accessed by end users.