Predictive Analysis of US Flight Delays

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20 Jan 2026

Overview

- The Problem
  - Flight delays disrupts passenger travel and airlines operation cost
- Objective
  - Use historical data to predict if a flight will be delayed
- Proposed Solution
  - Use predictive modeling to estimate chances of delays
  - Based of multiple variables

Project Idea

- Binary Outcome (Delayed or on-time)
- Use variables like airline, route, day/time, etc.
- Determine what factors lead to delays

The Dataset

- Bureau of Transportation Statistics
  - U.S. Department of Transportation
- January 2022 – July 2025
- Over 26 million rows
- 10 variables

Predictive Models

- Random Forest Model
  - Combination of many decision trees
- Gradient Boosting
  - Trees are weighted and made sequentially
- Support Vector Machine
  - Handles marginal relations or finds

Conclusion

- Main Objective: Predict delayed flights
- Use multiple predictive models
- Find leading factors in delays