

AIRLINE DELAY AND CANCELLATION ANALYSIS

Amina Sadiq(1867400), Nikhila Boosam(1855023)

In the dynamic world of air travel, where speed is the paramount consideration, on-time performance is everything for airlines and passengers alike. Flight delays and cancellations disrupt schedules and lead to massive losses for airlines which causes inconvenience for travelers. This project works with a large dataset of airlines sourced from [Kaggle](#), showing flight delays and cancellations recorded in the period between 2009 and 2018. For this project we will work with the 2018 dataset that includes features like airline carrier, flight number, origin airport, destination airport, scheduled and actual times for departure and arrival, and departure and arrival delays, taxi-out time, and wheels-off time. These aforementioned features provide insight into airline operations, airport efficiency, and scheduling challenges. In this project, we aim to analyze the given dataset to outline relevant trends and build data-driven strategies for reducing flight delays and cancellations.

Research Questions and Objective

This project is mainly intended to discuss the causes behind flight delays and cancellations in order to achieve constructive findings that could help reduce disruptions during flights. Our project will address the following key questions:

1. What are the main causes of flight delays and cancellations?
2. How do flight delays vary by airline, airport, and time of day?
3. What scheduling strategies could airlines adopt to reduce delays?
4. Can we develop a predictive model to anticipate flight delays and cancellations?
5. How do airline-specific operational strategies influence delay management?

Methodology and Approach

This research will employ exploratory data analysis (EDA), statistical modeling, and machine learning techniques to analyze flight delays and cancellations. Time series analysis will be used to identify seasonal and temporal trends, while predictive modeling (e.g., logistic regression, decision trees, and neural networks) will be applied to anticipate delays based on key flight attributes. We will also investigate airline-specific performance by comparing delays across carriers and identifying best practices. In this project, the focus will be on such insights that might inform airline operations and scheduling, providing practical recommendations that can enable airlines to minimize delays, hence improving efficiency and enhancing passenger experience.