

# Flight Delay Analysis Using the `nycflights13` Dataset

## Procedure

The analysis was conducted using R with packages ``nycflights13``, ``dplyr``, ``ggplot2``, and ``lubridate``. Key aspects investigated include:

1. **Average Delay by Destination:** Determining the average delay per destination and visualizing the spatial distribution.
2. **Plane Age and Delays:** Assessing if there's a correlation between the age of a plane and the average delay.
3. **Frequency of Flights and Delays:** Filtering flights to those with planes that have flown at least 100 flights.
4. **Airtime and Duration Comparison:** Comparing the airtime of flights with the actual duration between departure and arrival.
5. **Day of the Week and Delays:** Identifying which day of the week typically experiences the least delay.

## Results and Discussion

### 1. Average Delay by Destination:

- The analysis reveals the average delay experienced by flights to various destinations.
- A spatial plot was generated to visualize these delays across different geographic locations.

### 2. Plane Age and Delays:

- The relationship between the age of planes and the average delay was visualized.
- A scatter plot with a linear regression line showed the trend between plane age and delay times.

### 3. Frequency of Flights and Delays:

- Flights were filtered to include only those with planes that have completed at least 100 flights.
- This subset could provide insights into the reliability and delay patterns of frequently used aircraft.

#### **4. Airtime and Duration Comparison:**

- A comparison between the scheduled airtime and the actual duration of flights was performed.
- The plot indicates discrepancies and aligns them with potential causes such as airport locations and time zone changes.

#### **5. Day of the Week and Delays:**

- Analysis of delays across different days of the week was conducted to determine the optimal day for travel to minimize delays.
- The resulting visualization highlights the days with the lowest average delays.