# PREDICTING 2026 CIVIL AVIATION ACCIDENTS

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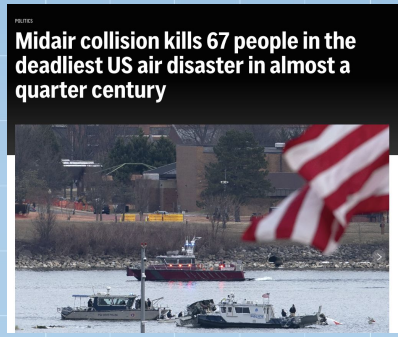
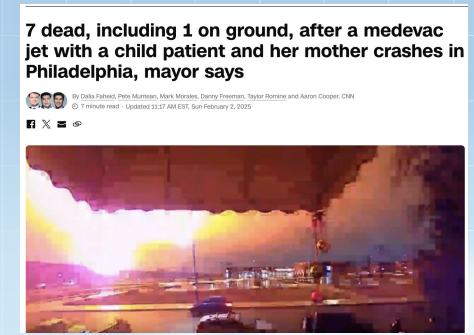
# PROJECT BACKGROUND

| | |
|---|---|
| **Motivation** | Is the recent surge in airplane crash media justified or has it been overblown? How have flight safety trends changed in the last decade? |
| **Hypothesis** | The number of aviation accidents will decrease in 2026. |
| **Research Question** | Based on US aviation data from 2015-2024, what are the predicted values of civil aviation accidents for 2026? |
| **Modeling Approach** | Data cleaning, create time series, analyze ACF/PACF and residuals, run ARIMA/forecast, evaluate based on RMSE (goal value between 0.2-0.5) and train-test-split outcomes. |
| **Goal** | Predict total aviation accidents for 2026 in order to investigate whether increased media coverage is justified. |



# THE DATA

Our dataset was pulled from the **National Transportation Safety Board** and includes aviation data from 2015-2025 (did not include 2025 in our analysis). After cleaning the data, we converted it to a time series with 12,682 rows and 29 columns. We used the following variables in our analysis:

| | |
|---|---|
| **EventDate** | The date of the aviation event in the format of YYYY-MM-DD. |
| **Year** | The year in which the aviation event took place, ranging from 2015-2024. |
| **Month** | The month in which the aviation event took place in numerical format. |
| **FatalInjuryCount** | The total number of fatal injuries caused as a result of the aviation event. |

# ANALYSIS PLAN

**Data Collection**

Get data from NTSB

**Data Cleaning**

Remove unnecessary variables, handle missing values, renaming, etc.

EDA

**ARIMA Model**

Augmented Dickey-Fuller Test for stationarity

Analyze ACF and PACF plots

Model selection using AIC/BIC

**Evaluation**

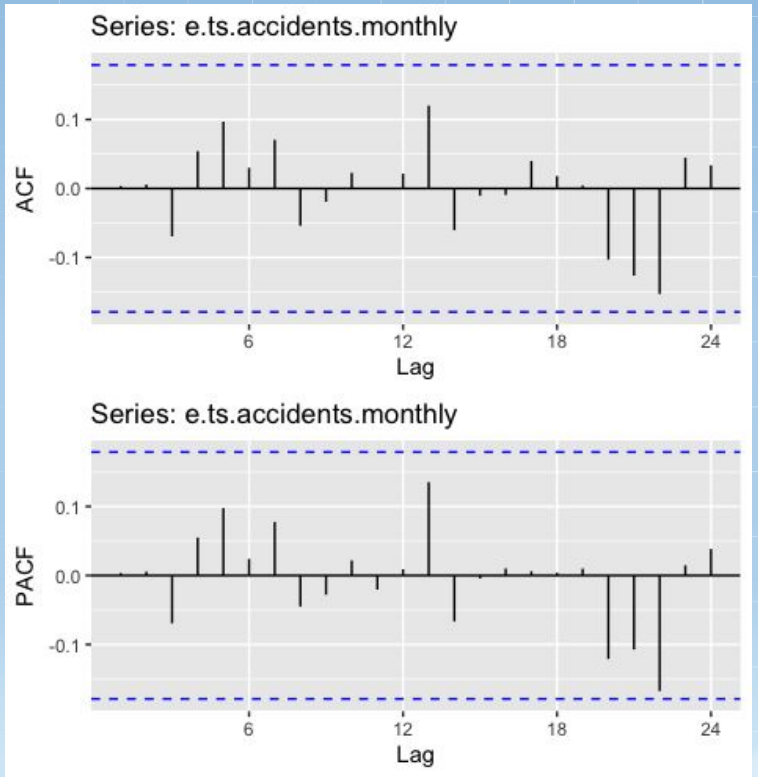
Analyze RMSE — aiming for 0.2-0.5

Compare train-test-splits

# TRICKY ANALYSIS DECISION

## AVIATION ACCIDENTS COUNT

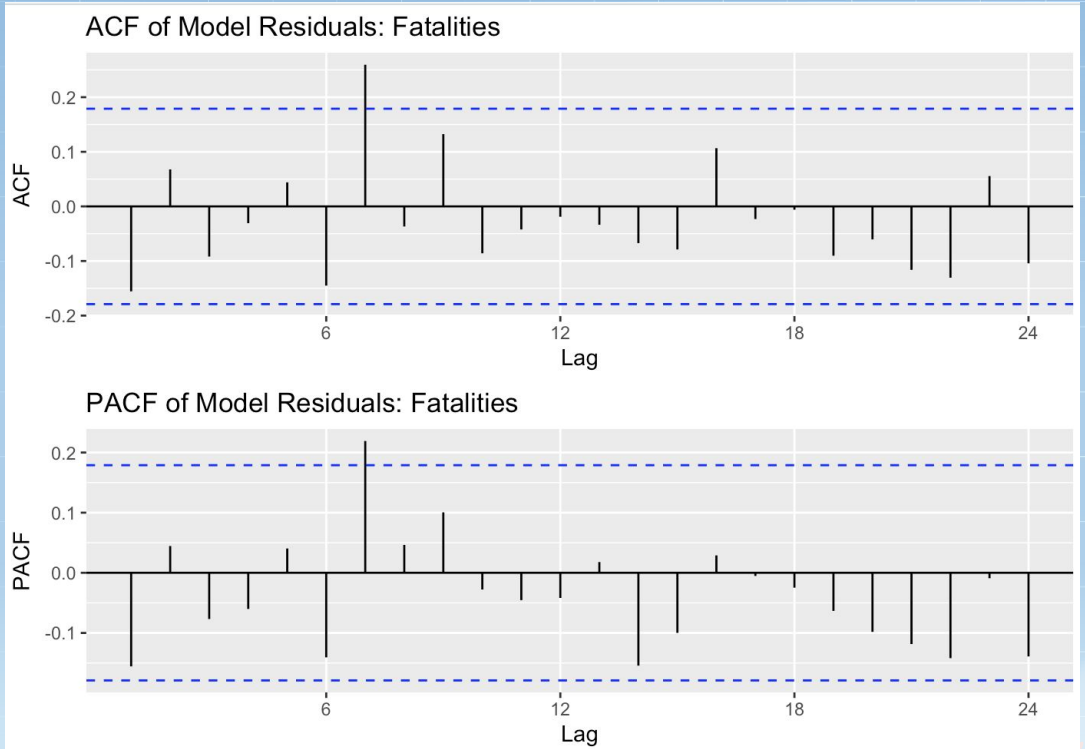
Our time series was already stationary and showed weak autocorrelation for monthly aviation accidents – we **did not need ARIMA** to do forecasting.



# TRICKY ANALYSIS DECISION

## EXPLORING OTHER VARIABLES

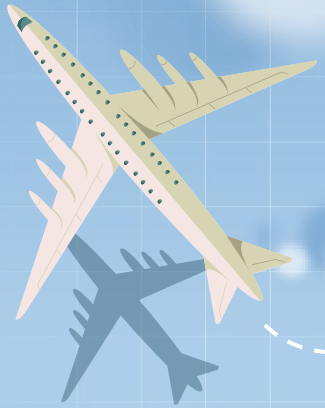
Since we did not need an ARIMA for aviation accidents, we investigated **FatalInjuryCount**. However, it also did not need ARIMA. To balance complexity with effectiveness, we opted for a simpler forecasting approach.



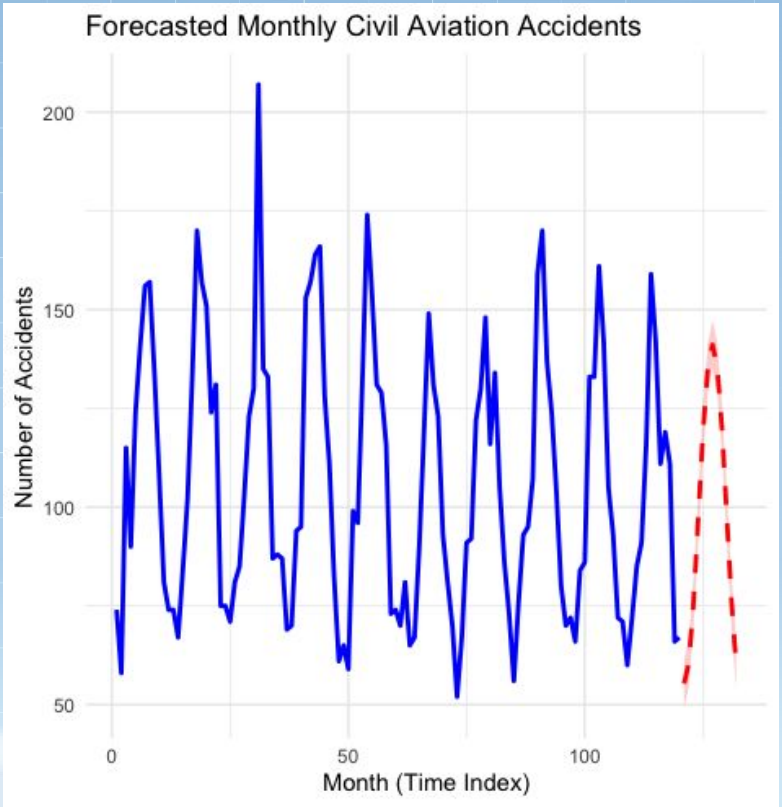
# BIAS & UNCERTAINTY

Biases:

- Decrease in flights during COVID may have slightly skewed the data
- Including too much data (i.e., too many years in the past) may lead to inaccurate forecasting due to changes in technology/flight trends over time



# RESULTS & CONCLUSIONS




- Forecasted values remain consistent with previous data and **align with our hypothesis**
- Contradicts the media's emphasis on aviation accidents
  - Disconnect between public perception and actual aviation accidents
  - Need for **more data-driven discussions** rather than drawing conclusions from the media

# NEXT STEPS

## MODEL MORE VARIABLES

Experiment with modeling other variables that could show different patterns.

## INCLUDE 2025 DATA ONCE AVAILABLE

Continue research to gain a better picture of flight safety this year.

## POLICY CHANGES & LAYOFFS

Layoffs in FAA and potential policy changes could influence future flight safety trends.

# RESOURCES


J. Raby, “What is known about the deadly collision between a passenger jet and Army helicopter,” AP News, https://apnews.com/article/ronald-reagan-national-airport-aircraft-crash-9d79051a9e535bd855df5a4e5553b2e9 (accessed Feb. 28, 2025).

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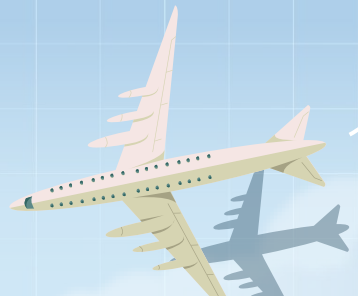
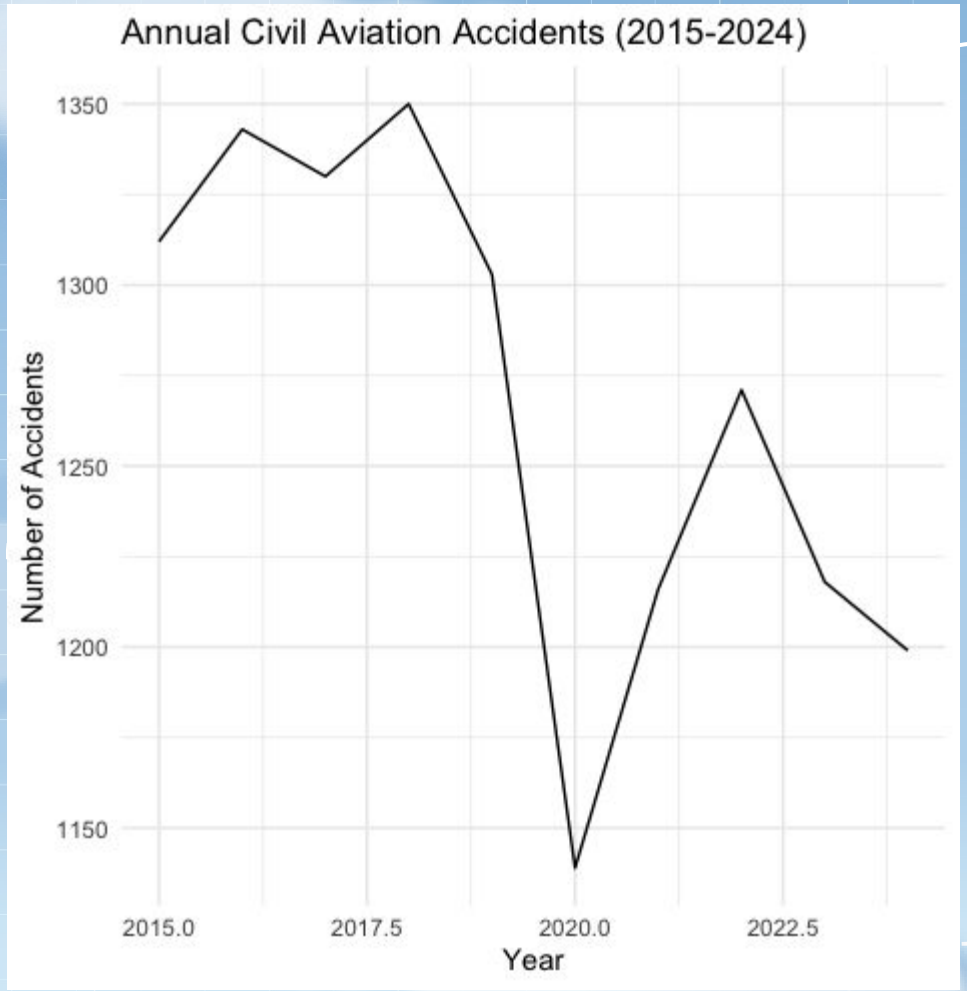
GitHub Repository: https://github.com/annagirerd/DSProject2


Annual Civil Aviation Accidents (2015-2024)
Number of Accidents
1350
1300
1250
1200
1150
2015.0
2017.5
2020.0
2022.5
Year

# THANK YOU!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