

NTSB Airline Accident Modeling & Analysis

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Predicting For Budget Airlines Using NTSB Aircraft Accident Data

Data Collection - The National Transportation Safety Board

- ❑ Independent federal accident investigation agency
- ❑ Investigates and determines probable causes of transportation accidents, including aircraft.
- ❑ Makes safety recommendations



Airline Accidents Mostly Occur Near Airports

- ❑ 53% of aviation accidents occurred during landing between 2005-2023 ([Statistica](#))
- ❑ Takeoff and approach rank second and third.
- ❑ Data focused on occurrences at or near airports.



Goal: Budget or Non-Budget Airline. Accuracy

Goal: Create a model that can predict if a plane belongs to a budget airline based on accident data. 'Budget' implies lower quality and therefore less emphasis on staff training and maintenance.

Budget

- Alaska
- Allegiant
- Frontier
- JetBlue
- Spirit
- Southwest
- Sun Country

Non-Budget

- American
- Continental
- Delta
- Hawaiian
- United

** 559 observations

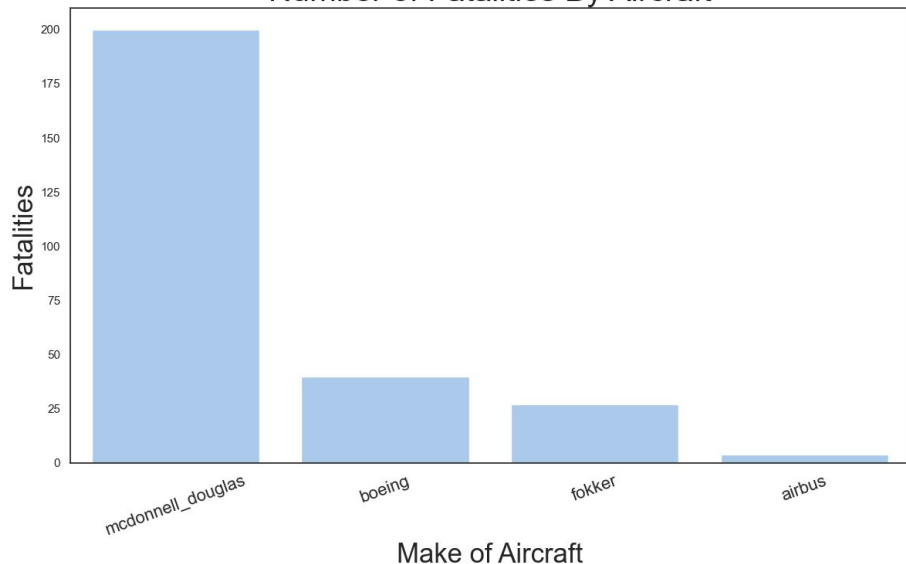
Best Model Results

	Training Data Accuracy	Testing Data Accuracy	Prediction Accuracy (<i>Goal</i>)	Sensitivity/Recall	<i>Specificity</i>	Precision
<i>Kristina</i> - Logistic Regression & CountVectorizer	99.52%	81.43%	77.86%	48.39%	90.83%	60%
<i>Holly</i> - Random Forest Classifier	78.08%	78.79%	78.57%	4%	100%	50%

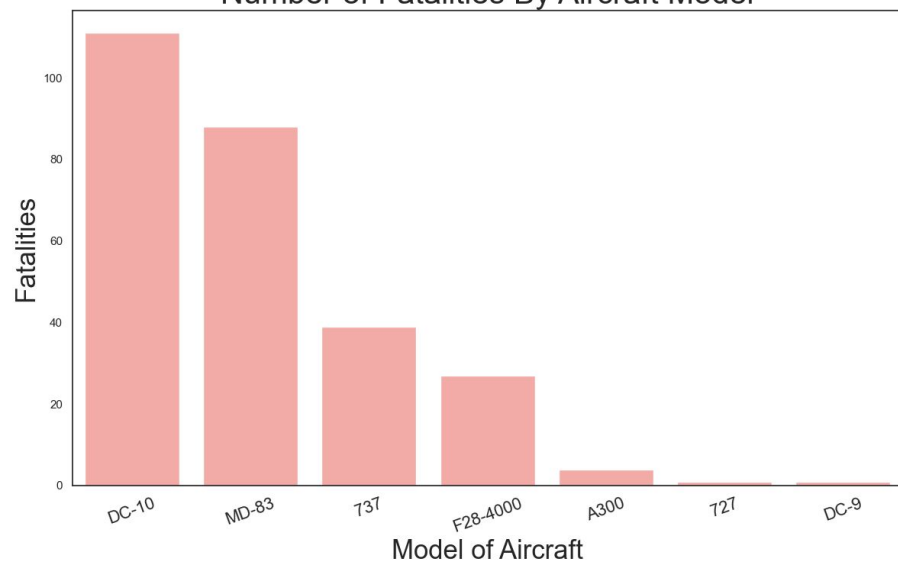
Base model: 78%

Fatalities Per Aircraft Make & Model

Number of Fatalities By Aircraft

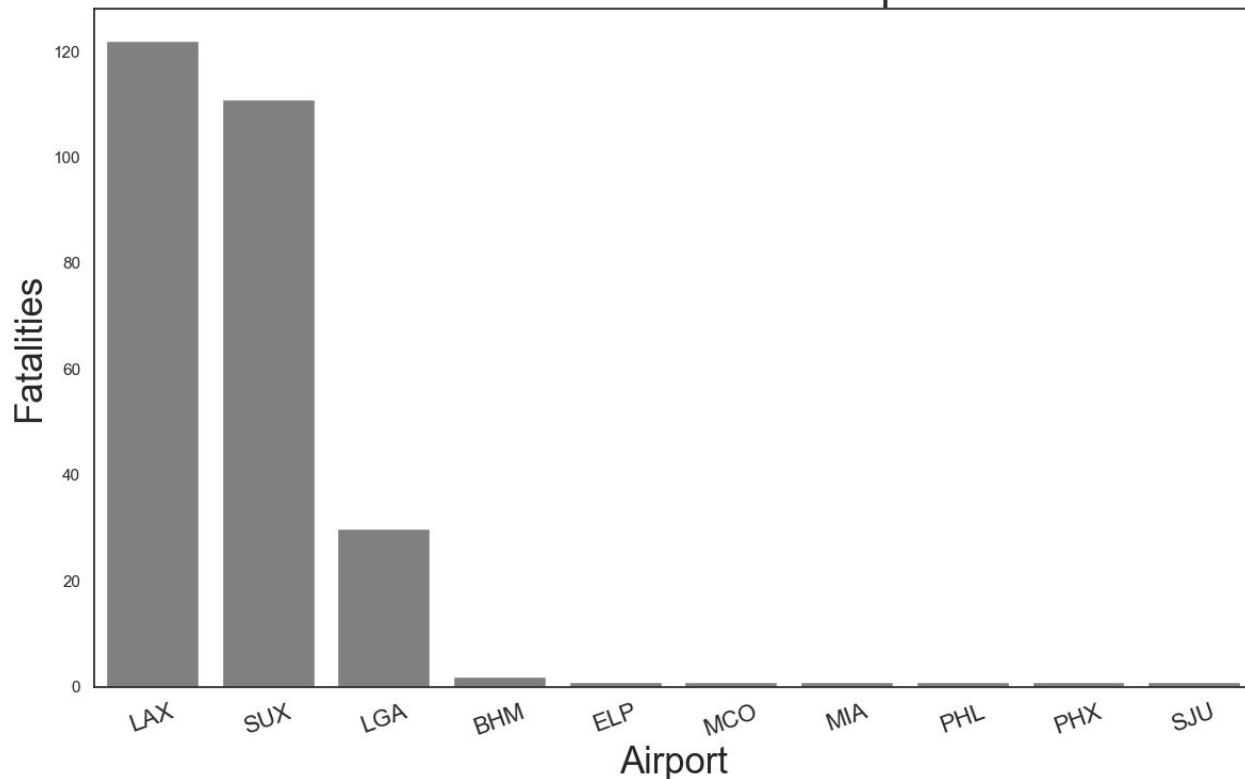


Number of Fatalities By Aircraft Model



Fatalities At Airports

Number of Fatalities At Airports



LAX

- 2/1/1991

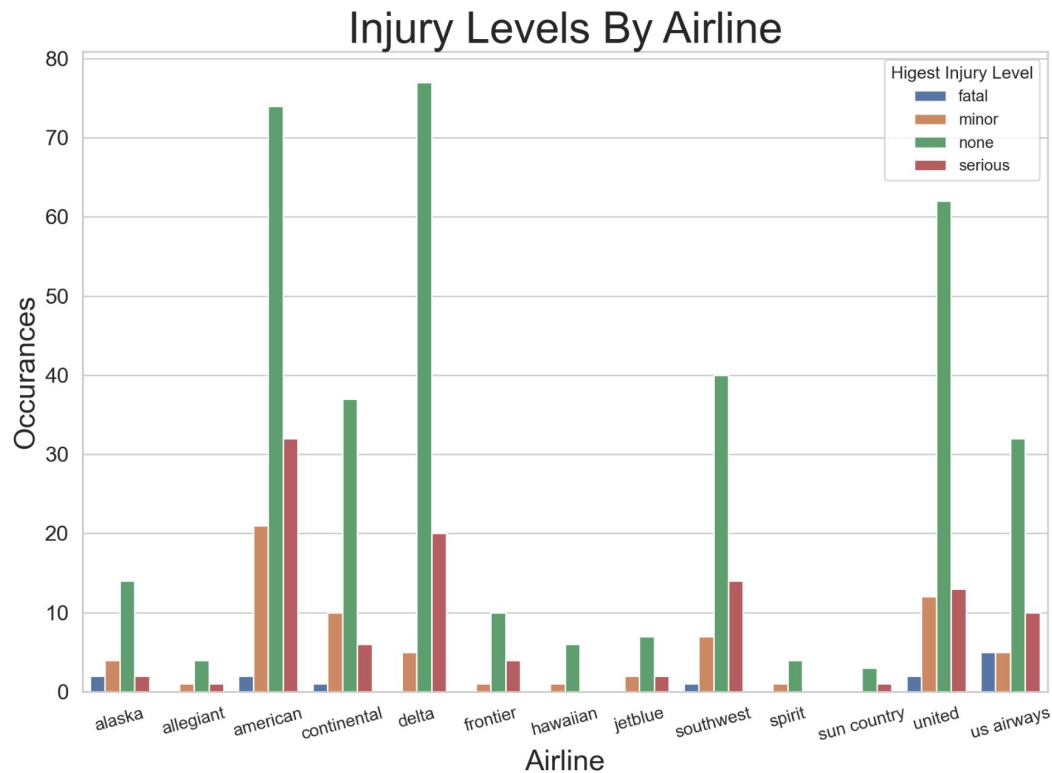
SUX

- 7/19/1989

LGA

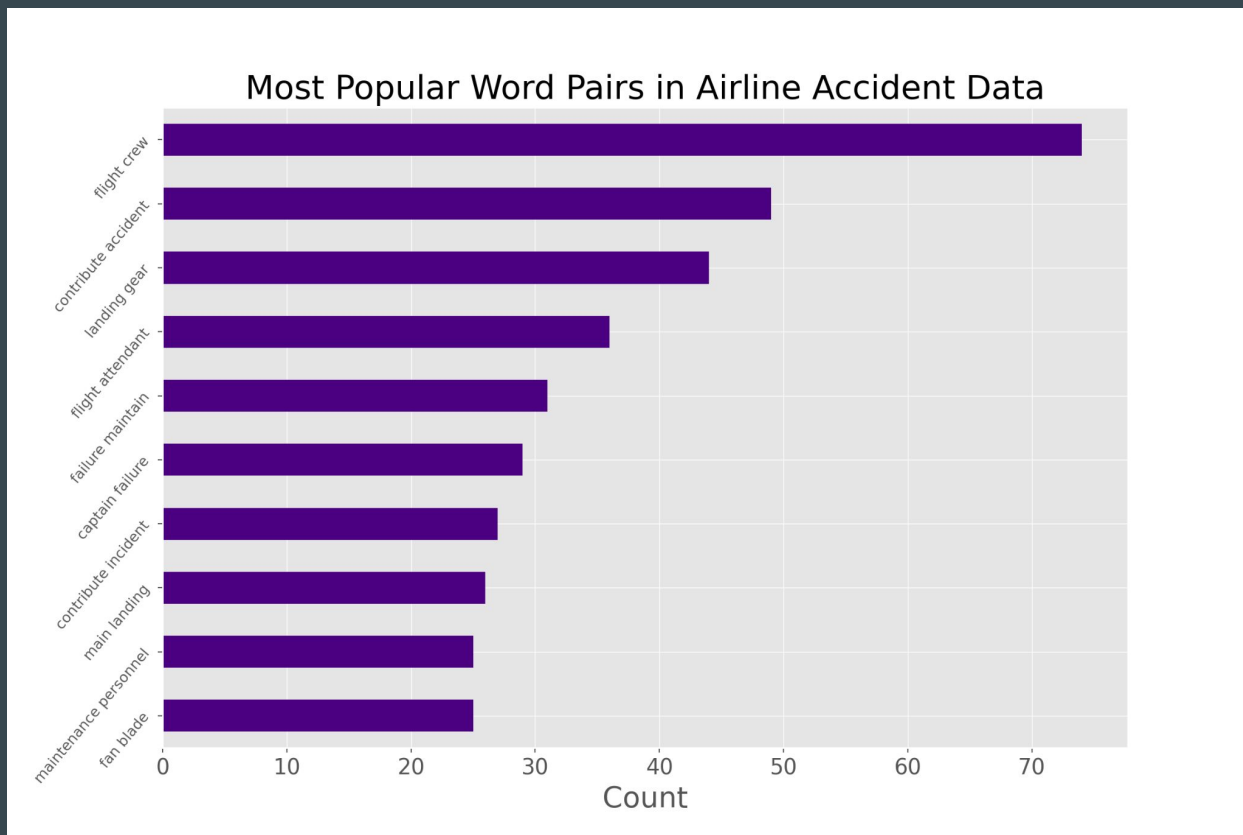
- 3/22/1992

Injuries by Airline



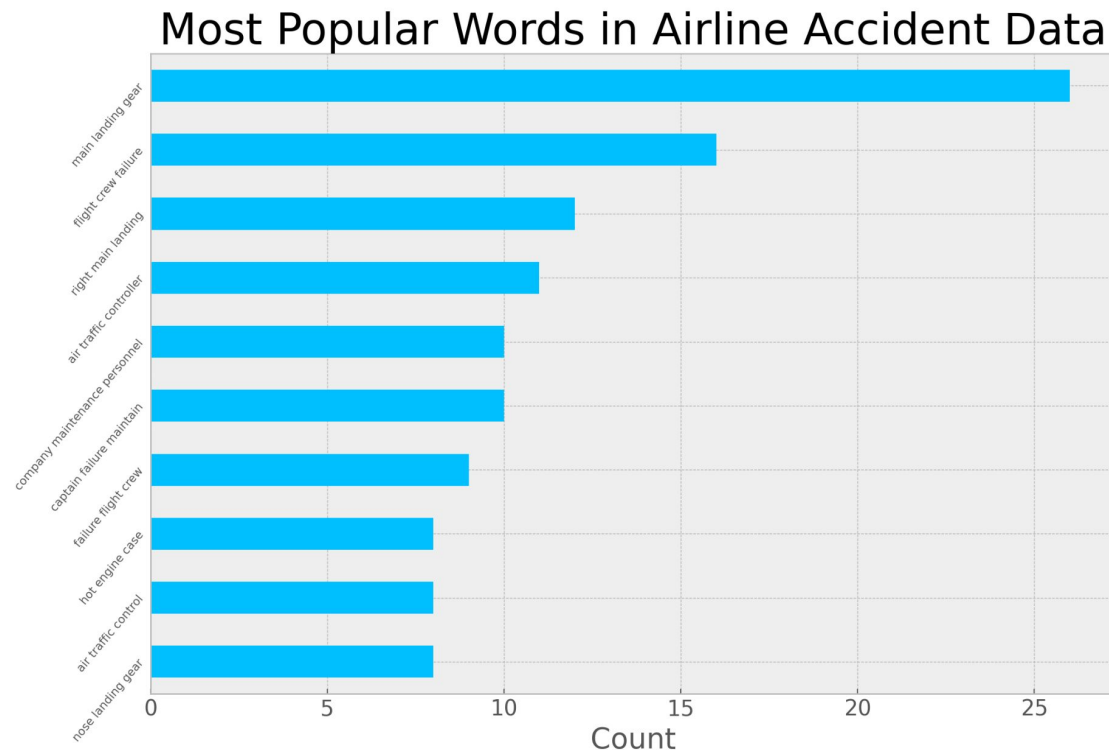
Even if there are accidents on an aircraft, few lead to fatalities.

Airline Safety Word Pairs



Flight crew is at the top of the list, followed by landing gear.

Airline Safety Word Trios



Once again, staff shows up frequently, including air traffic controllers.

Conclusions & Suggestions

Modeling

- ❑ The NTSB standardize their data entry
- ❑ More data

Commercial Aircraft Industry

- ❑ High quality training and frequent re-training for all staff
- ❑ Ensure air traffic controller teams are fully staffed and get enough rest
- ❑ Extra maintenance for landing gear