

Life is waiting.

Tom Leung

A STEVEN SPIELBERG film

# The Terminal



# The Questions

As a data scientist, you ask yourself two questions

1. Which airport is the worst?

And why is it SFO?

2. Which airline is the worst?

And why is it United?



# The Data

## Main

### Flights

7.4 million U.S. domestic flight  
from Feb '19 - Jan '20

Source: Department of  
Transportation

## Supplementary

### Climate

Daily Climate data from  
Feb '19 - Jan '20

Source: National  
Climate Data Center

### Runway

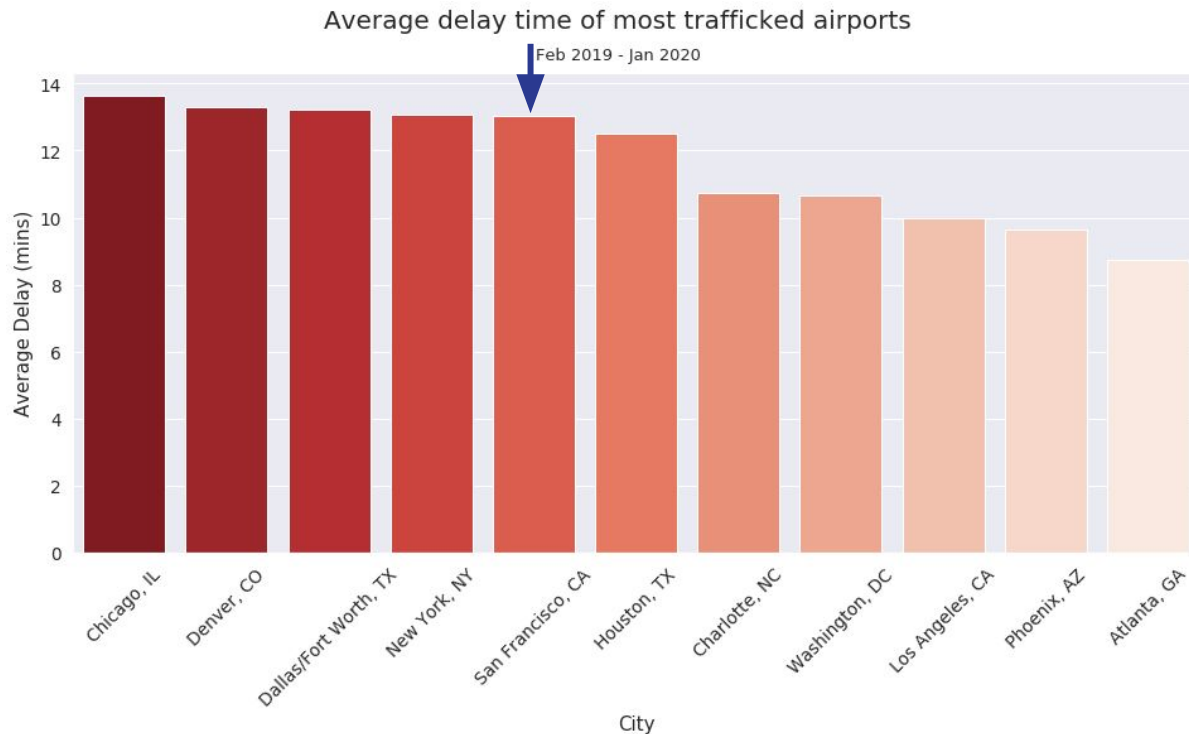
Technical specs of  
Airport Runway

Source: Department of  
Transportation

# The Worst Airport

# The Worst Airport with Delays

Focusing on the 11 busiest airports in the US, SFO ranks 5th in the average delay time



# The Hypothesis Testing

- Null:  
No difference with SFO delay time
- Alternative:  
Average delay time at SFO is greater than:
  1. National Average
  2. Los Angeles Airport
  3. Oakland Airport
  4. San Jose Airport
- Two-samples, one-tailed t-test with alpha of 0.05



# The Hypothesis Testing (cont)

- National Average
  - $p < 0.003$ , reject
- Los Angeles
  - $p < 0.003$ , reject
- Oakland
  - $p < 0.003$ , reject
- San Jose
  - $p < 0.003$ , reject

SFO had longer delay time





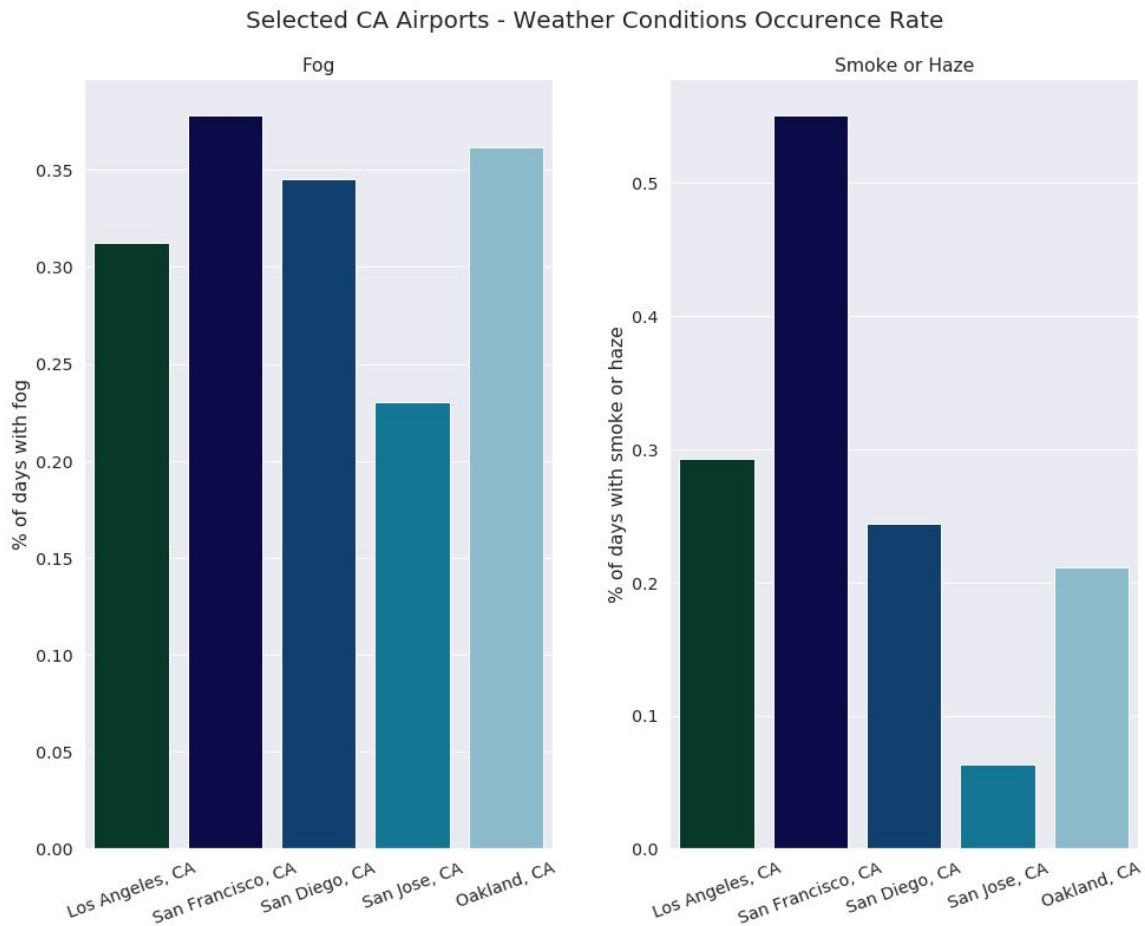
What causes the delay?



# The Worst Weather?

Based on weather station data, from Feb 19 to Jan 20, SFO had the highest ratio of fog, smoke and haze

Northern California suffered from historical wildfire last year, and the impact is visible in the data



# The Hypothesis Testing 2

- Null:  
Fog and Smoke has no impact on delay time at SFO
- Alternative:  
Fog and Smoke prolongs delay time at SFO
- Two Sample, One-tailed T-Test, Alpha = 0.05



# The Hypothesis Testing 2 (cont)

- Foggy days
  - $p < 0.003$ , reject
- Smoke/Haze days
  - $p < 0.003$ , reject

SFO had longer delay time when it is foggy or hazy

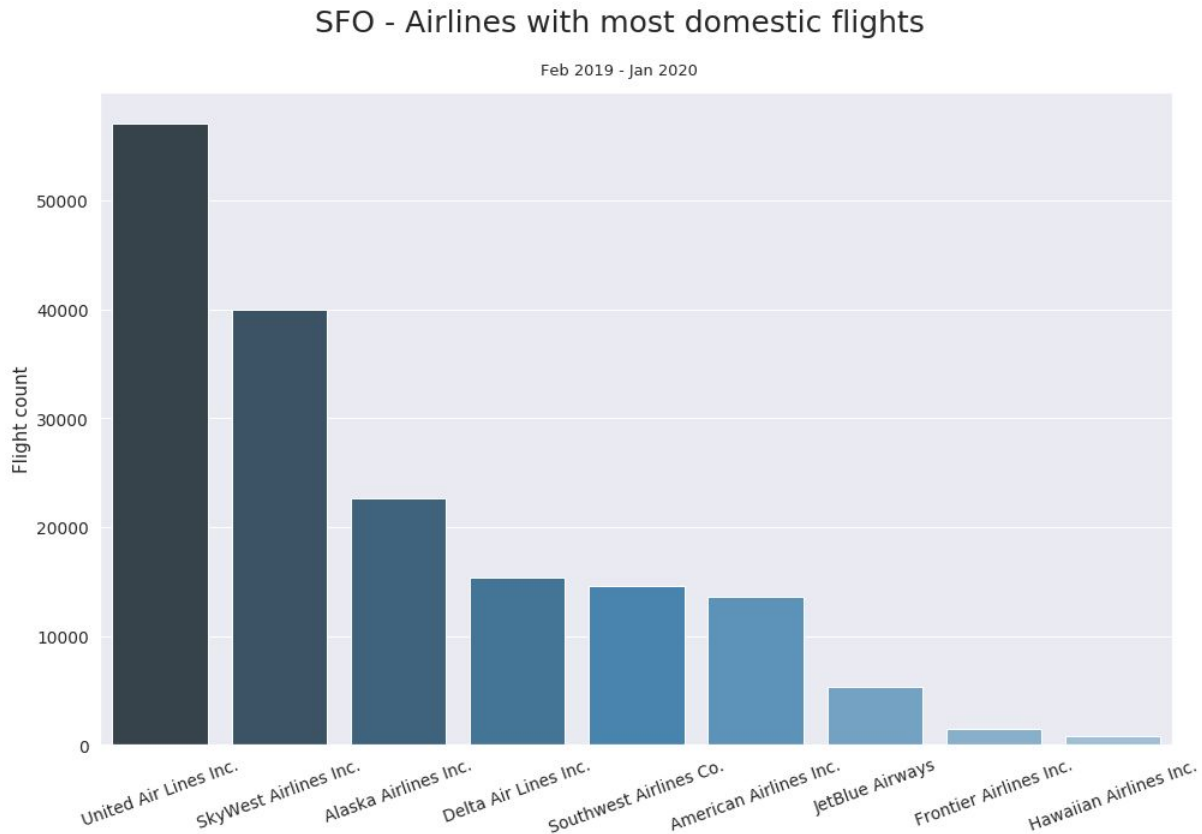


# The Worst Airline

# The United Airport

SFO is dominated by United

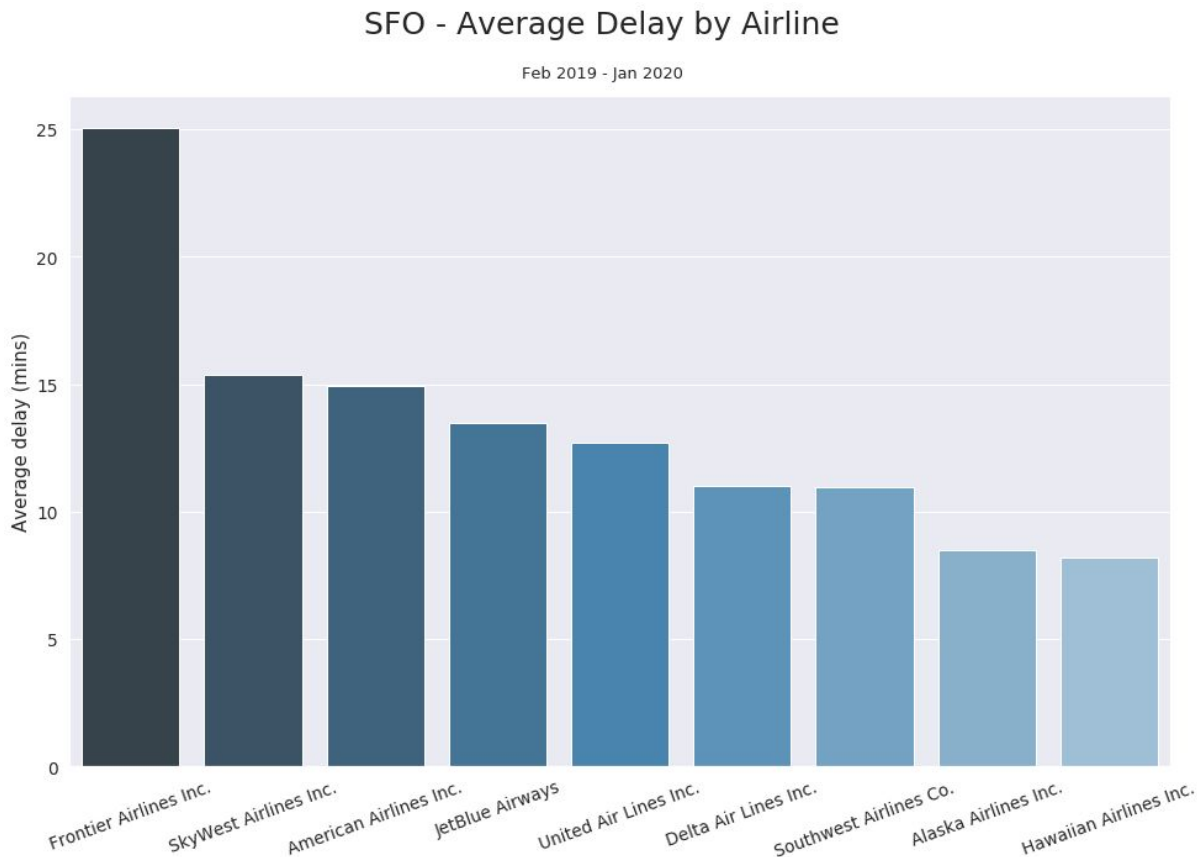
SkyWest in second place is a contractor that provides service to United Airlines



# The Worst Airline

Frontier had the worst average delay

United is not the worst



# The Hypothesis Testing 3

- Null:  
Frontier has the same delay as others
- Alternative:  
Frontier has longer delay
- Two Sample, One-tailed T-Test  
Alpha = 0.05



# The Hypothesis Testing 3 (cont)

- Frontier > SkyWest
  - $p < 0.003$ , reject
- Frontier > American
  - $p < 0.003$ , reject
- Frontier > JetBlue
  - $p < 0.003$ , reject
- Frontier > United
  - $p > 0.003$ , reject

Frontier is statistically the worst





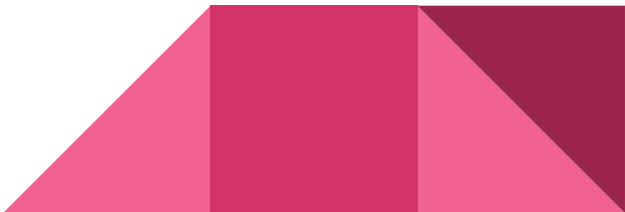
# Conclusion

# The Final Words

## Airports

- SFO is one of the worst major airports
- Weather condition is a big factor
- Consider flying at Oakland or San Jose

## Airline

- United is not the worst; cancellation and delay are more noticeable due to the volume of flights
  - Alaska is a good alternative [#NotSponsored](#)
  - You should probably not fly with Frontier (ever)
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The background is a solid pink color. In the top right corner, there is a decorative pattern of overlapping geometric shapes: a light pink triangle, a dark pink square, and a medium pink triangle, all arranged in a way that creates a sense of depth and modern design.

Thank you