

A photograph of a United Airlines Boeing 777-300ER aircraft on a tarmac at Newark Airport. The aircraft is white with blue and gold livery, featuring the United logo on the tail and fuselage. It is positioned in the foreground, angled slightly to the left. In the background, several other United Airlines aircraft are visible, along with airport ground service equipment and the New York City skyline, including the Empire State Building, under a hazy sky. A small horizontal bar with green and orange segments is located above the text.

# Flight Delays at Newark Airport

# Newark is the worst airport in the US for delayed flights

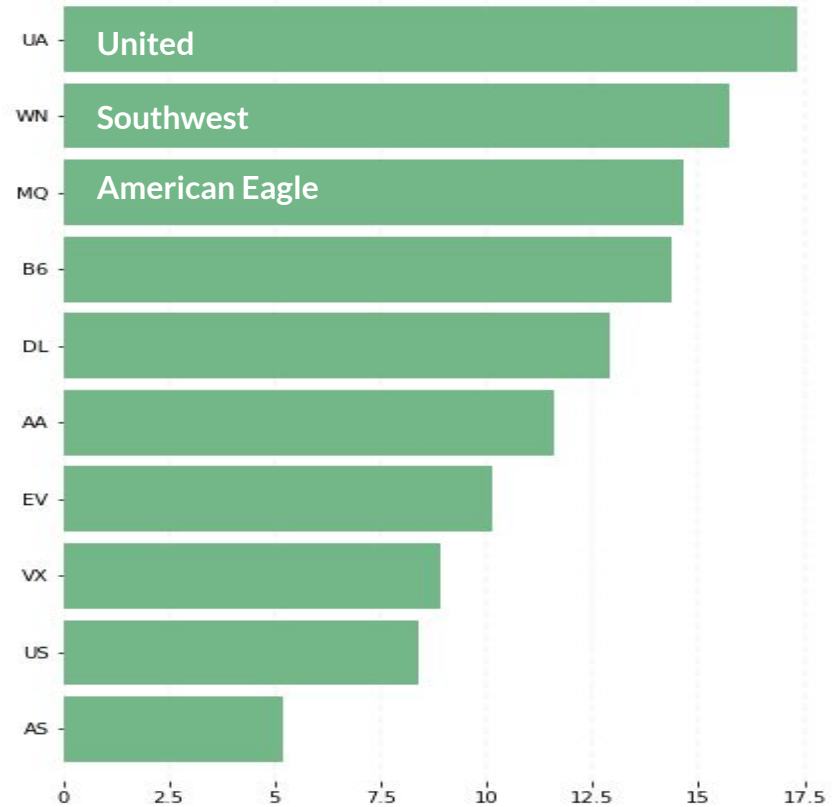
By Jacob Passy, Marketwatch

September 5, 2019 | 3:14pm | Updated





- 01 | Biggest operator in Newark (64% market share)
- 02 | Newark is United's third largest hub
- 03 | United has the worst on-time performance in Newark



Average flight arrival delay (in minutes) at Newark

MONEY TALKS

# United's public image can't get any lower—but will it actually lose customers?

March 14, 2018



By **Rosie Spinks**  
Quartzly Reporter



**Randi Mayem Singer** ✓  
@rmayemsinger



I will never fly @united as long as I live.

♡ 181 3:54 AM · Mar 14, 2018



💬 60 people are talking about this



**Olivia Munn** ✓  
@oliviamunn



I really hate @United Airlines. 🐶❤

♡ 2,790 3:43 AM · Mar 14, 2018



💬 439 people are talking about this



**Mollie Brown** ✓  
@\_MollieB



Absolutely heartbreaking. No words 🙏🙏🙏💔💔💔  
#boycottunited

On my way, I saw a Frenchie that looked identical to my own precious Winston. He was with his family - a young girl, no older than 8, her toddler sibling and their mother. He was meant to grow, learn, cry, play with those young children and be their furry friend. He was meant to live a long life filling that family's days with that special joy that only a dog can bring.

I sat behind the family of three and thought myself lucky - who doesn't when they get to sit near a puppy? However, the flight attendants of flight UA1284 felt that the innocent animal was better off crammed inside the overhead container without air and water. They INSISTED that the puppy be locked up for three hours without any kind of airflow. They assured the safety of the family's pet so wearily, the mother agreed.

There was no sound as we landed and opened his kennel. There was no movement as his family called his name. I held her baby as the mother attempted to resuscitate their 10 month old puppy. I cried with them three minutes later as she sobbed over his lifeless body. My heart broke with



♡ 47 8:35 PM · Mar 13, 2018



💬 26 people are talking about this







# How can good delay forecasting save cost?



01

## Cost to public image

Customers loyalty and impact on pricing strategy

## Cost of Compensation

Customers need to be compensated and government will impose penalties



02



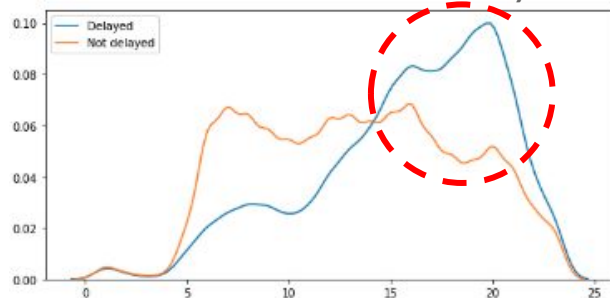
03

## Cost of Operation

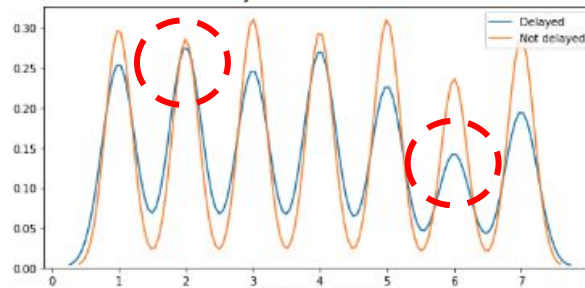
Delays require crew and aircraft to be retained at airports longer than budgeted

# What are the main delay predictors?

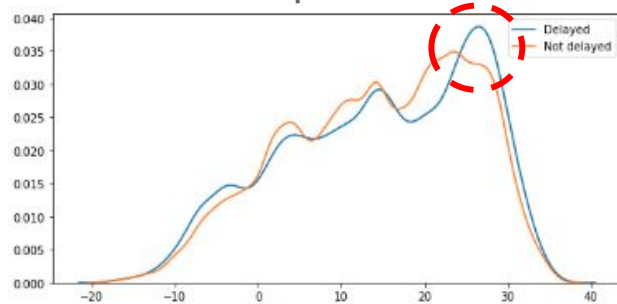
Scheduled time of day



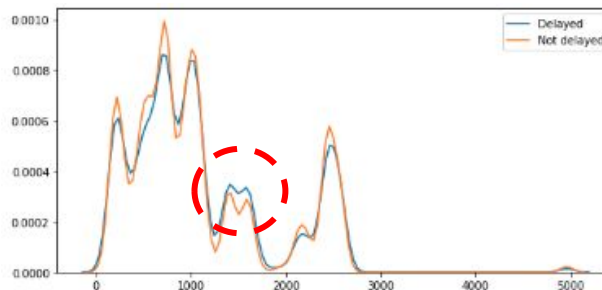
Day of the week



Temperature



Distance



	Feature	Weight
1	SCHEDULED_HOUR	0.369
2	DAY_OF_WEEK	0.136
3	DISTANCE	0.127
4	temperature	0.119
5	windSpeed	0.105
6	planeAge	0.078
7	DEPARTURE	0.018
8	weather_rain	0.016
9	United	0.012
10	weather_cloudy	0.01
11	weather_fog	0.006
12	weather_snow	0.003
13	weather_sleet	0.001



# Recommendation for anticipating delays



01

## More stand-by flights in the evening

Significantly higher chance of delays between 3pm and 9pm

## Staff readiness on Tue

Frontline staff to anticipate customer dissatisfaction to project a good image



02



03

## Weather shocks

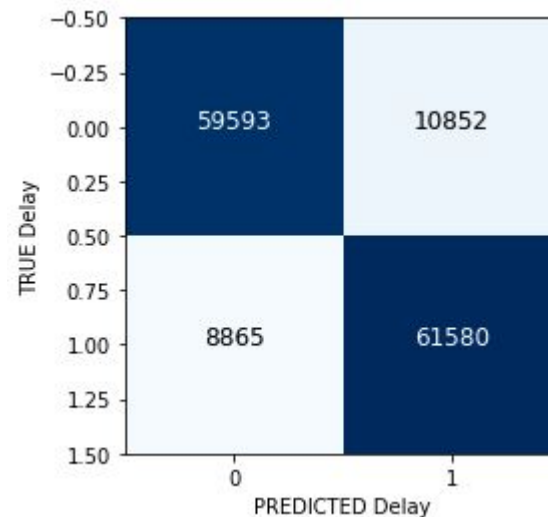
Advanced warning allows preparation for congestion at airports

# Flight prediction model

	Measures	Hyperparams	AUC train	AUC val
0	Baseline: Logistic reg	{C:1, penalty:l1, solver:saga}	0.6721	0.6739
1	Decision Tree	{max_depth:35, min_samples_leaf:13}	0.9355	0.8464
2	Random Forest	{max_depth:45, n_estimators:300}	0.9412	0.8775
3	AdaBoost	{learning_rate:1, n_estimators:300}	0.8374	0.8504
4	Gradient Boost	default	0.8564	0.8634

FalsePos=15.4%, FalseNeg=12.58%  
 TruePos=87.42%, TrueNeg=87.05%  
 Accuracy=86.01%, Precision=85.02%  
 Flscore=86.2%

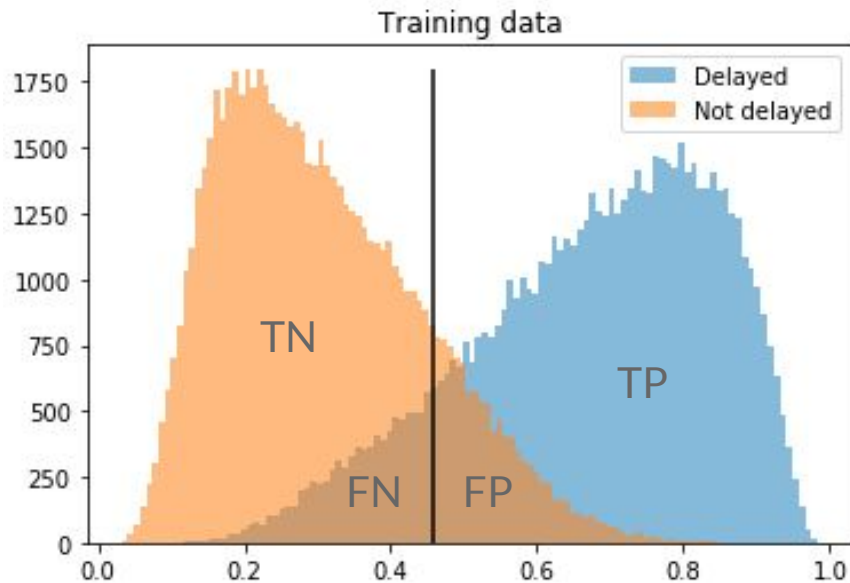
Random Forest (Training)



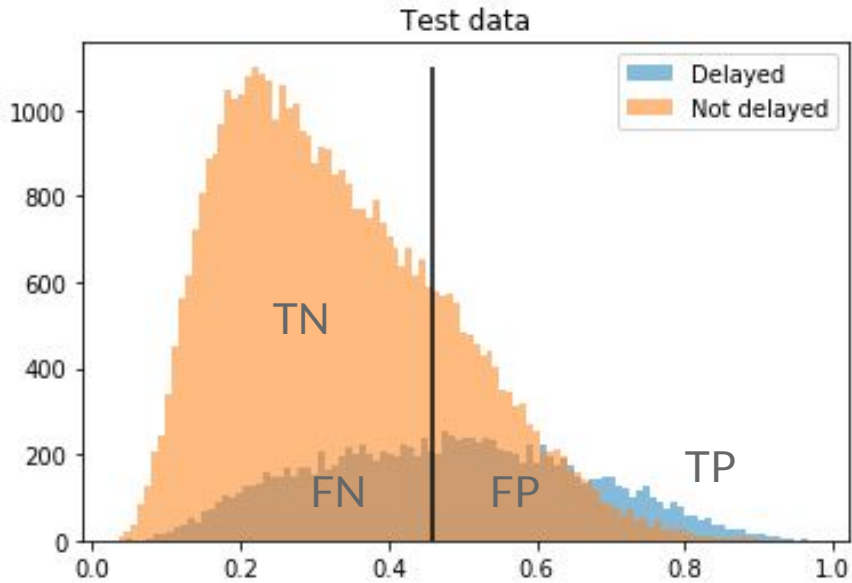




# Flight delay prediction model



Data balanced using SMOTE



Imbalanced original data



A photograph of a United Airlines Boeing 777-300ER on a tarmac. The aircraft is white with blue and gold livery, featuring the word "UNITED" in blue on the fuselage and the globe logo on the tail. It is parked on a wet surface, and other United aircraft are visible in the background. The New York City skyline, including the Empire State Building, is visible in the distance under a hazy sky. A small orange and green horizontal bar is positioned above the "Q&A" text.

# Q&A