


Predicting NJ Transit Train Delays During the COVID-19 Pandemic

Presenter: Jiamin Tan, Project Partner: Jiaxuan Lyu

NEWS > LOCAL NEWS > MANHATTAN

Service resumes at Penn Station after extensive delays on NJ Transit, Amtrak



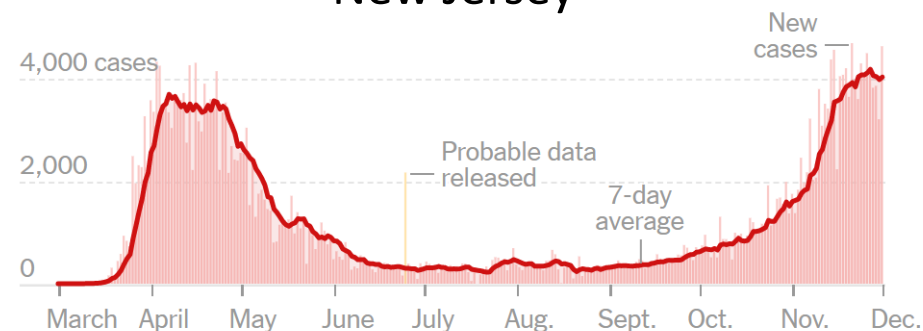
Commuters face massive delays at Penn Station on Feb. 3, 2020.

By: [Natasha D. Smith](#)

<https://www.pix11.com/news/local-news/manhattan/nearly-3-hour-delays-massive-crowds-continue-at-penn-station>

By The New York Times Updated December 2, 2020, 3:46 P.M. E.T.

New Jersey



	TOTAL REPORTED	ON DEC. 1	14-DAY CHANGE
Cases	348,042	4,606	+12% →
Deaths	17,145	90	+68% ↗
Hospitalized		3,129	+45% →

<https://www.nytimes.com/interactive/2020/us/new-jersey-coronavirus-cases.html>

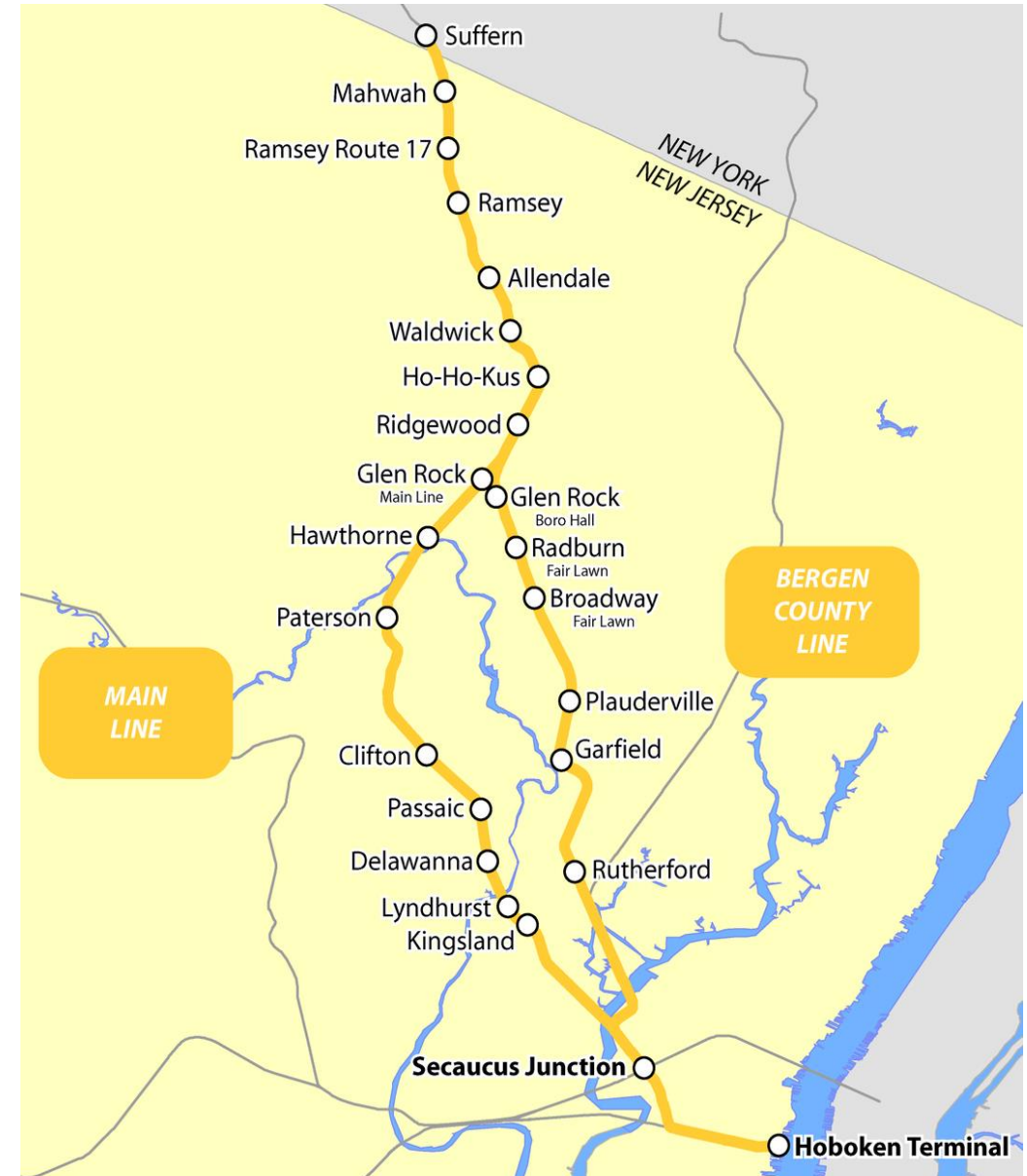
Main-Bergen County Line



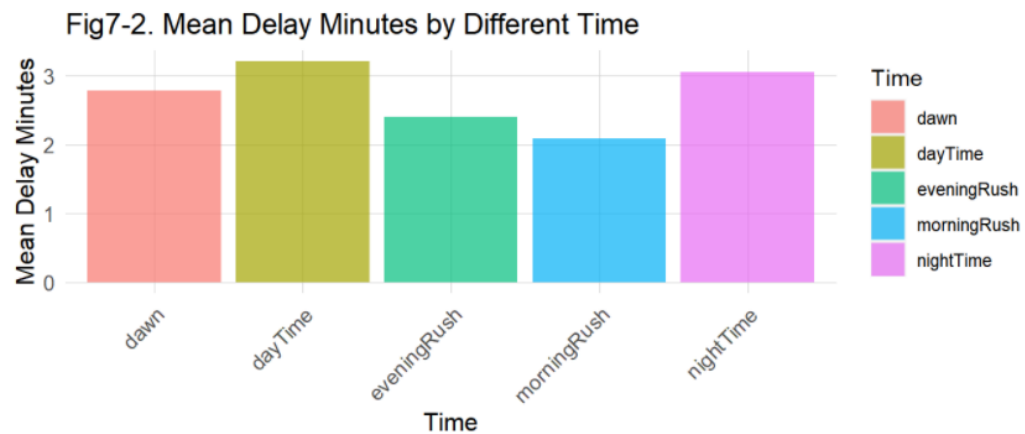
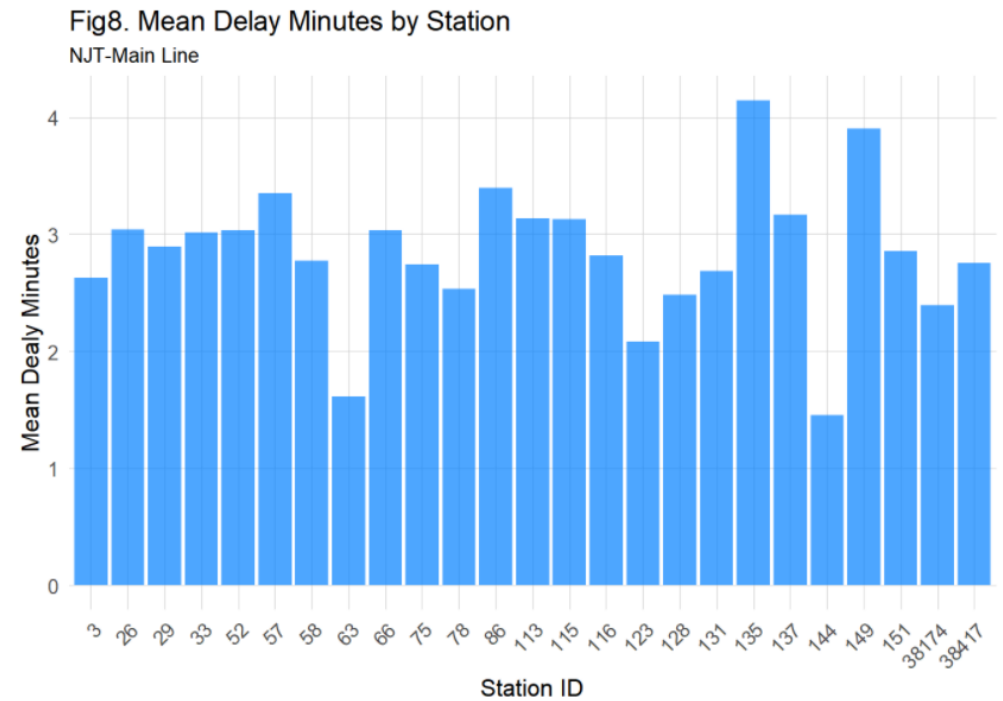
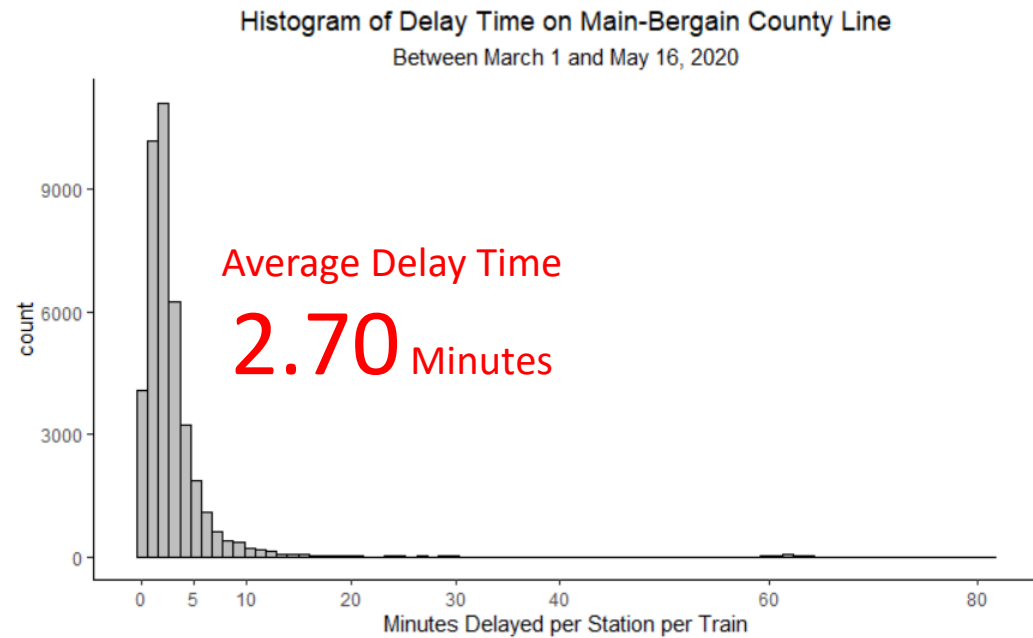
NJ COVID-19 Cases by Counties, Dec 1, 2020

Location	Total cases	New cases (1 day*)	New cases (last 60 days)	Cases per 1M ↓ people	Deaths
New Jersey	343,739	4,606		38,968	17,083
➔ Passaic County	30,720	396		61,194	1,320
Union County	28,926	319		53,617	1,437
➔ Hudson County	32,192	342		50,204	1,582
Essex County	36,021	430		45,879	2,238
➔ Bergen County	35,577	456		39,053	2,139

<https://news.google.com/covid19/map?hl=en-US&mid=%2Fm%2F05fjf&gl=US&ceid=US%3Aen>



<https://commons.wikimedia.org/wiki/File:MainBergenCoLineNJTMap.png>



**DOES
IT EVEN
MATTER ???**

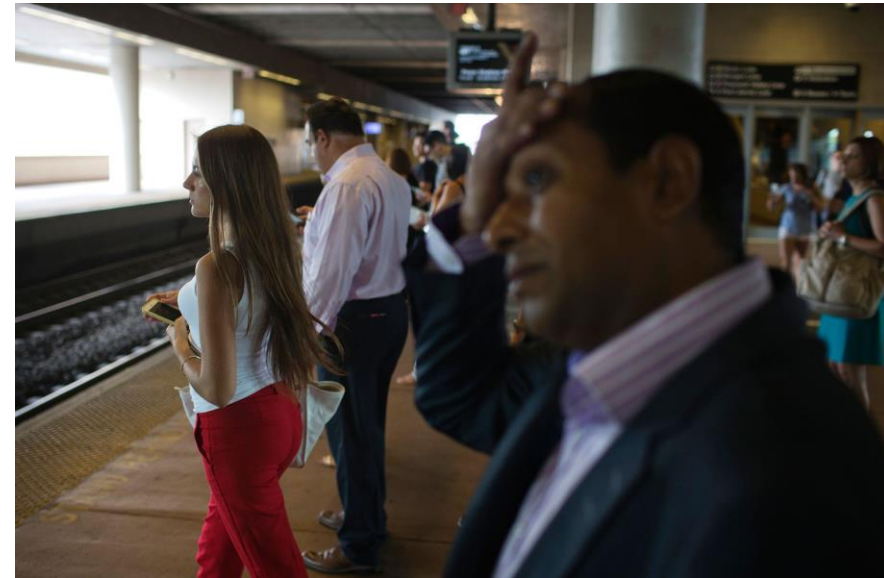
For All Stations

Will you show up on a platform LATER than planned *if you knew there would be...*

a 60-min delay?

a 10-min delay?

a 3-min delay?

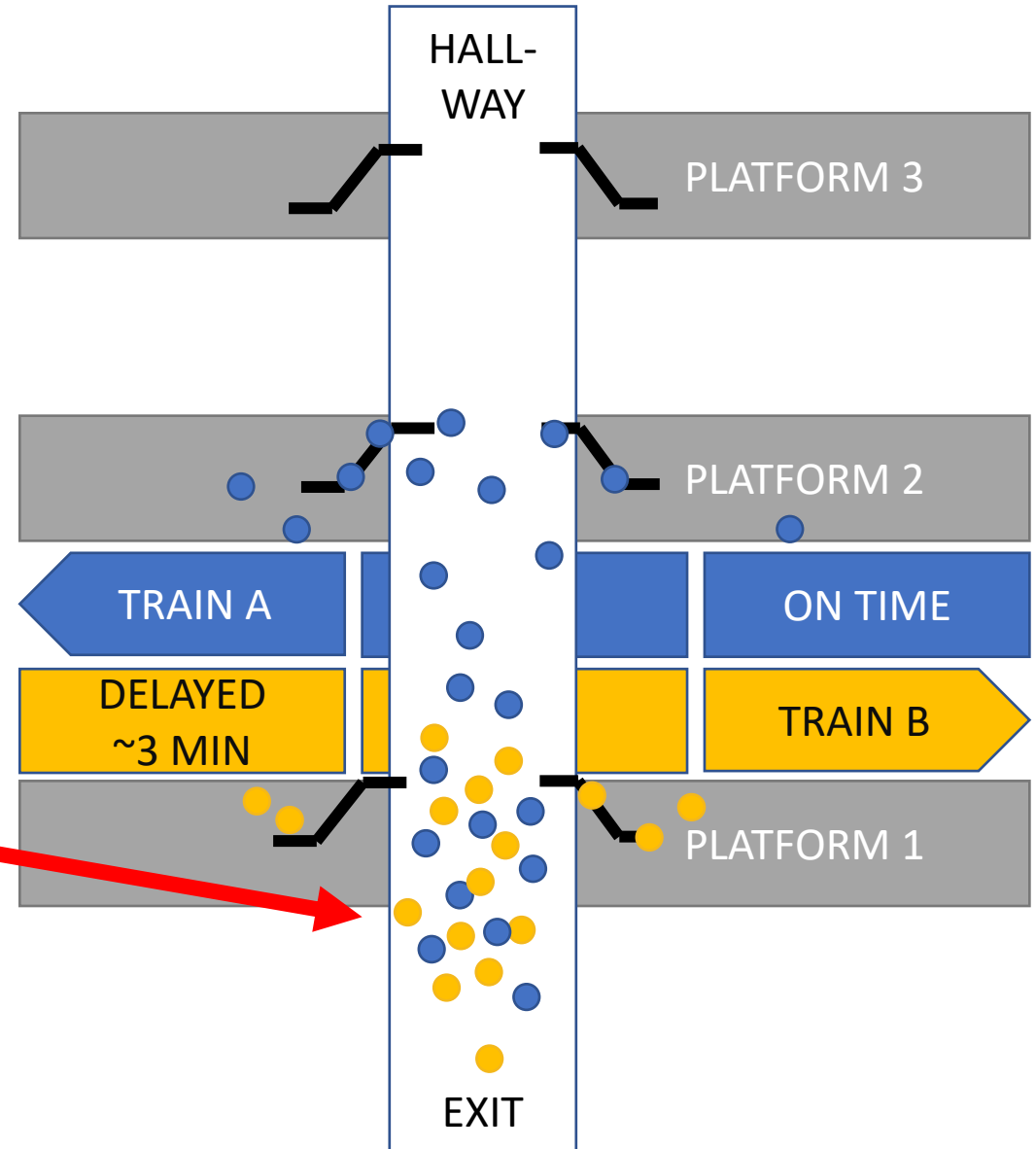


For Large Stations



A train enters *Secaucus Junction*
every **4 minutes** on average.

**NO SOCIAL
DISTANCING
HERE!**



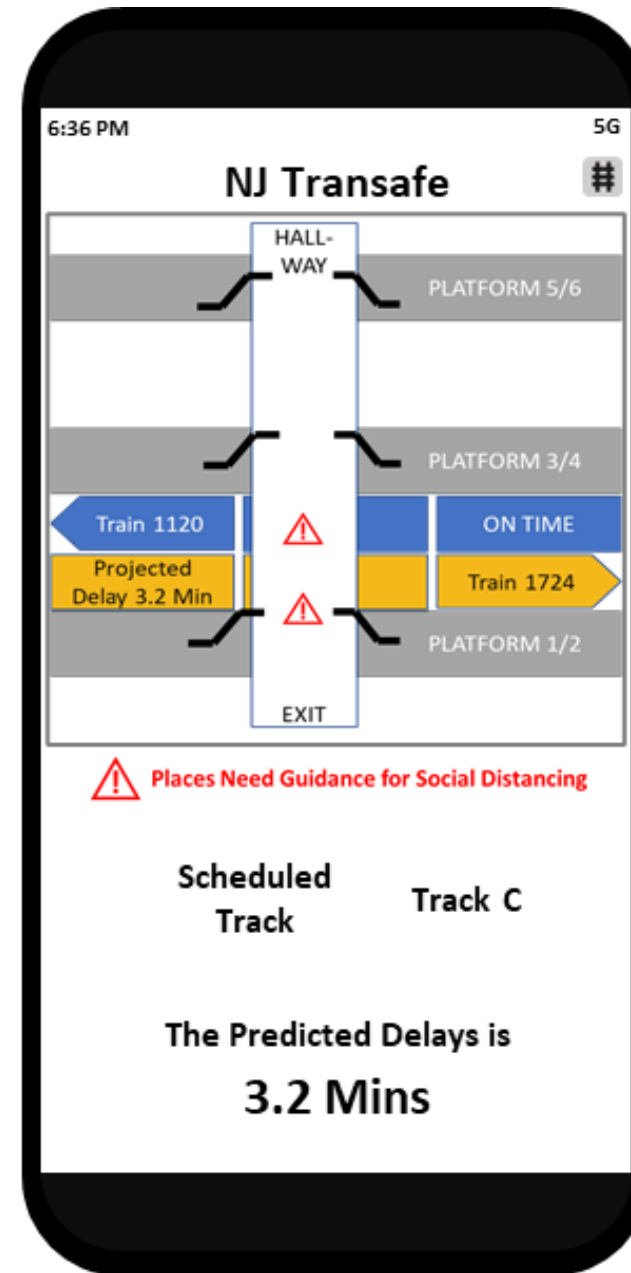
NJ Transafe

For Station Management Staffs of NJ Transit



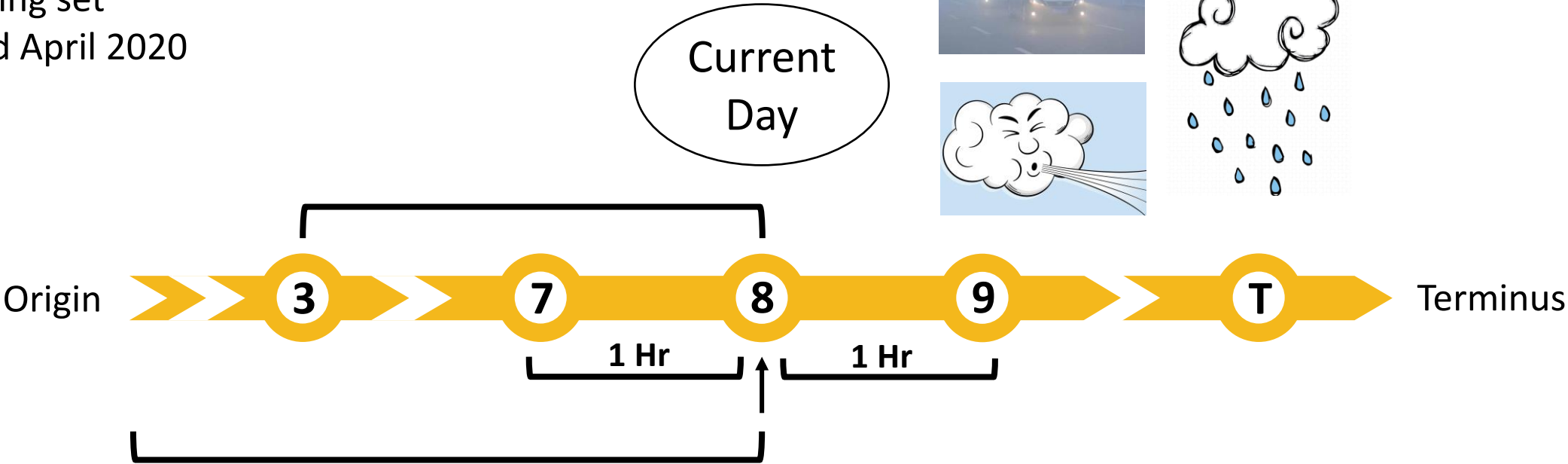
NJ Transafe

For Station Management Staffs of NJ Transit



OLS Model

Training set
March and April 2020



train_id	date	from	to	cd_delay_minutes			
1725	3/8/2020	Secaucus L	Kingsland	3.13333333			
train_id	date	from	to	sd_date	sd_delay_minutes	sd_act_timeDiff	sd_preDelay
1725	3/8/2020	Kingsland	Lyndhurst	3/1/2020	3.1	0.116666667	2.233333333
1725	3/8/2020	Lyndhurst	Delawanna Passaic	3/1/2020	2.15	0.033333333	3.116666667
1725	3/8/2020	Delawanna Passaic	Clifton	3/1/2020	3.05	0.066666667	2.116666667
1725	3/8/2020	Clifton	Paterson	3/1/2020	4.416666667	0.066666667	2.733333333
1725	3/8/2020	Paterson	Lawthorne Glen	3/1/2020	4.083333333	0.05	3.116666667
1725	3/8/2020	Lawthorne Glen	Glen Rock	3/1/2020	4.15	0.116666667	2.716666667
1725	3/8/2020	Glen Rock	Ridgewood	3/1/2020	5.1	0.083333333	0
1725	3/8/2020	Ridgewood	Waldwick	3/1/2020	5.166666667	0.066666667	4.75
1725	3/8/2020	Waldwick	Allendale	3/1/2020	5.166666667	0.066666667	4.233333333
1725	3/8/2020	Allendale	Ramsey	3/1/2020	5.033333333	0.116666667	4.35
1725	3/8/2020	Ramsey	Midland	3/1/2020	3.166666667	0.033333333	4.083333333
1725	3/8/2020	Midland	Ramsey	3/1/2020	3.416666667	0.083333333	3.366666667
1725	3/8/2020	Ramsey	Mahwah	3/1/2020	3.566666667	0.05	3.05
1715	3/8/2020	Mahwah	Secaucus L	3/1/2020	5.183333333	0.083333333	3.066666667
1715	3/8/2020	Secaucus L	Kingsland	3/1/2020	2	0.033333333	4.183333333
1715	3/8/2020	Kingsland	Lyndhurst	3/1/2020	2.05	0.116666667	0
1715	3/8/2020	Lyndhurst	Delawanna	3/1/2020	0.35	0.016666667	0
1715	3/8/2020	Delawanna	Passaic	3/1/2020	2.1	0.066666667	0
				3/1/2020	1.066666667	0.033333333	0

Weather pics sources: <https://www.highlightskids.com/explore/science-questions/where-does-wind-come-from>
<https://pngio.com/PNG/a80660-rain-cartoon-png.html>
http://www.chinadaily.com.cn/ethnic/photo/2013-11/27/content_17133596_2.htm

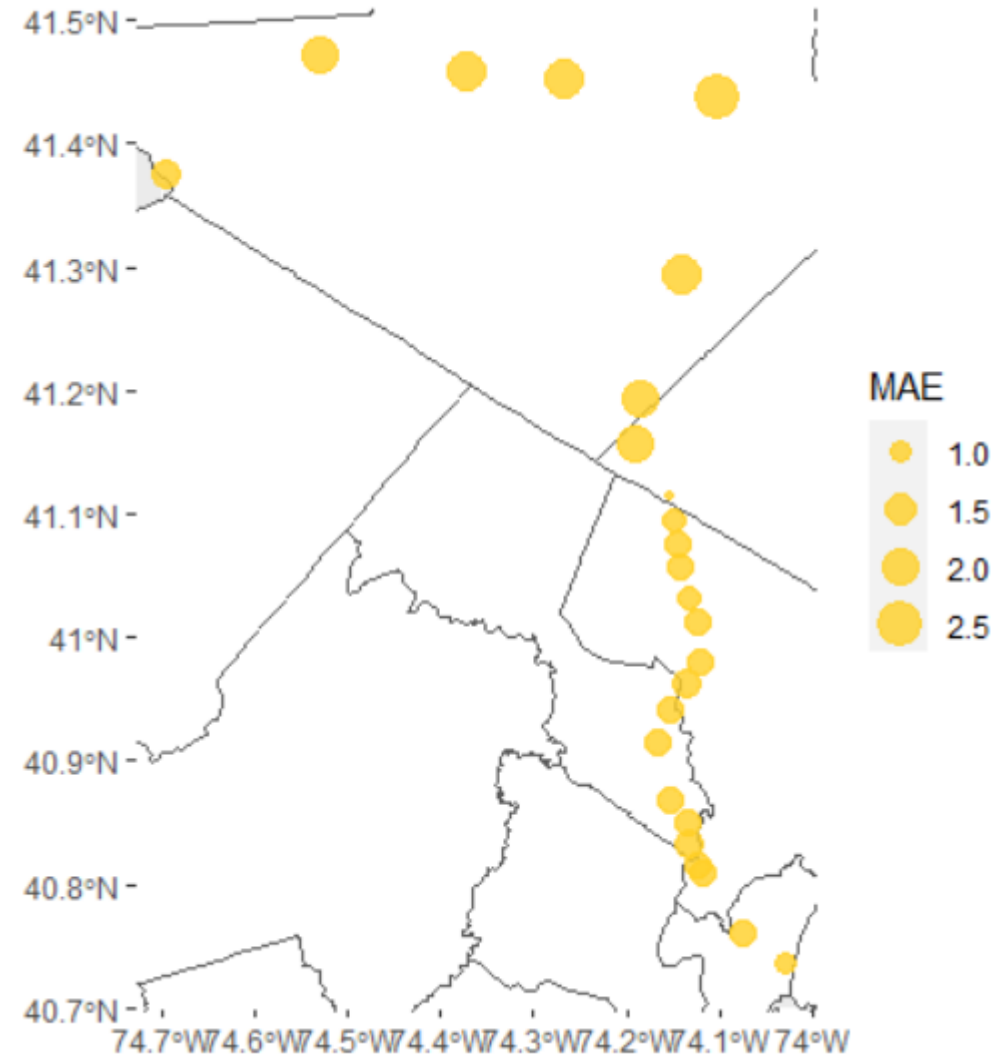
OLS Model

Test set
May 2020

Overall
Mean Absolute Error (MAE)

1.26 Minutes

59% of all are OVER PREDICTED



For ALL Stations

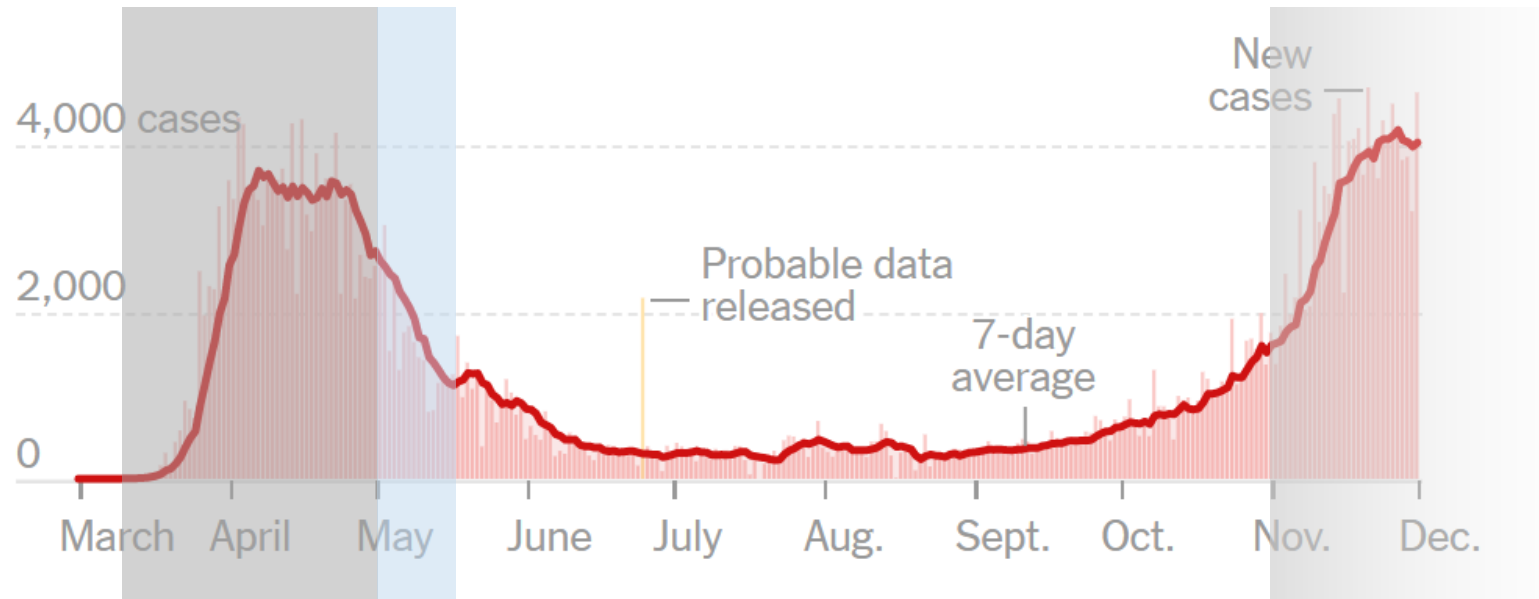
Actual Delay (Mins)	MAE (Mins)
0 – 2	1.00
2 – 5	0.81
5 – 10	2.47
10 – 20	6.70
Over 20	25.15

Secaucus Junction

Actual Delay (Mins)	MAE (Mins)
0 – 2	1.02
2 – 5	0.99
5 – 10	2.67
10 – 20	6.12
Over 20	25.45

New Jersey COVID-19 Confirmed Cases by Each Day

By The New York Times Updated December 2, 2020, 3:46 P.M. E.T.



Training Data
March 8 – April 30, 2020

Test Data
May 1 – May 16, 2020

Now
And
Future