

MTA Turnstile Analysis



An exploratory data analysis done for WTWY International
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Objectives and Motivation

The motivation behind this EDA was to assist WTWY International and their survey teams, so that they can increase turnout for their annual gala and increase their potential donor base.

The objectives of this analysis were to:

1. Determine the subway station with the most foot traffic over the summer months using the most current data
2. Investigate whether the time of day and day of the week would influence ridership
3. Deliver a location, day of the week, and time of day that WTWY International should send their survey teams to maximize visibility



Datasets, Tools and Methods

-NYC turnstile data was provided by the MTA website:

<http://web.mta.info/developers/turnstile.html>

-Data was filtered, cleaned, aggregated, and visualized through a combination of resources including:





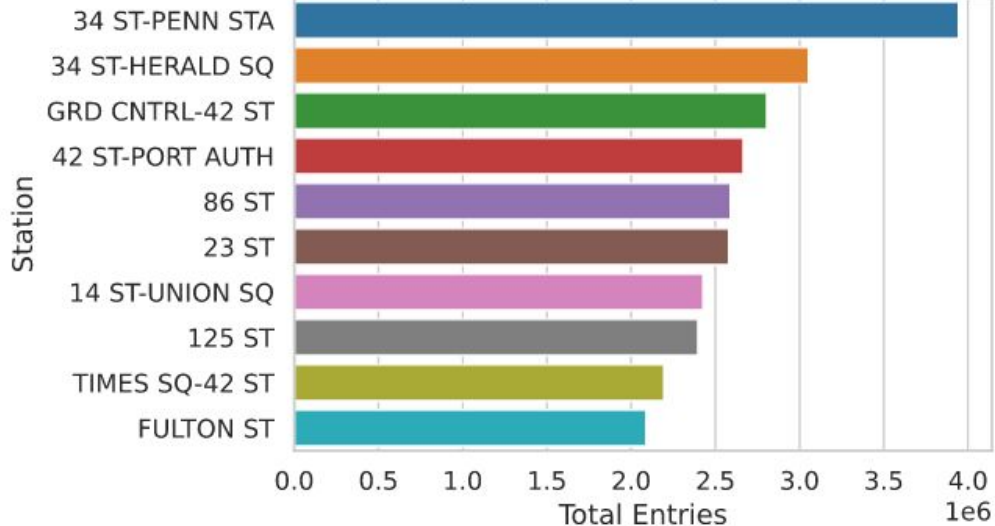
Datasets, Tools and Methods

Key assumptions:

- A single turnstile would not see more traffic than 1 person per second in any 24 hour period
- No duplicate entries were used, with rows labelled as recovery entries being eliminated in that situation
- Subway users jumping the turnstile (thus not being counted in our data) would not factor into which station sees the most traffic

Key Results

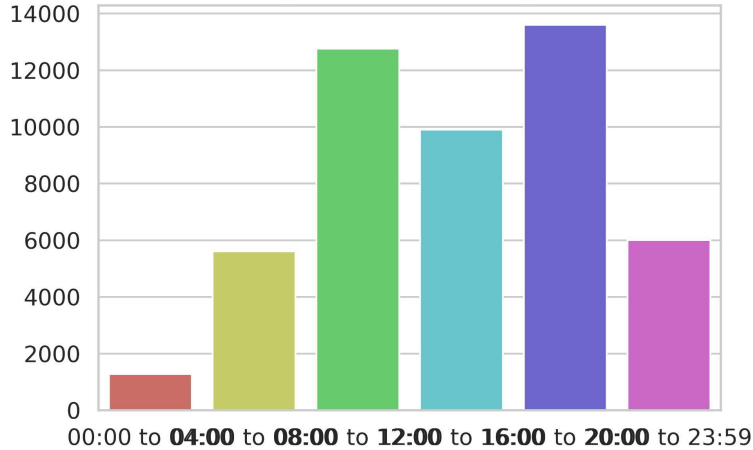
Busiest New York Subway Stations for Summer 2021



Key Results

Mean # of Entries

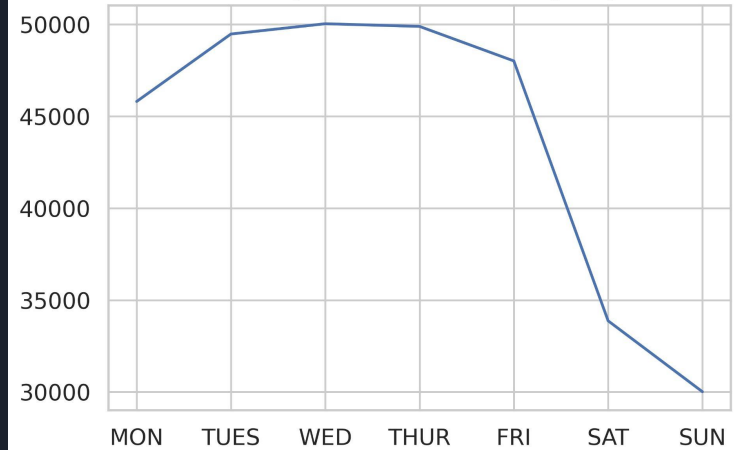
Wednesday at Penn ST Subway Turnstiles



Time of Day

Mean # of Entries

Weekly Traffic at Penn ST by Day



Day of Week



Possible Further Analysis

- Foot traffic as a function of square footage of station
- Including riders of other transportation (Amtrak, busses , etc.) in traffic considerations





Photo Acknowledgements

<https://www.amtrak.com/stations/nyp>

<http://web.mta.info/lirr/AlternateRoute/PennStation.htm>

https://en.wikipedia.org/wiki/New_York_City_Subway_map

Historical MTA Rider Data

Annual Subway Ridership											
Station (alphabetical by borough)	*	Boro	2015	2016	2017	2018	2019	2020	2019-2020 Change	2020 Rank	
Times Sq-42 St (N,Q,R,W,S,1,2,3,7)/42 St (A,C,E)		M	66,359,208	64,531,511	64,815,739	65,060,656	65,020,294	20,341,240	-44,679,054	-68.7%	1
Grand Central-42 St (S,4,5,6,7)		M	46,737,564	46,121,509	44,928,488	45,207,849	45,745,700	13,162,826	-32,582,874	-71.2%	2
34 St-Herald Sq (B,D,F,M,N,Q,R,W)		M	39,541,865	39,000,352	39,672,507	39,111,312	39,385,436	12,826,841	-26,558,595	-67.4%	3
14 St-Union Sq (L,N,Q,R,W,4,5,6)		M	35,320,623	34,289,822	34,557,551	33,124,407	32,385,260	10,830,712	-21,554,548	-66.6%	4
Fulton St (A,C,J,Z,2,3,4,5)		M	21,671,684	25,162,937	26,838,473	27,719,115	27,715,365	8,855,302	-18,860,063	-68.0%	5
34 St-Penn Station (1,2,3)		M	28,309,160	27,741,367	26,034,238	25,968,950	25,967,676	8,103,809	-17,863,867	-68.8%	6
34 St-Penn Station (A,C,E)		M	26,147,434	25,183,869	24,366,500	24,857,456	25,631,364	8,010,472	-17,620,892	-68.7%	7
59 St-Columbus Circle (A,B,C,D,1)		M	23,299,666	23,203,443	22,929,203	22,991,014	23,040,650	7,618,925	-15,421,725	-66.9%	8
74-Broadway (7)/Jackson Hts-Roosevelt Av (E,F,M)		Q	17,224,537	17,301,839	17,095,073	16,994,358	17,077,862	7,523,538	-9,554,324	-55.9%	9
Flushing-Main St (7)		Q	19,082,391	19,257,879	18,746,832	17,799,862	17,568,837	6,944,923	-10,623,914	-60.5%	10
Lexington Av (N,R,W)/59 St (4,5,6)		M	21,407,792	21,000,635	17,888,188	16,955,204	16,760,813	6,273,480	-10,487,333	-62.6%	11
Chambers St (A,C)/WTC (E)/Park Pl (2,3)/Courtlandt St (6)		M	19,623,616	20,349,660	20,927,141	21,636,146	20,820,549	5,930,847	-14,889,702	-71.5%	12
47-50 Sts-Rockefeller Center (B,D,F,M)		M	18,469,446	18,086,203	17,471,620	17,289,384	18,604,810	5,826,100	-12,778,710	-68.7%	13
Lexington Av-53 St (E,M)/51 St (6)		M	20,479,923	19,929,405	18,940,774	18,585,755	18,957,465	5,718,725	-13,238,740	-69.8%	14
Atlantic Av-Barclays Ctr (B,D,N,Q,R,2,3,4,5)	13	B	13,690,678	13,818,168	13,571,093	13,807,282	13,939,794	5,474,265	-8,465,529	-60.7%	15
42 St-Bryant Pk (B,D,F,M)/5 Av (7)		M	16,220,605	16,934,142	16,594,289	16,056,128	17,213,702	5,405,394	-11,808,308	-68.6%	16
86 St (4,5,6)		M	20,890,828	20,337,593	14,277,369	13,486,510	13,537,308	5,155,496	-8,381,812	-61.9%	17
14 St (F,M,1,2,3)/6 Av (L)		M	16,121,318	16,118,952	15,187,056	15,002,214	14,736,035	5,057,029	-9,679,006	-65.7%	18
Canal St (J,N,Q,R,W,Z,6)		M	15,094,135	15,274,896	16,285,516	15,995,877	15,861,864	4,881,373	-10,980,491	-69.2%	19
West 4 St-Washington Sq (A,B,C,D,E,F,M)		M	14,147,148	13,955,067	13,849,130	13,446,383	14,063,633	4,503,429	-9,560,204	-68.0%	20
72 St (1,2,3)		M	13,341,361	13,257,766	12,749,746	12,879,887	12,379,560	4,498,641	-7,880,919	-63.7%	21
14 St (A,C,E)/8 Av (L)		M	14,763,727	14,572,075	14,153,266	14,324,670	14,239,275	4,463,227	-9,776,048	-68.7%	22
96 St (1,2,3)		M	13,008,596	12,700,397	11,948,981	11,702,401	11,628,887	4,293,386	-7,335,501	-63.1%	23
Jamaica Center-Parsons-Archer (E,J,Z)		Q	12,622,977	12,470,914	11,604,228	10,681,269	10,010,419	4,284,646	-5,725,773	-57.2%	24
Broadway-Lafayette St (B,D,F,M)/Bleecker St (6)		M	12,666,868	12,405,639	11,956,465	11,414,999	12,455,155	4,062,645	-8,392,510	-67.4%	25