Optimizing Outreach for WTWY Gala

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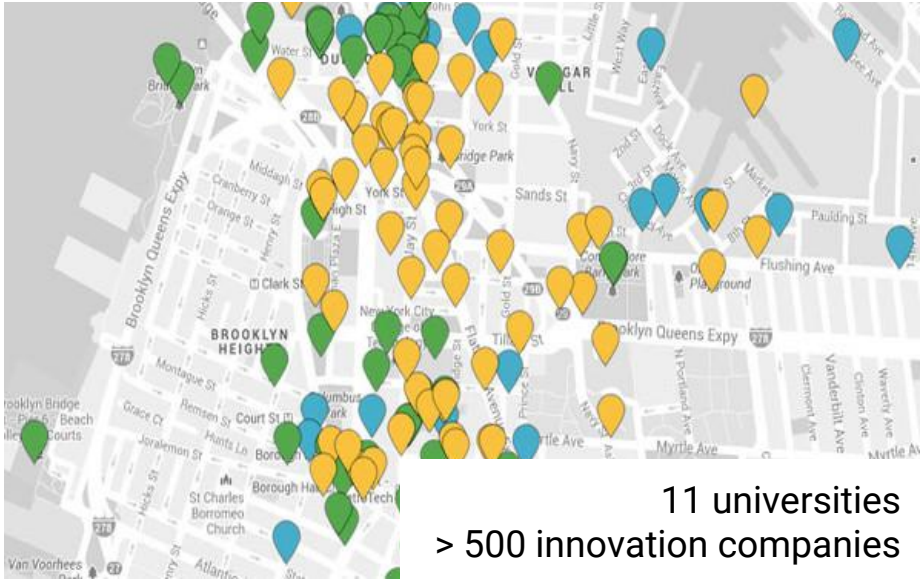
Goal

Determine best MTA subway stations to place street teams for WTWY Gala

Select stations by:

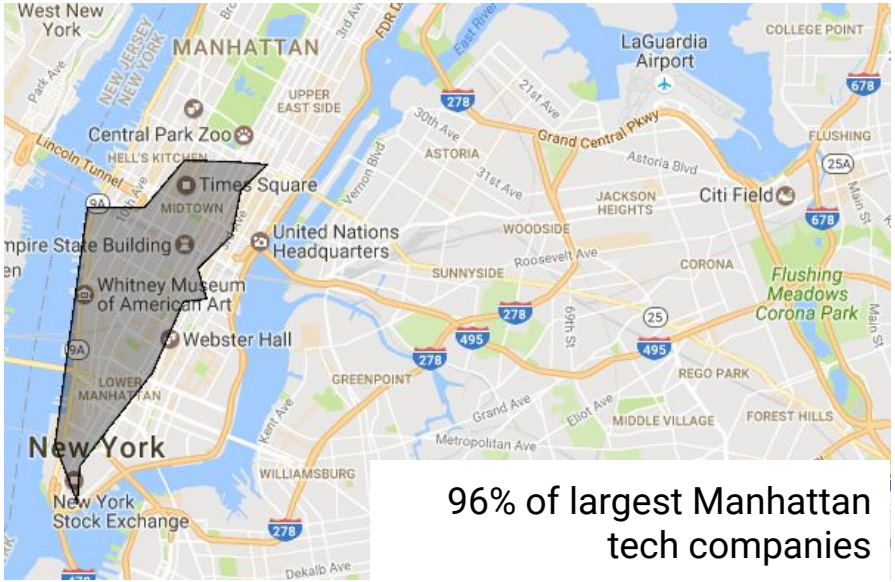
- Location: proximity to tech companies
- Commuters vs tourists: Stations with higher weekday ridership
- High traffic

Location, Location, Location



11 universities
> 500 innovation companies

https://inhabitat.com/nyc/brooklyn-tech-triangle-plan-could-re-create-silicon-valley-in-nyc/



96% of largest Manhattan tech companies

https://www.builtinnyc.com/2016/12/13/big-tech-companies-nyc-locations

Data Collection and Filtering by Location

Map coordinates of tech hub boundaries to get all coordinates within the tech hubs

Prioritise stations with coordinates inside of tech hubs

Data Collection and Filtering by Ridership

MTA turnstile data from March through June 2016-2018

- Remove night data
- Separate into weekday and weekend traffic
  - Stations with high weekday throughput
- Calculate ratio of weekday/weekend traffic to identify stations with higher % of commuters
- Prioritize high traffic stations with high weekday ridership ratios

“Score”

- A weighted value determined by :
  - Number of people using the station on weekdays
  - Proximity to NYC tech hubs
  - Percent change in station throughput between weekends and weekdays (as a measure of how tourist-y the station is)

http://oldcooperriverbridge.org/wrapper_mobile.php?oct_05_2006_singapore.html

https://www.flickr.com/photos/techhub/19889757856

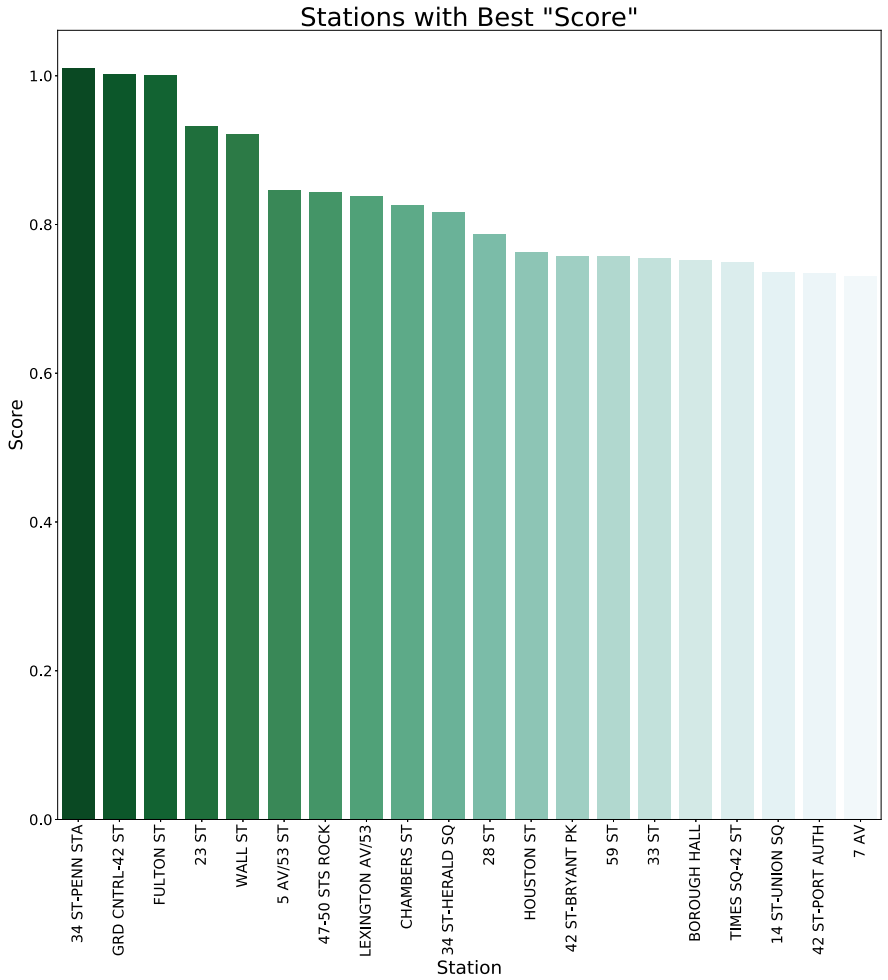
Results

Top stations :

1. 34 Street/Penn Station
2. Grand Central Station/42 Street
3. Fulton Street
4. 23 Street
5. Wall Street
6. 5 Avenue/53 Street
7. 47-50 Street Rockefeller
8. Lexington Avenue/53 Street
9. Chambers Street
10. 34 Street/Herald Square

Mean labour force participation :**78.4%**
Mean female labour force participation: **79.43%**

Means for Manhattan : 68.15%, 74.18%



Conclusions

The best stations to place volunteers are larger stations where people transfer and are in tech hot spots.

Where we recommend WTWY place their volunteers:

1. 34 Street/Penn Station
2. Grand Central Station/42 Street
3. Fulton Street
4. 23 Street
5. Wall Street

Future Work

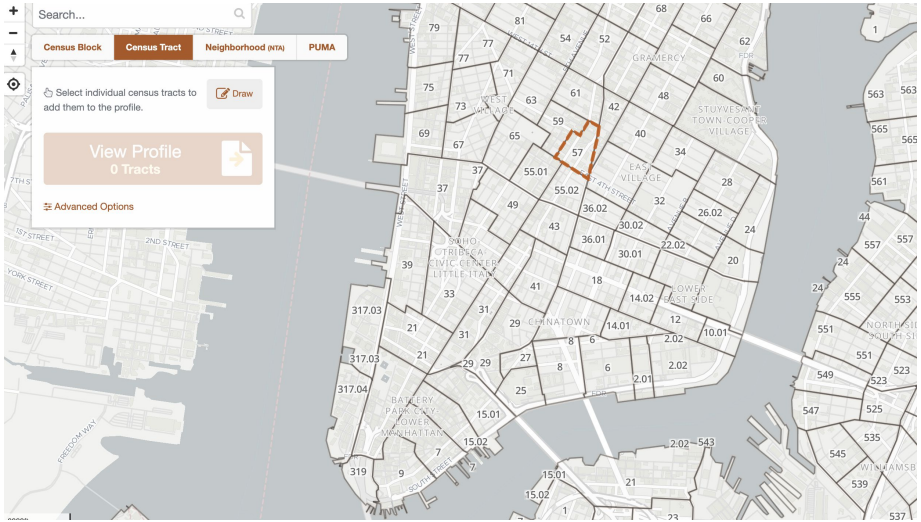
Create ‘shift’ locations at stations by time

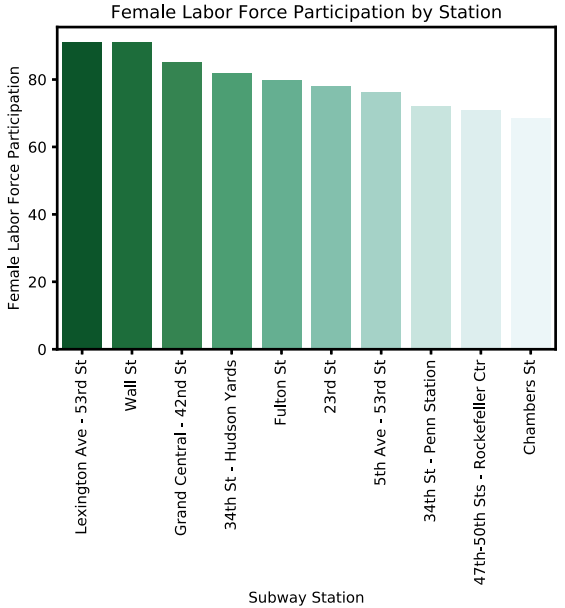
Verify commuter presence by seeing what type of card is used at different stations

Incorporating geographic and demographic information around stations

Demographic Data

Subway coordinates mapping using US Census Geocoder





THANK YOU!

Appendix

MTA Card Data

Station	Full Fare	Senior Citizen / Disabled	7 Day ADA Farecard Access System Unlimited	30 Day ADA Farecard Access System Unlimited	Joint Rail Road Ticket	7 Day Unlimited	30 Day Unlimited
WHITEHALL STREET	66303	2890	469	1067	243	30768	37958
CYPRESS HILLS	2531	178	9	35	0	2140	1190
75TH STREET & ELDERTS LAN	5953	375	45	109	0	4265	3117
85TH STREET & FOREST PKW	6784	540	51	161	0	4212	3677
WOODHAVEN BOULEVARD	6832	501	71	179	1	5896	4424
104TH STREET	6060	391	36	82	0	3988	2825
121ST STREET	4035	277	45	93	6	3127	2112
42ND STREET & 8TH AVENUE	87006	5124	476	1125	127	47302	48590

Weighted formula :

.6*percent change from weekend to weekday - .1*throughput/10,000,000
(-.3 if near the tech hub)

(golf scoring - less was better)

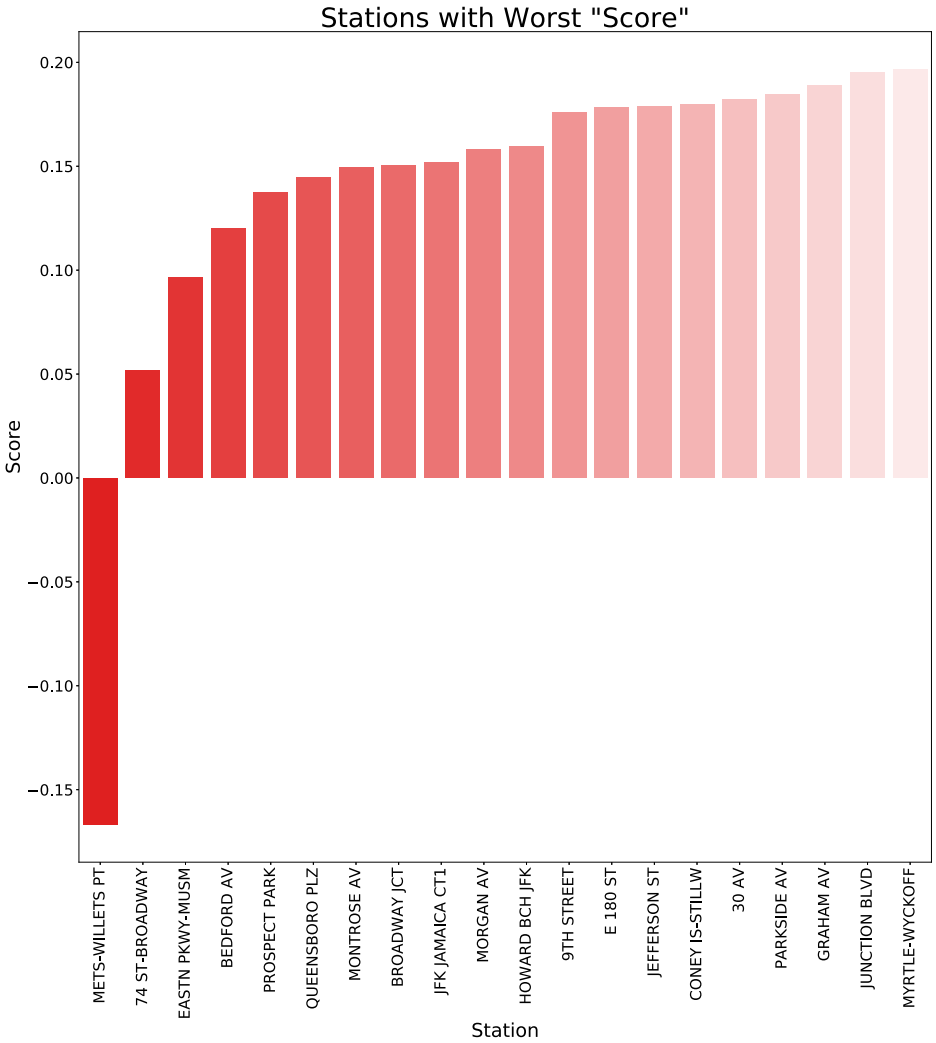
We filtered the data from 0400-1900 as 90% of our data was in four hour periods and we removed 2 data points from each of the three main timing systems.

Throughput was limited to a maximum of 720 people per 4 hours - even then, with one volunteer they would be taking 3 signatures a minute non-stop!

We included both entries and exits in order to make sure that no station was unfairly benefitting from having people mostly coming out

Proof of concept -
These were the worst stations.

(beaches/stadiums/museums/airports
 nearby, so their scores were lowered
 by their weekend/tourist activity)



	Labor Force Participation	Female Labor Force Participation	Female Unemployment Rate	Bachelor degree or higher
count	10.000000	10.000000	10.000000	10.000000
mean	78.400000	79.430000	3.330000	3077.700000
std	13.494279	7.937821	2.440423	2308.406283
min	42.700000	68.400000	0.000000	87.000000
25%	76.625000	73.075000	2.150000	677.250000
50%	82.050000	78.950000	3.600000	3636.500000
75%	85.925000	84.300000	4.450000	4708.250000
max	88.700000	91.000000	8.300000	6208.000000

On average these areas have high female labor force participation

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1 subway_demog_clean.describe()
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	Labor Force Participation	Female Labor Force Participation
count	94.000000	94.000000
mean	68.147872	74.175532
std	15.929676	14.456607
min	0.000000	0.000000
25%	64.450000	71.025000
50%	70.000000	77.550000
75%	76.950000	81.225000
max	90.800000	100.000000