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Metis, EDA Module  
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# Extremely Hot and Incredibly Crowded: heat-illness risk in New York City's busiest MTA stations

# Overview



## Motivation

NYC Department of Health wants to compile a list of MTA stations that pose the greatest health hazard to people at high-risk for heat-related illnesses



## Objectives

Determine:

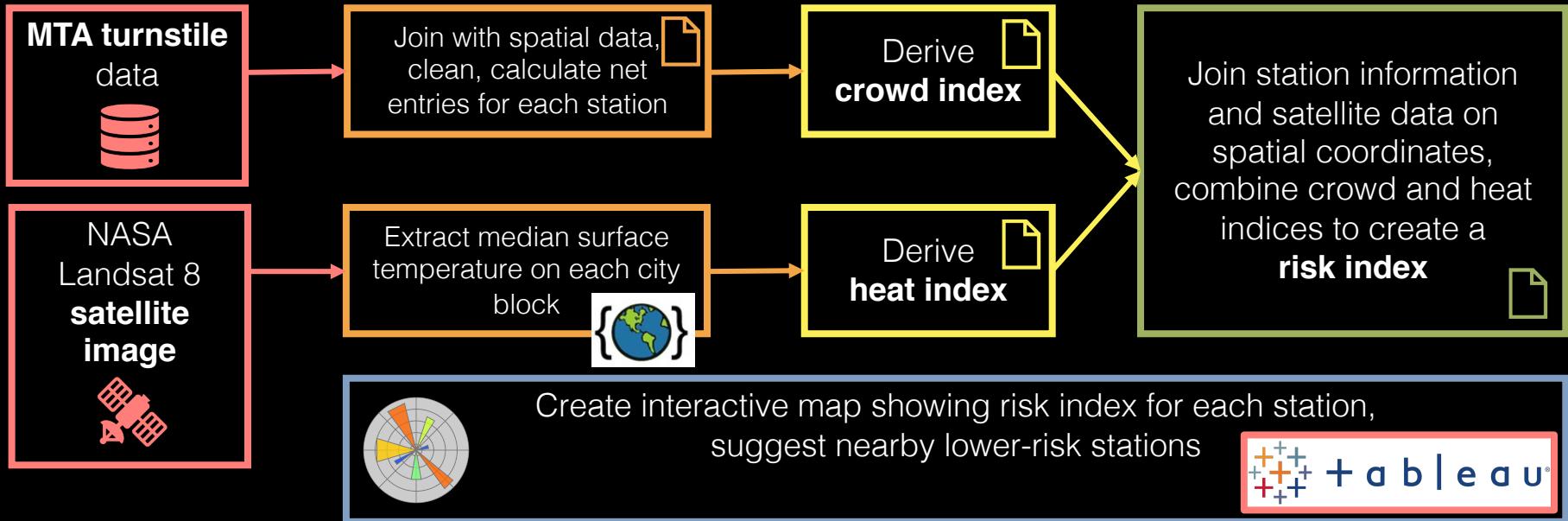
- (1) the most crowded stations,
- (2) the hottest stations,
- (3) the highest risk stations due to the **combined** impact of these factors



## Results

Interactive map to find high-risk stations and to search for nearby stations with lower risk indices

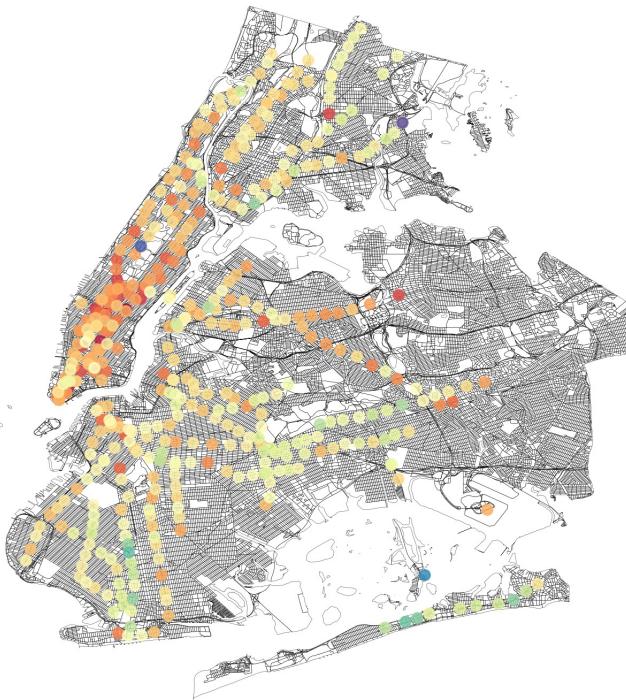
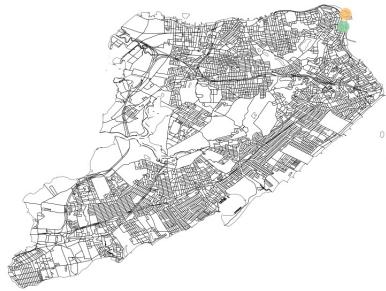
# Data & Methods



GeoPandas

## Results: Crowd Index

- Based on net entries for each station
- Scaled from 1 (fewest entries, bluer colors) to 10 (most entries, redder colors)

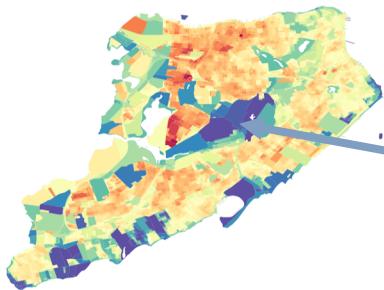


crowd index  
1

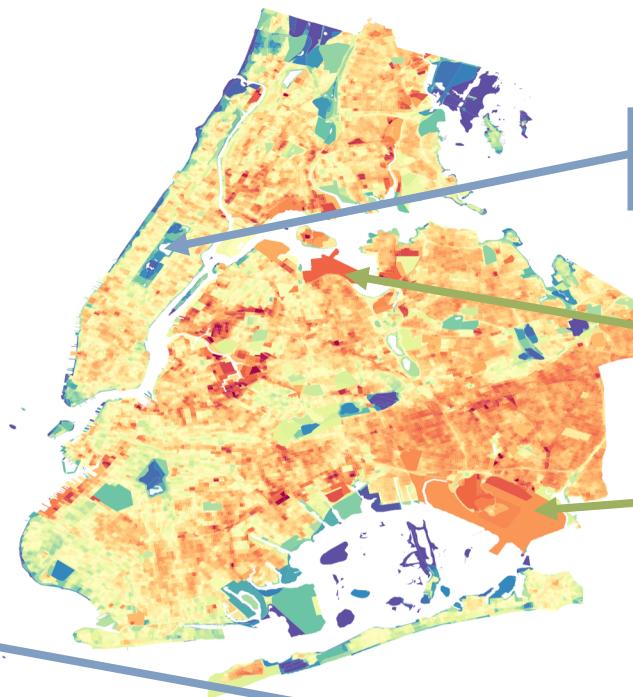
crowd index  
10

## Results: Heat Index

- Based on median surface temperature on each city block
- Scaled from 1 (lowest temperature entries, bluer colors) to 10 (highest temperature, redder colors)



heat index  
1



heat index  
10

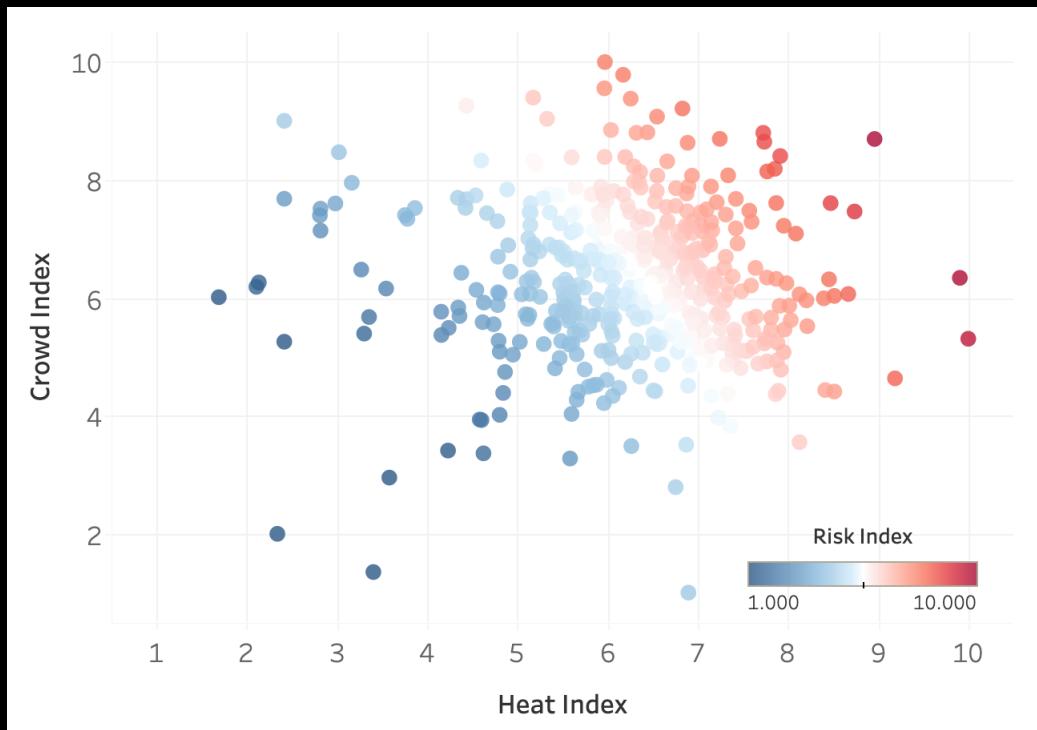
Central Park

La Guardia

JFK

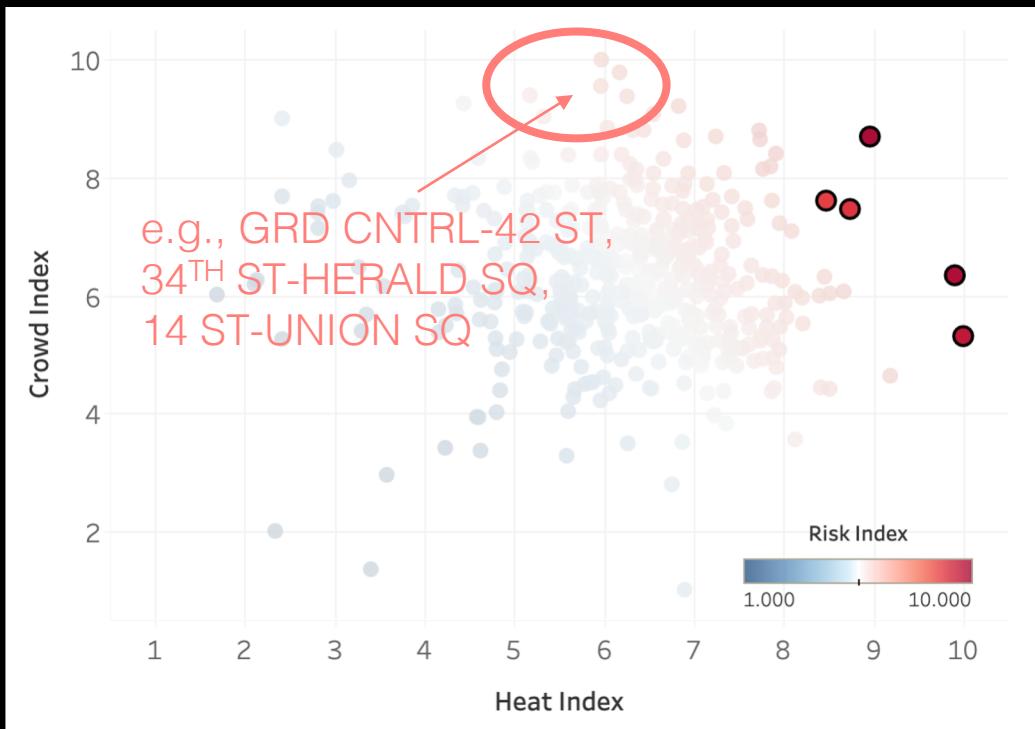
Latourette Park

# Results: Risk Index



- Risk index (RI) quantifies heat-illness risk due to combined impact of both heat (H) and crowds (C)

# Results: Risk Index



- Top 5 **risk index** stations...
  - 59 ST
  - KINGSBRIDGE RD
  - EAST 105 ST
  - JAMAICA 179 ST
  - 3 AV-149 ST
- Are both busy and in hotter parts of the city
- High crowd index and high heat index, yields high risk index

# Conclusions: Public Risk Index Station Map

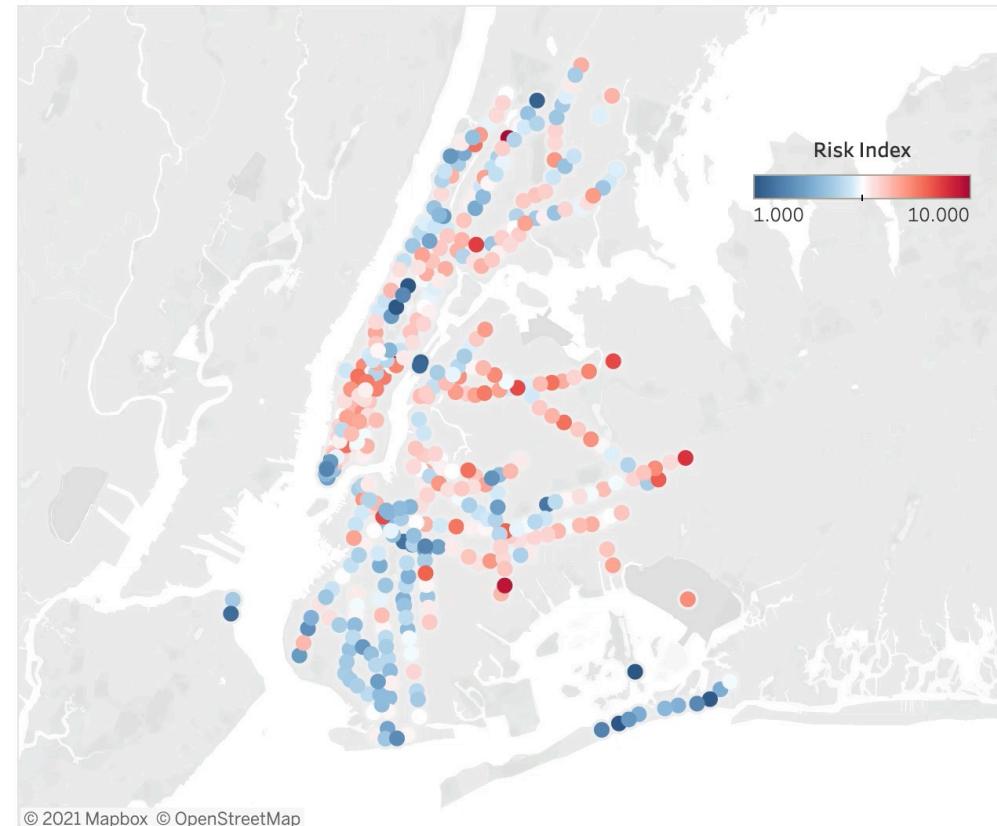
<https://bit.ly/mta-heat-eda>

SCAN WITH YOUR  
SMARTPHONE CAMERA



## Extremely Hot and Incredibly Crowded:

avoiding heat-illness in New York City's busiest MTA stations



A map of NYC's subway stations. Each station location is colored by its Risk Index, which considers heat-illness risk due to **both** high heat and large crowds.

A Risk Index of 10 (redder colors) indicates a high risk of heat-related illnesses and 1 (bluer colors) indicates a low risk.

# Conclusions: Public Risk Index Station Map

- Top 5 risk index stations: 59 ST, KINGSBRIDGE RD, EAST 105 ST, JAMAICA 179 ST, 3 AV-149 ST
- Many of these high-risk stations have lower-risk stations that are nearby, and service the same lines

# Future Work



- Provide alternate nearby, low-risk stations **for each line** at a high-risk station
- Expand heat analysis to **include New Jersey** so that more PATH stations can be included

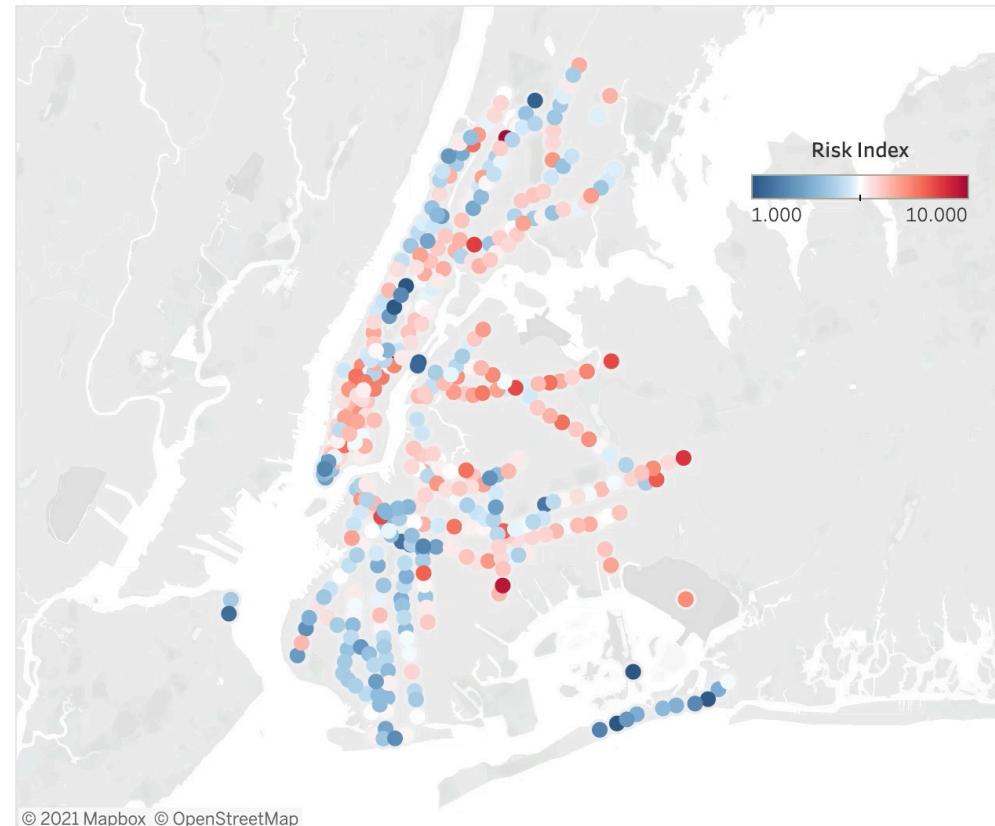
# Questions?

SCAN WITH YOUR  
SMARTPHONE CAMERA



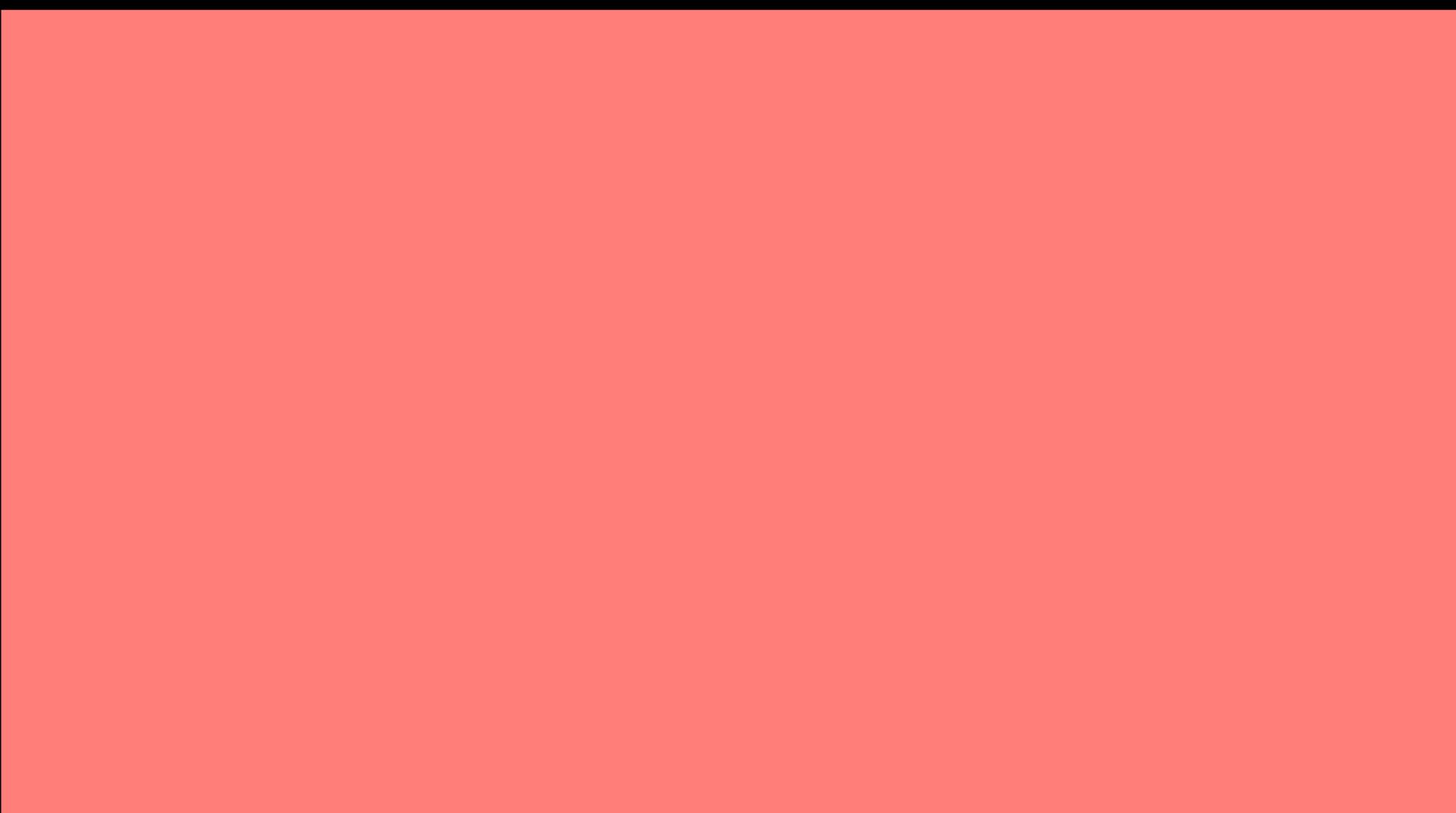
## Extremely Hot and Incredibly Crowded:

avoiding heat-illness in New York City's busiest MTA stations



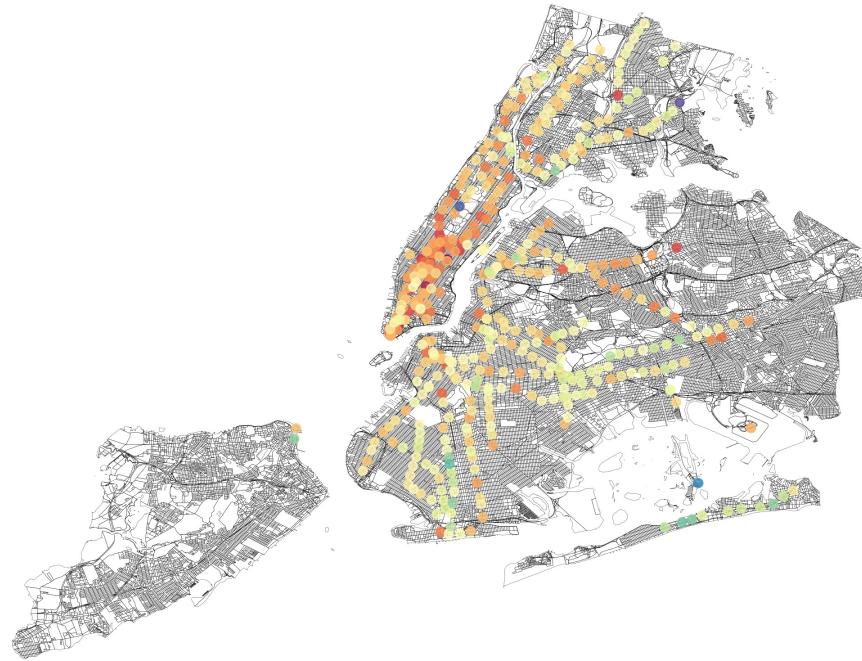
A map of NYC's subway stations. Each station location is colored by its Risk Index, which considers heat-illness risk due to **both** high heat and large crowds.

A Risk Index of 10 (redder colors) indicates a high risk of heat-related illnesses and 1 (bluer colors) indicates a low risk.



- 59 ST (lines 456NQRW) → RIT MANHATTAN (line R)
- KINGSBRIDGE RD (line 4) → FORDHAM RD (line 4)
- EAST 105 ST → no low-risk station serving the same lines within 0.75 miles
- JAMAICA 179 ST → no low-risk station serving the same lines within 0.75 miles
- 3 AV-149 ST (lines 25) → JACKSON AV (lines 25)

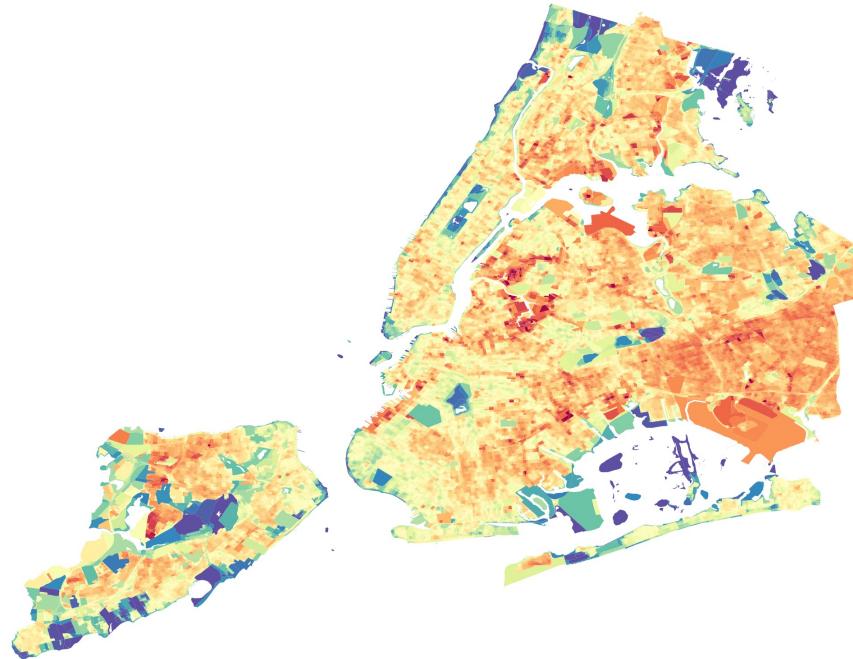
# Net Entries



9530 entries

11840017 entries

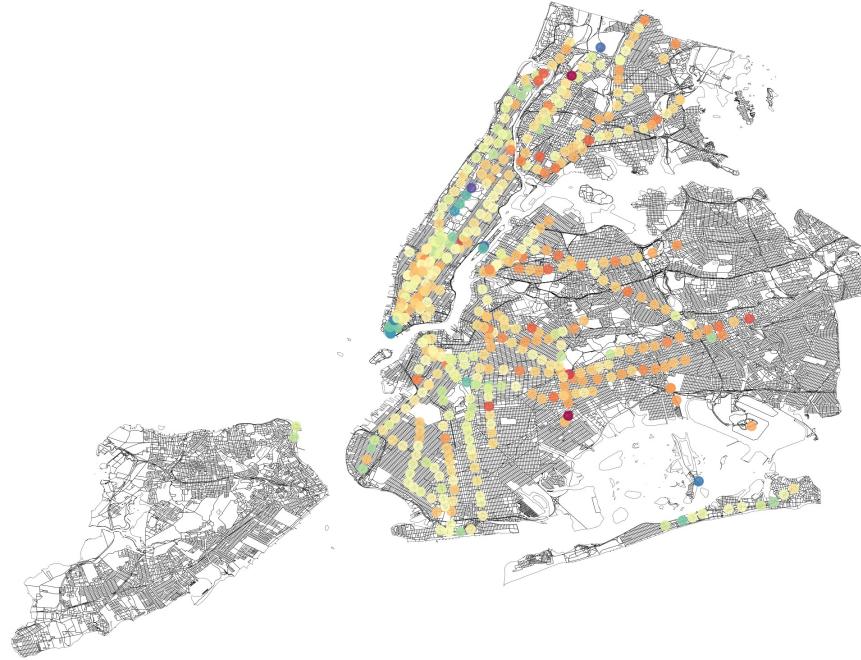
## Surface Temperature (relative to median)



-10.1 °C  
cooler

6.8 °C  
hotter

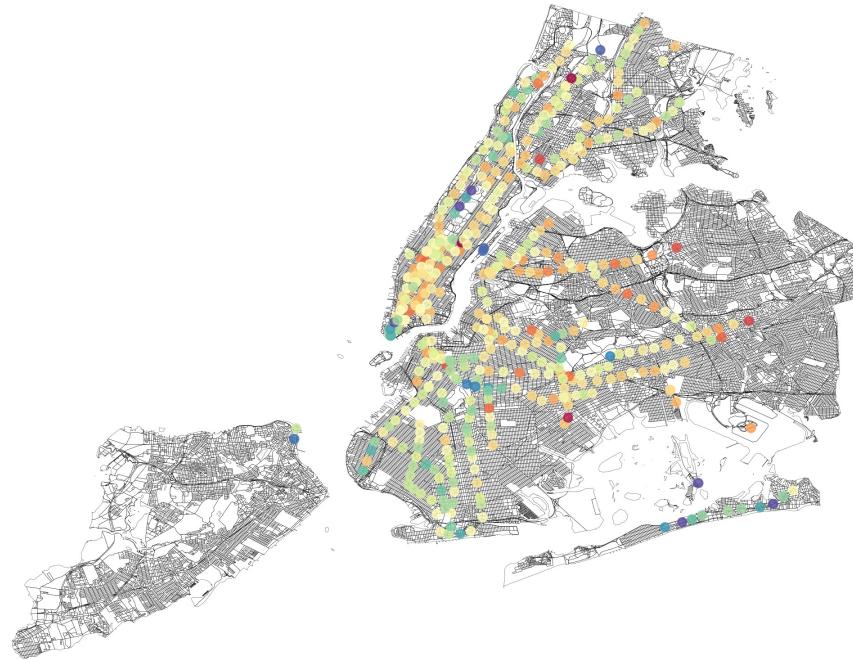
## Heat Index (per station)



heat index  
1

heat index  
10

# Heat-Illness Risk Index



risk index  
1

risk index  
10