

Dummy Title

By Dummies

27 JUN 2020

Abstract

On 24 April, 2020, a researcher at MIT released a working paper finding that "The Subways Seeded the Massive Coronavirus Epidemic in New York City". While the analysis in the paper has been called into question, it remains true that the role of public transportation in the spread of COVID-19 is still unknown. In this paper, we introduce an agent-based model of the New York City subway and analyze how well it can predict the spread of COVID-19 through the boroughs of New York City.

Our findings that [insert findings here] should interest public health officials looking to make policy decisions about public transportation.

[Writer's Note: Of course, this is the ideal final result. We will focus on the early infection period and I give it a 50/50 that we even get to taking into account countermeasures and ridership losses. We will make a preliminary model, improve it, and see how far we can get.]

Competencies Briefing

Purpose: Brief others on competencies so we can discuss things

Transportation Networks

specifically subways, the NYC subway. mapping, passenger flow

python, networkx, mesa

we're working with these techs.

Writer's Note: Obviously to be removed before submission

This report was last pushed to OverLeaf on 30.05.2020. You will find our latest work at the link below: https://github.com/cheung-ho-lum/NS_Epidemics_ABM_Approach/blob/master/Report/ABM_NYC_Subway.pdf

Background

Epidemics and COVID-19

A Timeline of the Start of COVID-19 in NYC

[Writer's Note: I mean the honest reference is Wikipedia]

Feb 25 - Some guy came back from Iran

Mar 3 - First P2P spread

Mar 9 - 16 confirmed cases

Mar 9 (Approx.) - Metro ridership starts decreasing

Mar 16 - schools close

Mar 18? - PAUSE government order to shelter in place

Mathematical Modeling of Epidemics

SEIR Model

[Some explanation of SEIR goes here]. We're looking into more advanced models (see bibliography). The key additions are 'super-spreaders' and 'asymptomatic'. At the end of the day, we just need pure mathematical modeling to provide some parameters for how agents should behave.

Newer Compartmental Models

Agent Based Models

It's just a tool. like any model. Simulating agents in an environment. Key parameters are agent, model, and environment parameters. For example, we have the following list thus far:

```
(Agent)STATUS_SUSCEPTIBLE = 'Susceptible'  
(Agent)STATUS_EXPOSED = 'Exposed'  
(Agent)STATUS_INFECTED = 'Infected'  
(Agent)STATUS_INFECTED_ASYMPTOMATIC = 'Asymptomatic'  
(Agent)STATUS_RECOVERED = 'Recovered'  
(Agent)TIME_TO_RECOVER = 10  
(Agent)TIME_TO_INFECT = 3  
(Model)RUN_SPAN = 60  
(Model)TOTAL_POPULATION = 50000
```

The environment is new york subway mapped as a network.
All of this is still being discussed.

Urban Transportation Networks and Subways

This guy is indispensable for figuring out how to parse some of this data:
https://en.wikipedia.org/wiki/New_York_City_Subway_nomenclature

MTA Station Data

Station, Complex, Line, Route

station 167... doubled

making edges. GTFS Data... no we do it ourselves

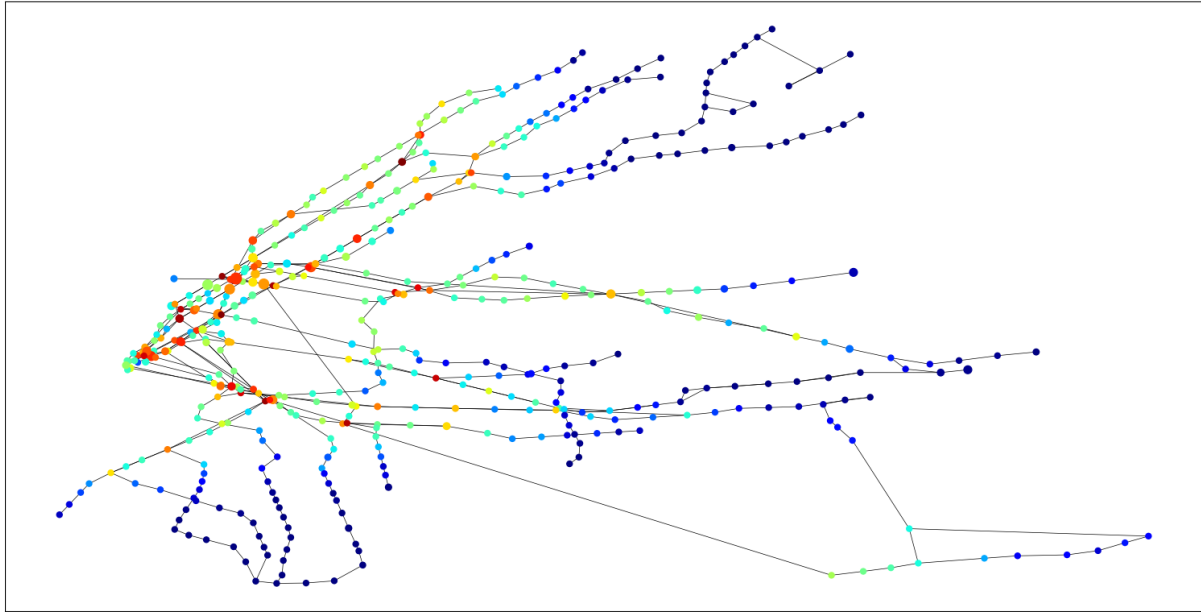
MTA Turnstile Data

discuss format. every 4 hours, every machine. aggregation.

MESA(Or our model)

Methodology

Results



Conclusion

References

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