City College of New York

Citation:

**Copyright and reuse**: Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City College of New York, CUNY may be freely distributed and linked to.

**Analysis of Covid impacts on New York City urban traffic and taxi routes management based on spatiotemporal and time big data**

Jin Chen, Zhiying , Juliana Ma, Bosen Li

*Abstraction* — The recent COVID-19 pandemic has forced humanity to experience an unprecedentedly expansive lockdown around the world, which resulted in the urban transport systems under a near standstill. In this study, we took five urban areas in the center of New York City as an example, used Python to process, analyze, and used tableau, Python Plotly to visualized the data from 112 millions of NYC taxi data records that can help to study the pre-covid-19 and during covid-19 urban traffic congestion/situation, and then establish [what, such as principle component analysis] model to find out the impact of that shows how the covid-19 has impacted urban traffic flow. Finally, we found that [how many factors], such as [detail factors], have significant impact on road urban traffic congestion, and predicted what traffic congestion would mean for the future of urban traffic at the post-covid-19 era through [models/methods, spatio-temporal analysis, traffic behavior ].

KEYWORDS- urban traffic congestion, [models]

1. INTRODUCTION

With the widespread covid-19 virus, cases have grown exponentially worldwide, especially in the US where local government were unable to effectively put the virus under controlled. Initial optimism over the virus’ grasp and swift return to normal life has now switched to a widely shared understanding that the public health crisis is global and requires immense recovery efforts. While effective vaccine would not become reality sooner than we hope, government lockdown, social distancing and mask mandate were restricting social life. Urban traffic was brought to a standstill during this particular period.

In our study, we found a strong correlation between urban traffic situation and virus spreading routes through research. When one area has slowly the more infection rate, the traffic has rapidly reduced. There were less or nearly non-traffic jams than pre Covid. This series of hazards means huge economic losses[2]. In order to better promote the economic and social development and realize the people's growing demand for a better life, solving the Covid problem must be put in the first place.

1. DATA AND METHODS
2. Data source and preprocessing
3. Data source

The 112 millions of New York City taxi data were from NYC open data platform. It is spanning yellow taxi trip data from 2018 for our study, and contain ten kinds of information: trip id, vendor id, pickup datetime, drop-off datetime ,passenger count , pickup longitude, pickup latitude, drop-off longitude, drop-off latitude, store and fwd. flag (This flag indicates whether the trip record was held in vehicle memory before sending to the vendor because the vehicle did not have a connection to the server - Y=store and forward; N=not a store and forward trip, trip duration. Through importing and processing the data from the NYC open data platform by Python pandas library, we reduced the data to including five kinds of information: taxi zone info, zip code info, zone distance, time period for taxi trips, and zone geo information. The rest of the data are from Chengdu Municipal Bureau of statistics.

Reference

Analysis of influencing factors on urban traffic congestion and prediction of congestion time based on spatiotemporal big data from <https://ieeexplore.ieee.org/document/9196363>

**Urban transport and COVID-19: challenges and prospects in low- and middle-income countries** <https://www.tandfonline.com/doi/full/10.1080/23748834.2020.1791410>

* DATA
  + 2016: https://www.kaggle.com/c/nyc-taxi-trip-duration/data
  + 2018: https://data.cityofnewyork.us/Transportation/2018-Yellow-Taxi-Trip-Data/t29m-gskq

KEYWORDS:

* + Spatio-temporal analysis
  + Taxi allocation management
  + Traffic behavior during specific day, month or period/season
  + Identification of traffic bottlenecks
* NYC Taxi trips information
* Structured data
  + Pick-up and drop-off dates/times, pick-up and drop-off locations, trip distances, itemized fares, rate types, payment types, passenger counts, etc.

Identify possible correlations between COVID-19 outbreak and most common taxi routes

* + - Identify possible “spreading routes”
    - Taxis routes and rides data before and during the pandemic period