

NYC Human Mobility Adequacy

Emma Corbett

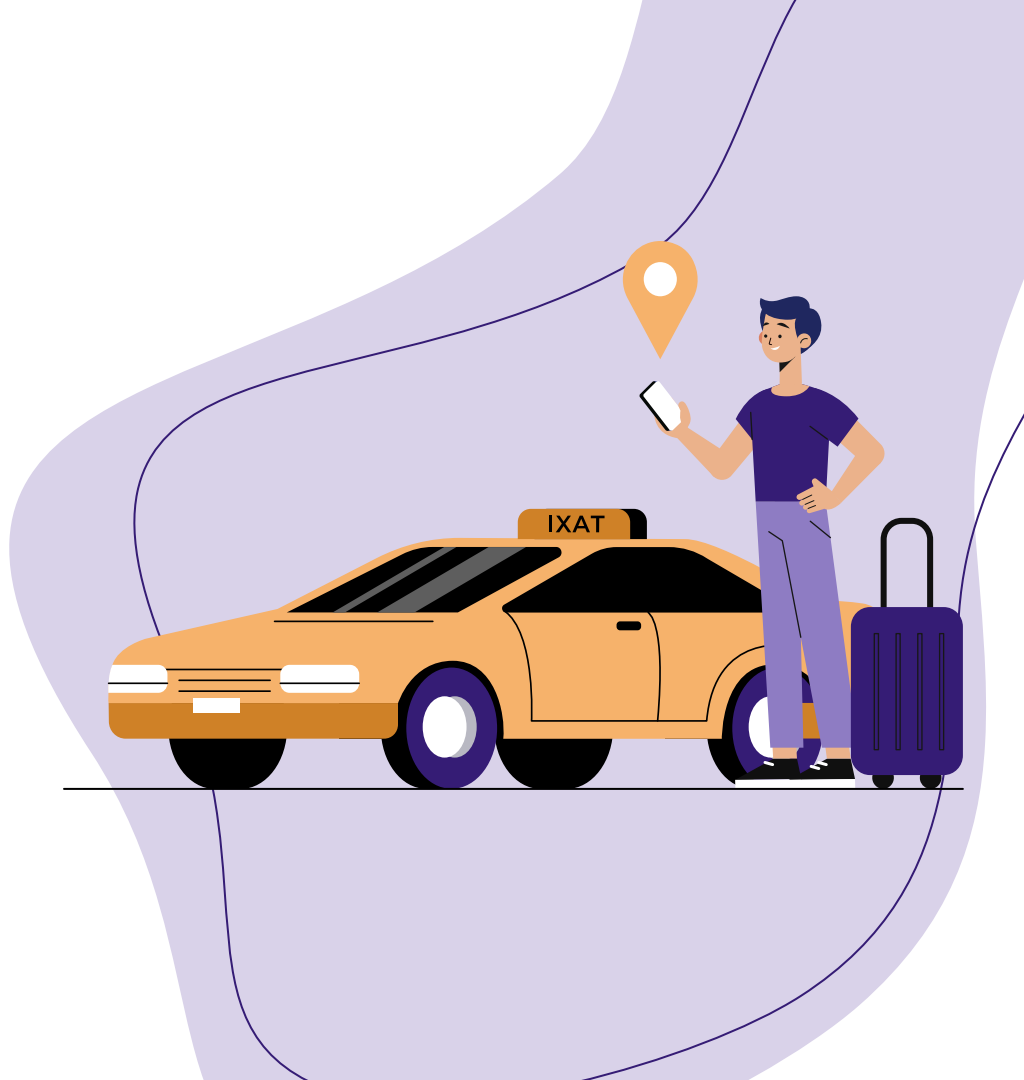




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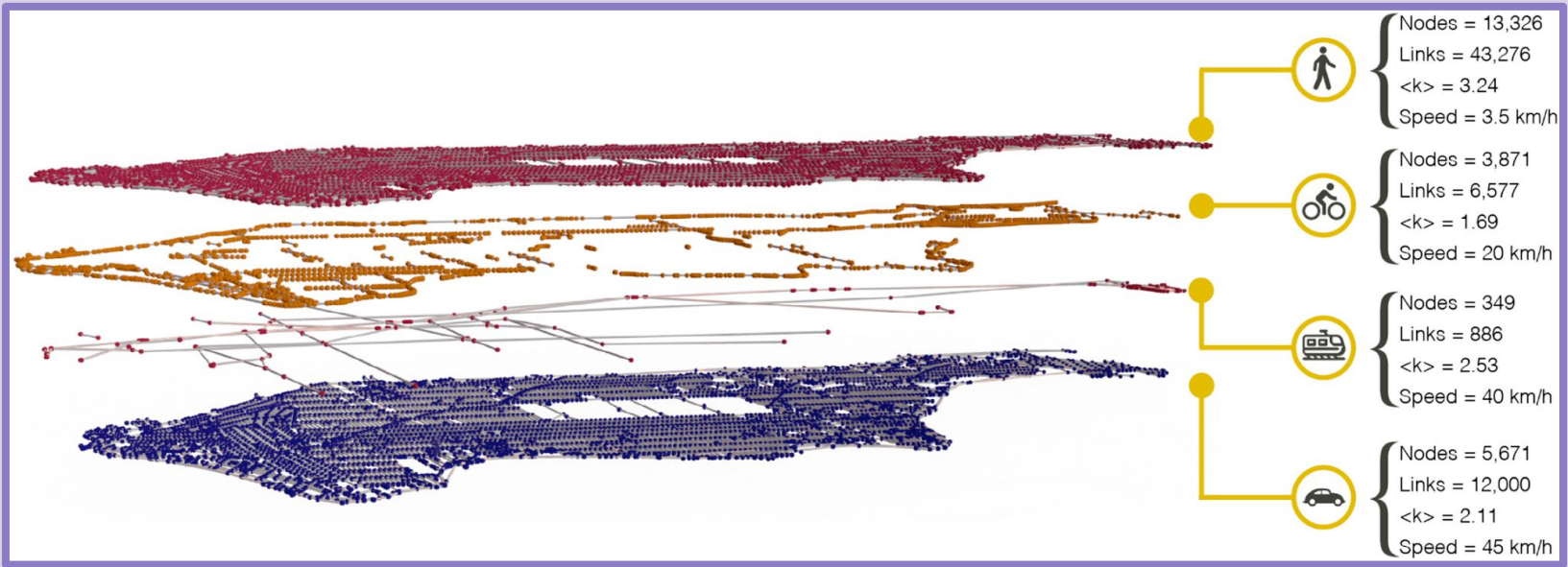
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01 Situation Analysis

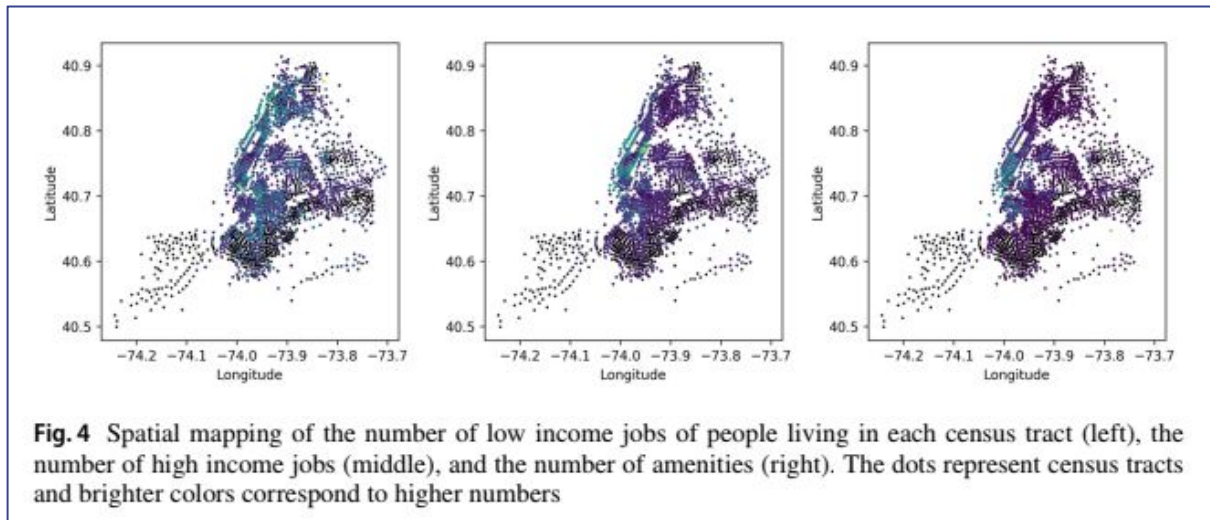




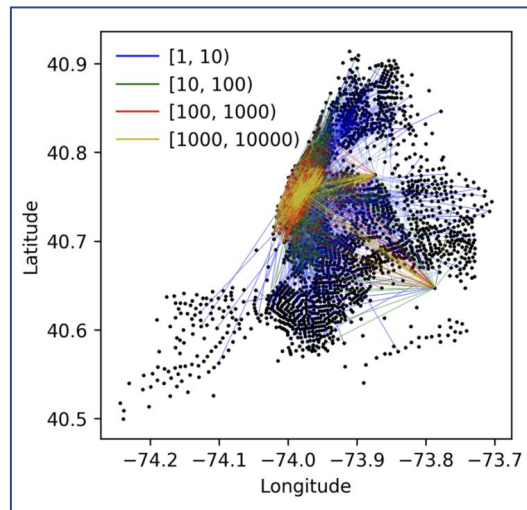
My research has focused on studying multi-modal transportation in NYC. A multimodal trip is one where you used 2 or more different modes of transportation. This is more complicated than looking at one mode at a time, but yields more realistic results.

Quantifying the uncertainty of mobility flow predictions using Gaussian processes

Aike Steentoft, Bu-Sung Lee, Markus Schlöpfer



Taxi Flows



I based my study in part off this paper. It predicts taxi mobility flows using income level. I wanted to do something similar using more modes and also machine learning!

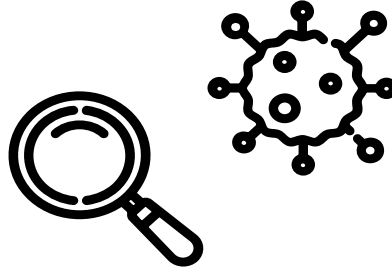


02 Objective

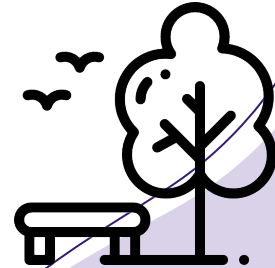
Desired Insights



Effect of income on
mobility patterns

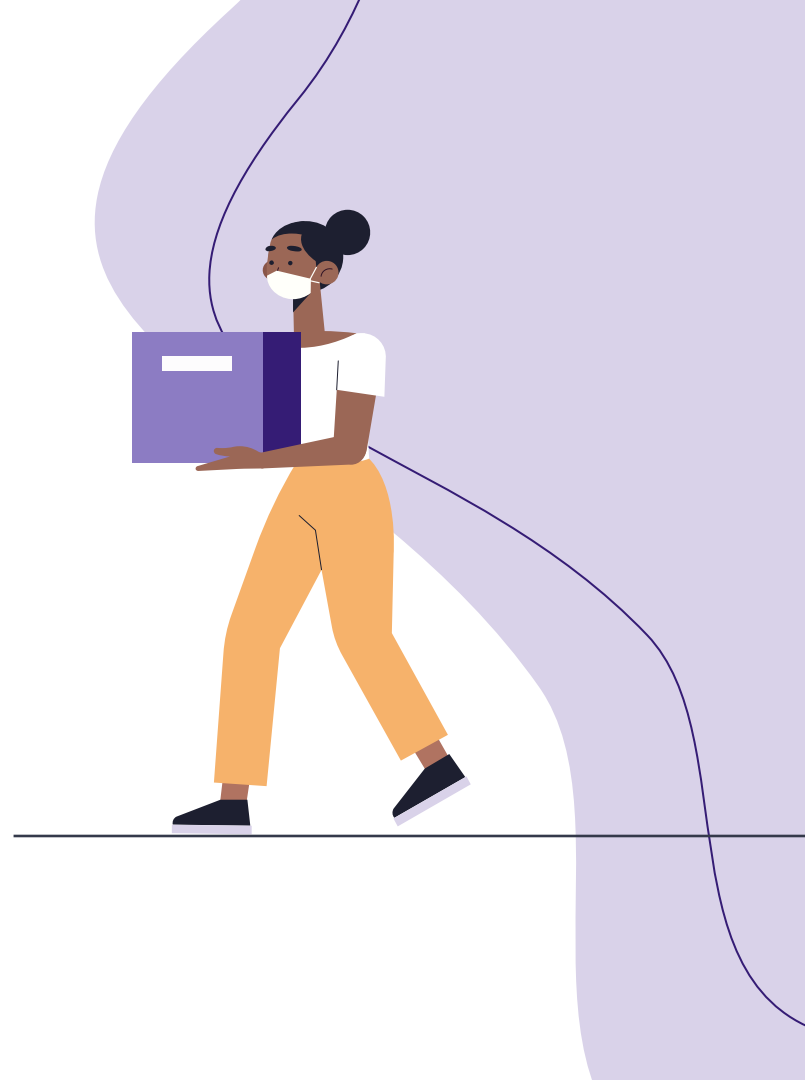


Explore pre- and post-
covid trends

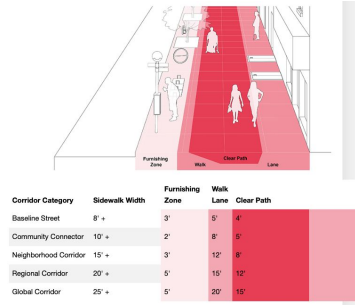


Effect of new points of
interest (parks)

03 Data



Data



Multiscale Dynamic Human Mobility Flow Dataset in the U.S. during the COVID-19 Epidemic

GeoDS Lab, Department of Geography, University of Wisconsin-Madison.

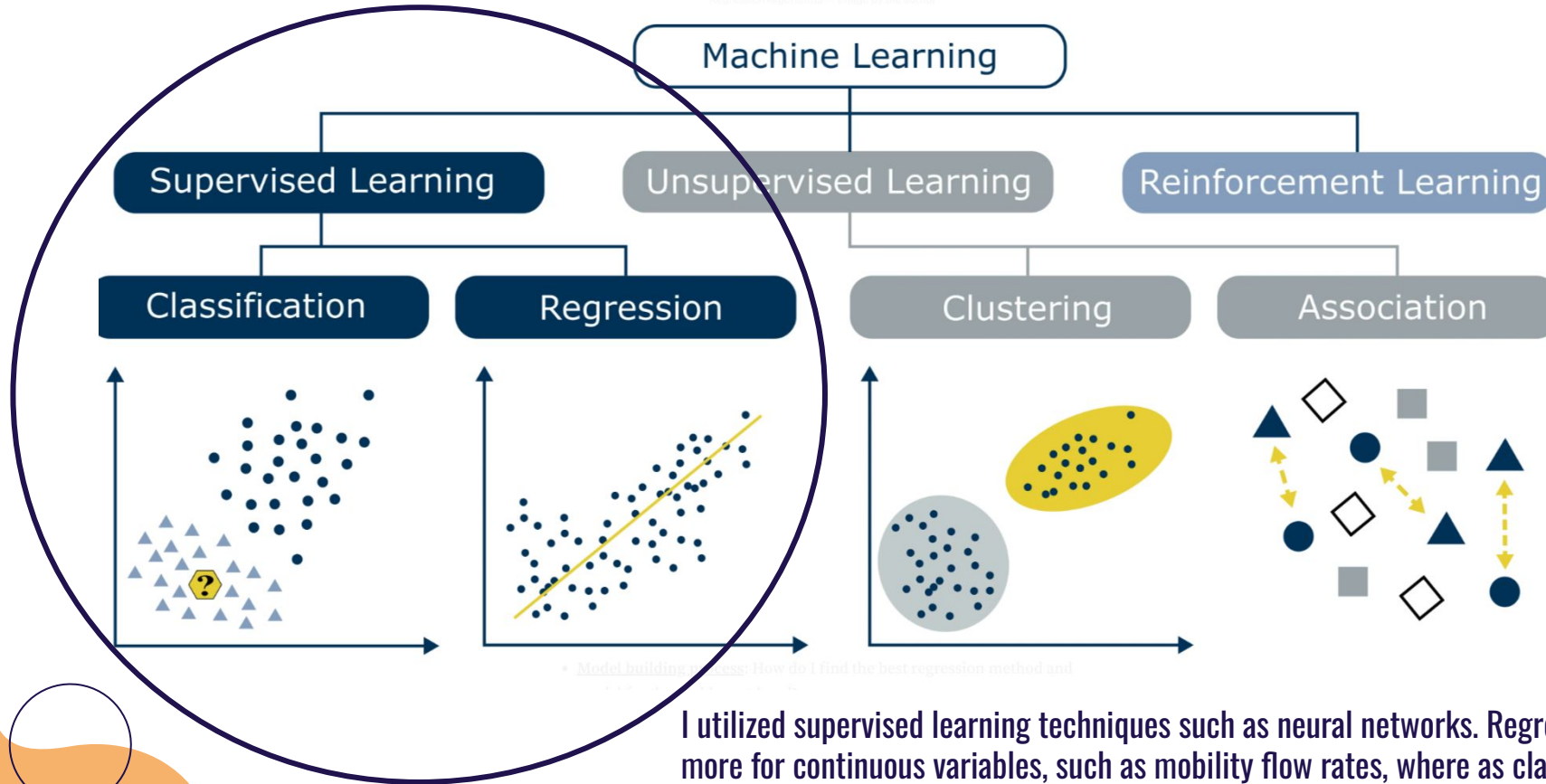


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04 Models & Results





• **Model building process:** How do I find the best regression method and

I utilized supervised learning techniques such as neural networks. Regression is more for continuous variables, such as mobility flow rates, where as classification is more for categorical variables.

Neural Network To Predict Mobility Flows Using Mobile Phone, POI, and Census Data

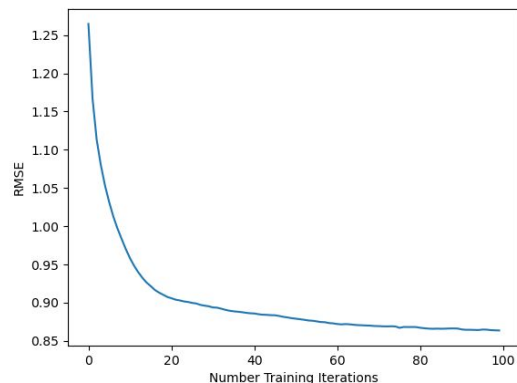
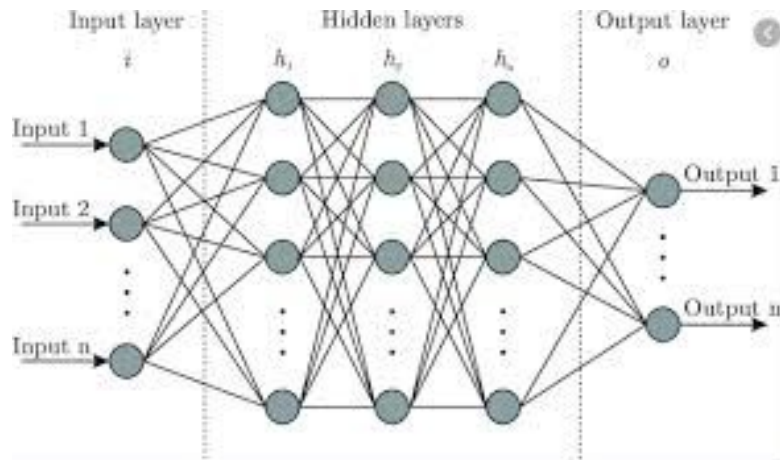
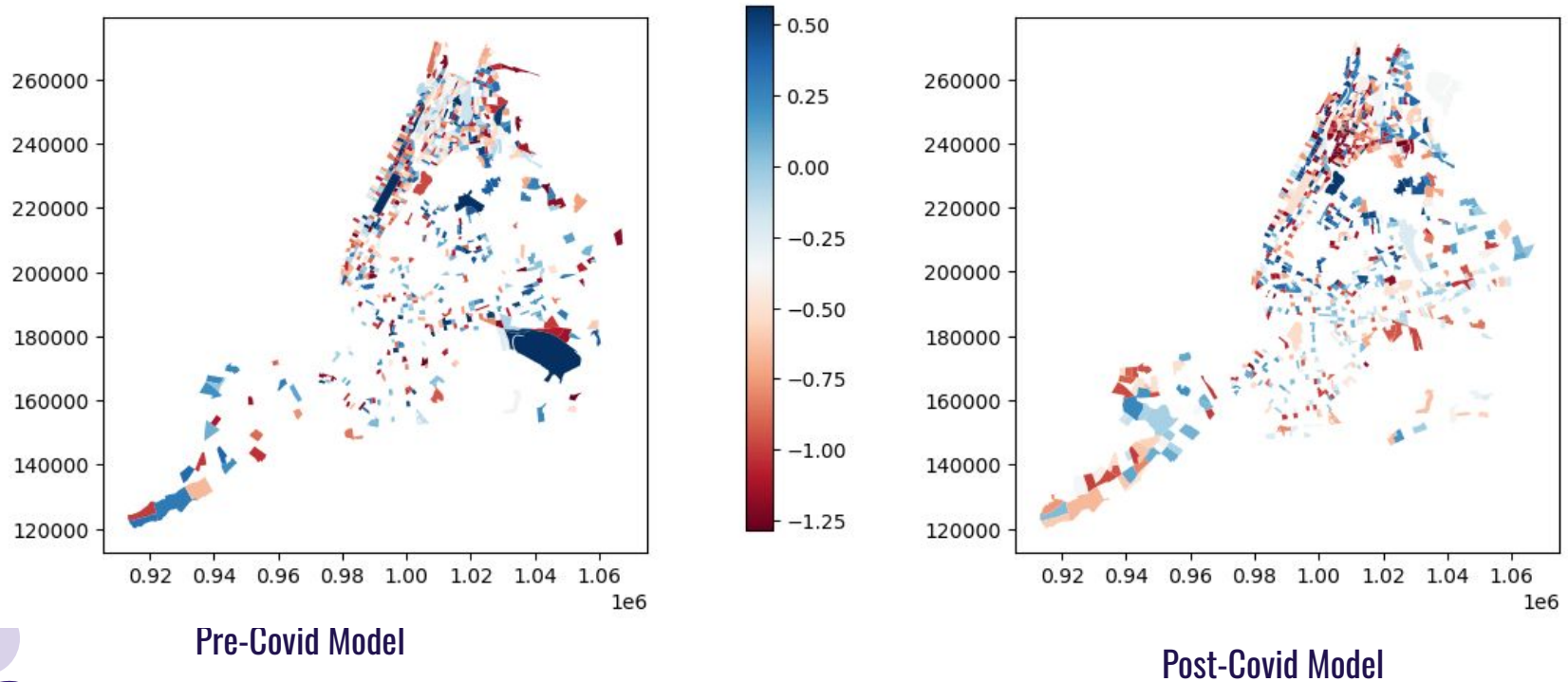


Table 3 Location attributes (urban features) related to attraction of trips, production of trips, and interaction between origin and destination

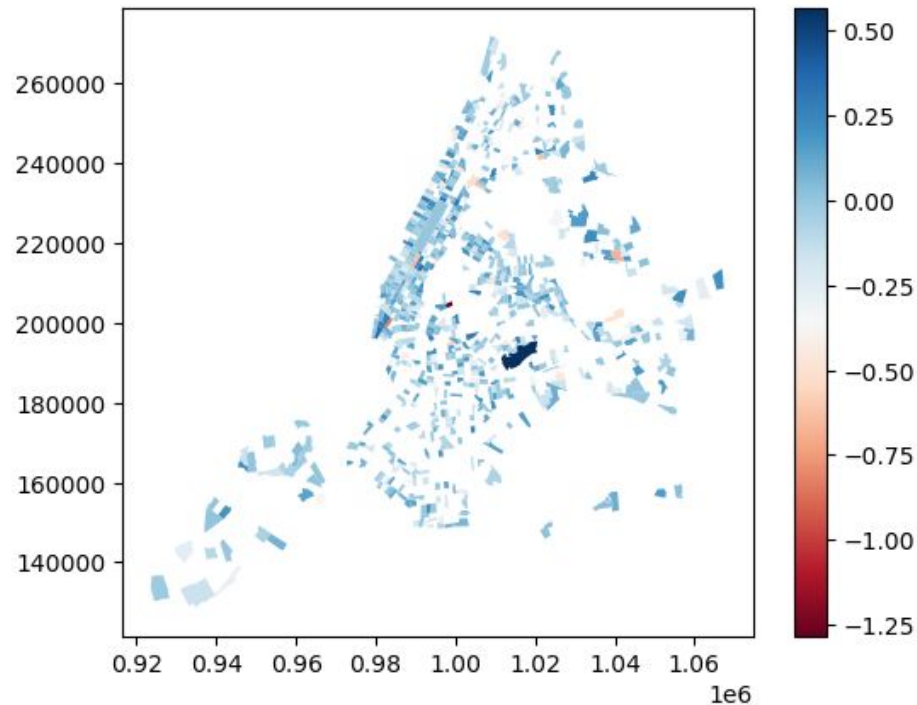
Trip relation	Attribute (urban feature)
Destination (attraction)	No. of low-income residents
	No. of medium-income residents
	No. of high-income residents
	No. of low-income workers
	No. of medium-income workers
	No. of high-income workers
Origin (production)	No. of amenities
	No. of low-income residents
	No. of medium-income residents
	No. of high-income residents
	No. of low-income workers
	No. of medium-income workers
Intervening attributes	No. of high-income workers
	No. of amenities
	Distance between origin and destination
	No. of low-income residents closer to origin
	No. of medium-income residents closer to origin
	No. of high-income residents closer to origin
	No. of low-income workers closer to origin
	No. of medium-income workers closer to origin
	No. of high-income workers closer to origin
	No. of amenities closer to origin

Predicted change in mobility from 10% increase in number of high income residents & workers in 20 random Bronx Census Tracts

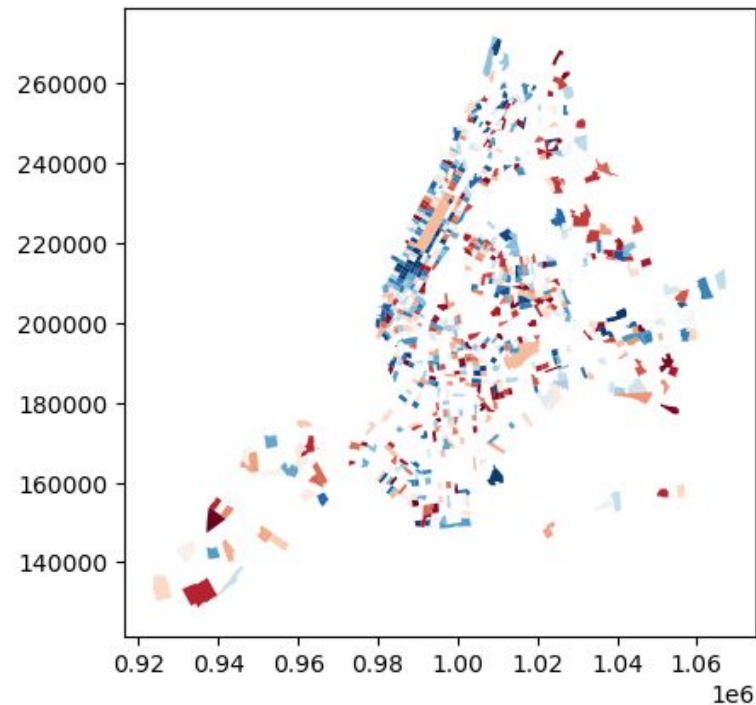


Here I am exploring income related changes to mobility predictions. Downside to NN models is lack of explainability.

Hudson Yards Case Study



Percent Change in Flow Rate to Hudson Yards Two Months before vs after Hudson Yards Opening



Model Trained on Pre-Hudson Yards Data
Prediction Accuracy on Post-Hudson Yards Data

05 Conclusion



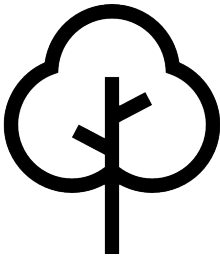
How does this make cities more sustainable?



Education level as a predictor



Economic, job market, RTO implications



Infrastructure planning

Future Work

- Incorporate other types of mobility data (taxi, bike, etc) to strengthen results
- Seeing how new congestion pricing affects mobility
- More parks and other POIs (libraries, schools, etc...)

Resources

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