BROADBAND INTERNET ACCESS

Measuring disparities between two counties in New York State

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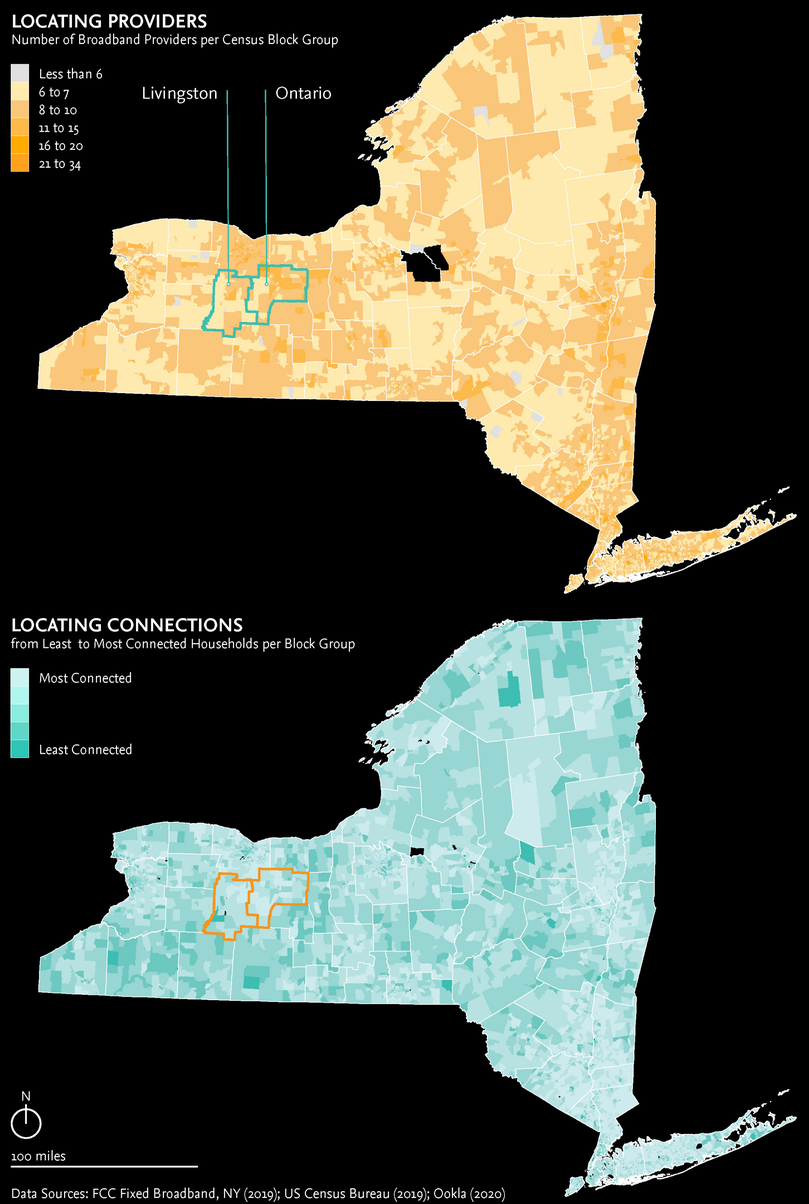
The project intends to understand the spatial factors behind the digital divide in New York State. Our study aims to identify connectivity gaps between two rural counties as a way to understand disparities between regions.

Livingston and Ontario County were selected because they are contiguous counties. They shared a similar population density, and both have disparity in accessibility to broadband Internet service, i.e., the number of providers per census block group and percent of household with broadband subscription.

What is the spatial relationship between broadband connectivty, patterns of urban density, and social vulnerability?

LOCATING PROVIDERS

Number of Broadband Providers per Census Block Group



LOCATING CONNECTIONS

from Least to Most Connected Households per Block Group

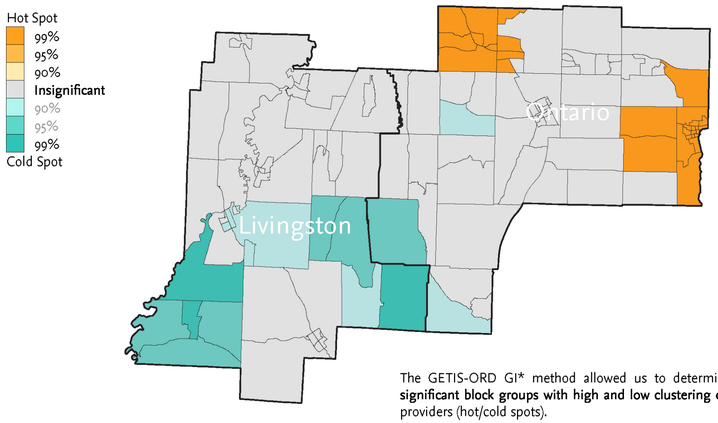
Data Sources: FCC Fixed Broadband, NY (2019); US Census Bureau (2019); Ookla (2020)

Methodology

Three spatial analysis methods were used to determine the relationship between the number of broadband providers in Ontario and Livingston and their demographic and population density patterns.

1 | GETIS-ORD GI*

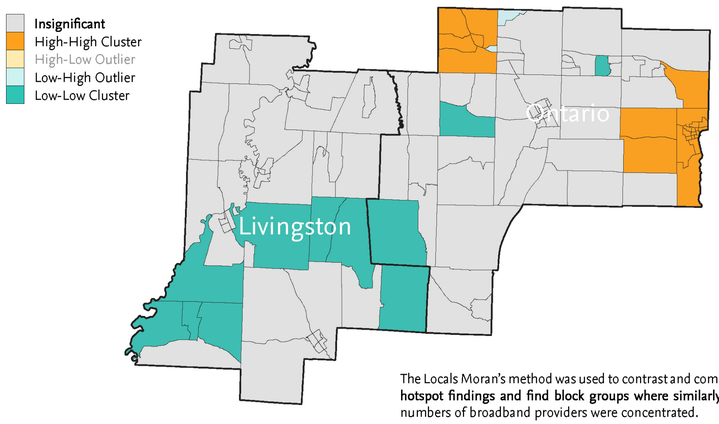
Number of Internet Providers per Census Block Group



The GETIS-ORD GI* method allowed us to determine statistically **significant block groups with high and low clustering of broadband** providers (hot/cold spots).

2 | LOCAL MORAN'S I

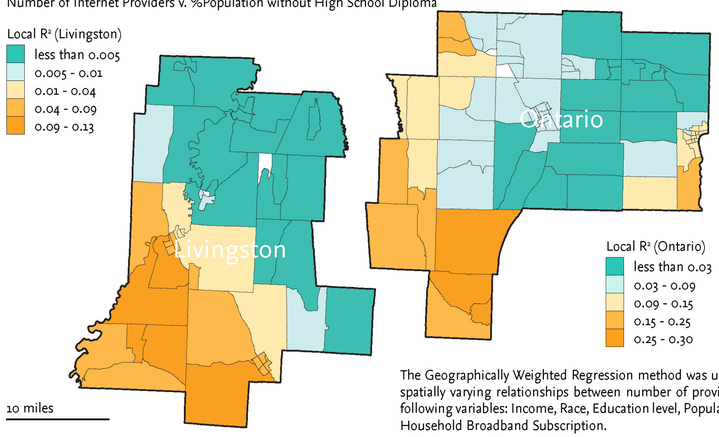
Number of Internet Providers per Census Block Group



The Locals Moran's method was used to contrast and compare previous **hotspot findings and find block groups where similarly high or low** numbers of broadband providers were concentrated.

3.1 | GEOGRAPHICALLY WEIGHTED REGRESSION (GWR)

Number of Internet Providers v. %Population without High School Diploma



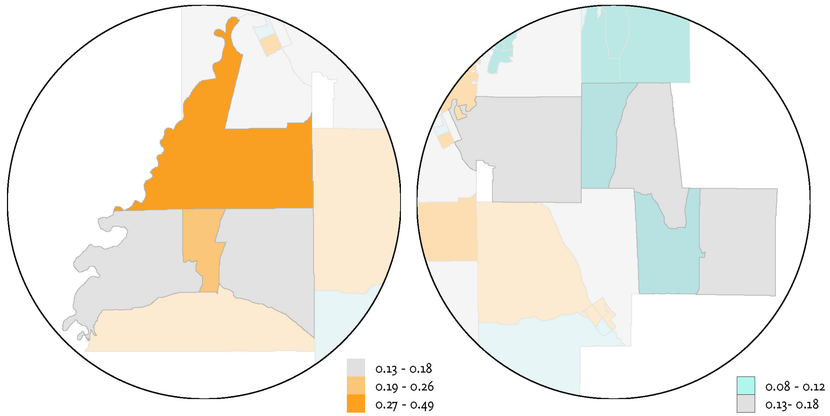
The Geographically Weighted Regression method was used to model spatially varying relationships between number of providers and the following variables: Income, Race, Education level, Population Density, Household Broadband Subscription.

Understanding Clusters

The results from the Getis-Ord GI* and Local Moran's I both reflect the clustering/spatial correlation of number of Internet Provider per Census Block Group. The similar concentration of Hot Spots/High-high Clusters and Cold Spots/Low-Low Clusters draws our attention to the following census block groups.

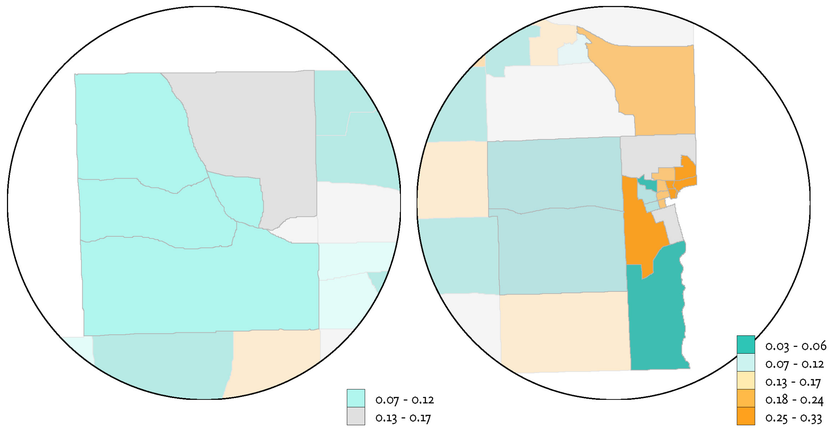
Livingston County Block Groups:

Local Rates of Disconnected Households



Ontario County Block Groups:

Local Rates of Disconnected Households



Findings

Geographically Weighted Regression - Others

Number of Internet Provider v. Demographic and Density Variables

Independent Variables	Livingston	Ontario
	R^2	
Median household income	0.34	0.34
% Population nonwhite	0.45	0.45
Population density (ppl/acre)	0.5	0.33
%Population without a high school diploma	0.52	0.34
%Households with broadband suscription	0.42	0.03

Among the demographic and density variables analyzed the level of education has the highest spatial correlation with the number of broadband providers per block group (r2=0.52). The local R-squared map shows that in block groups with low values, the GWR model is performing poorly, and other variables need to be studied and **included to refine the model.**

Impacts

Areas with low access to broadband providers are concentrated in the sectors where people have no high school diploma, which increases the education gap in the new hybrid education model the U.S. and the rest of the world is experiencing.