(Re)Detecting & (Re)Examining Heat Vulnerability Index (HVI)

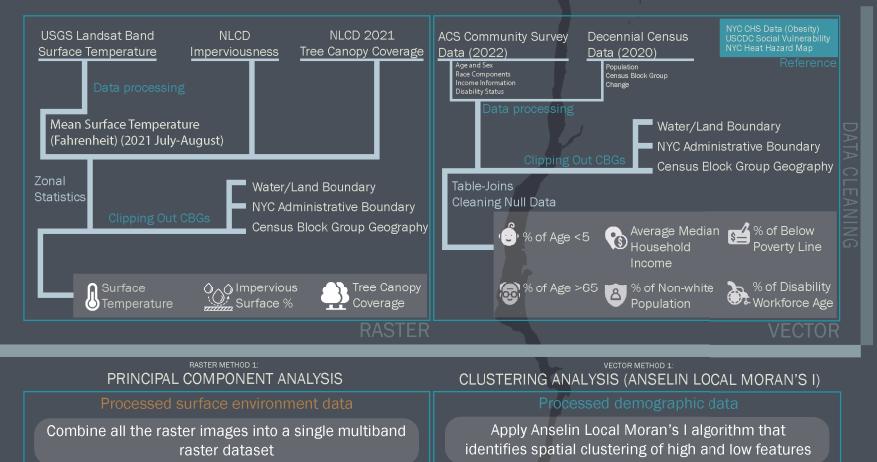
Mapping Vulnerability and Adaptive Capacity in New York City

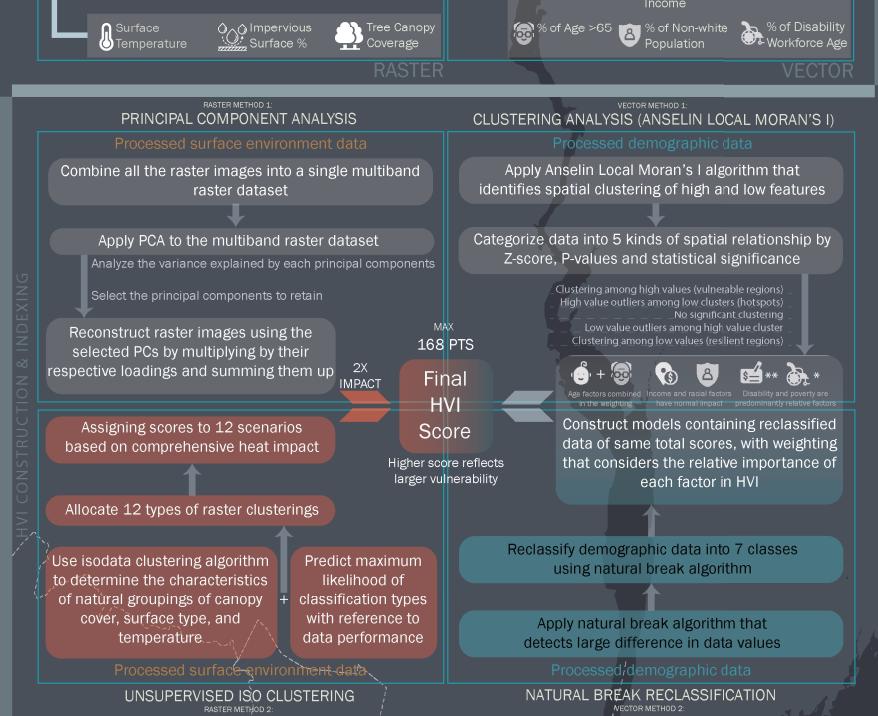
Eric Xia, Hui Chen & Mina Wei **Advanced Spatial Analysis** Spring 24

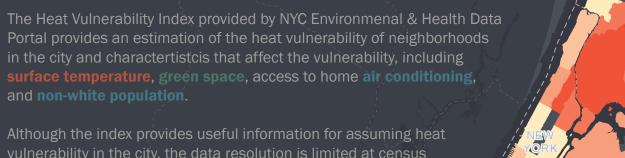
Research Questions

- 1. What is the impact of different geoprocessing techniques on the HVI?
- 2. How do different geoprocessing techniques influence the spatial distribution and accuracy of the HVI?
- To what extent do factors such as data resolution, interpolation algorithms, and modeling assumptions impact the construction and interpretation of the HVI?
- How can the choice of geoprocessing technique affect the identification of high-risk areas and the prioritization of interventions to mitigate heat-related risks in urban environments?

Methodology

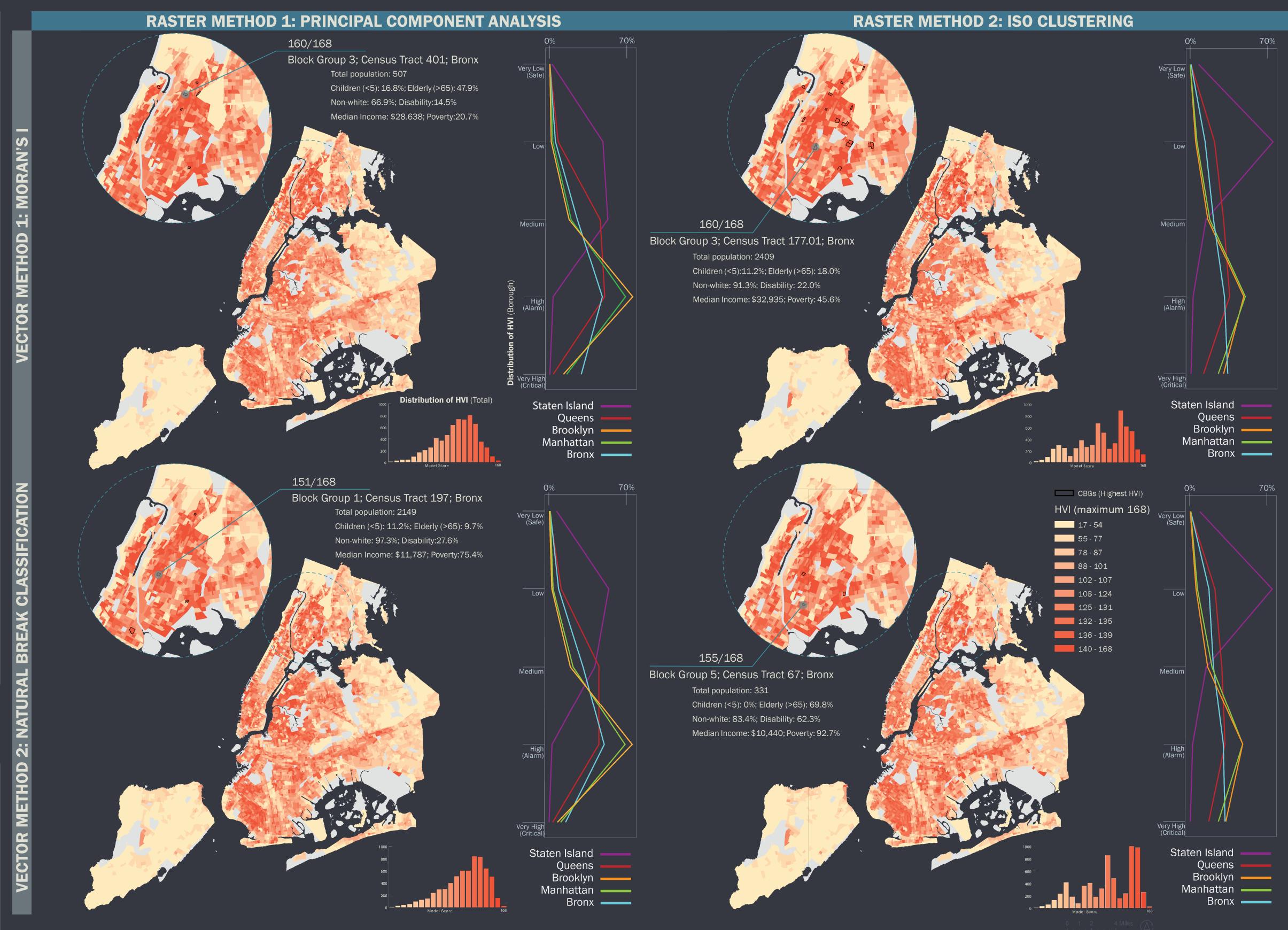






Although the index provides useful information for assuming heat vulnerability in the city, the data resolution is limited at census tracts, which are too coarse for an in-depth research. In addition, the current HVI does not factor into the impact of **demographic** composition, income, and disability in determining heat vulnerability, which leaves space for furthur modification and improvement with new methodologies.

Inspired by McHarg's Ecological Method in natural geographic research, the methodology in producing HVI indices use layered transparency geospatial methodologies, which are Principle Component Analysis (PCA), ISO Clustering, Anselin Local Moran's I, and Natural Break mapping with the integration of nature and built environment factors. Utilizing multiple geographic information software and algorithms, Reclassification. The poster also reflects data performance and characteristics of each indexing methodology and the distribution of the research first examines heat exposure based on LANDSAT land cover data, and then examines heat sensitivity with data provided HVI across the New York City. in Census and American Community Survey. This poster illustrates how the research combines these two factors with four different



Conclusion

prediction and estimation of areas in NYC that are threatened by heat risks and extreme weather events. Using raster Land surface data classification and more ordered distribution of HVI across census block groups in the city. While ISO Clustering analysis indices with high resolution (15 x 15) and vector data in census block group level, the research designates multiple sets of HVIs with higher accuracy better differentiate block groups with low-to-mid HVI, these indices work less effectively in examinating clusteirngs of high HVI values. and precision compared to mainstream census-tract-based indices. The four sample indices, constructed from different methodologies, demonstrate similarities in regions with higher heat vulnerabilities, which can assist policymakers in better distributing resources to enhance. Planners and city officials are informed to compare multiple HVI results from a variety of methods and act at a larger scale to ensure local resilience. However, each of the index presents visible differences in extreme values and shows different distribution of census block equity and comprehensiveness during urban policymaking process. group values, suggesting that different method selection and weighting mechanism are potentially biased towards certain characteristics.

The pattern of heat vulnerability differs from existing social vulnerability indexes that cover the New York City area, providing a more accurate Among the indices presented, the combinations between PCA and Natural Break Reclassification/Local Moran's I present a clearer