Spatial & General Data Analytics

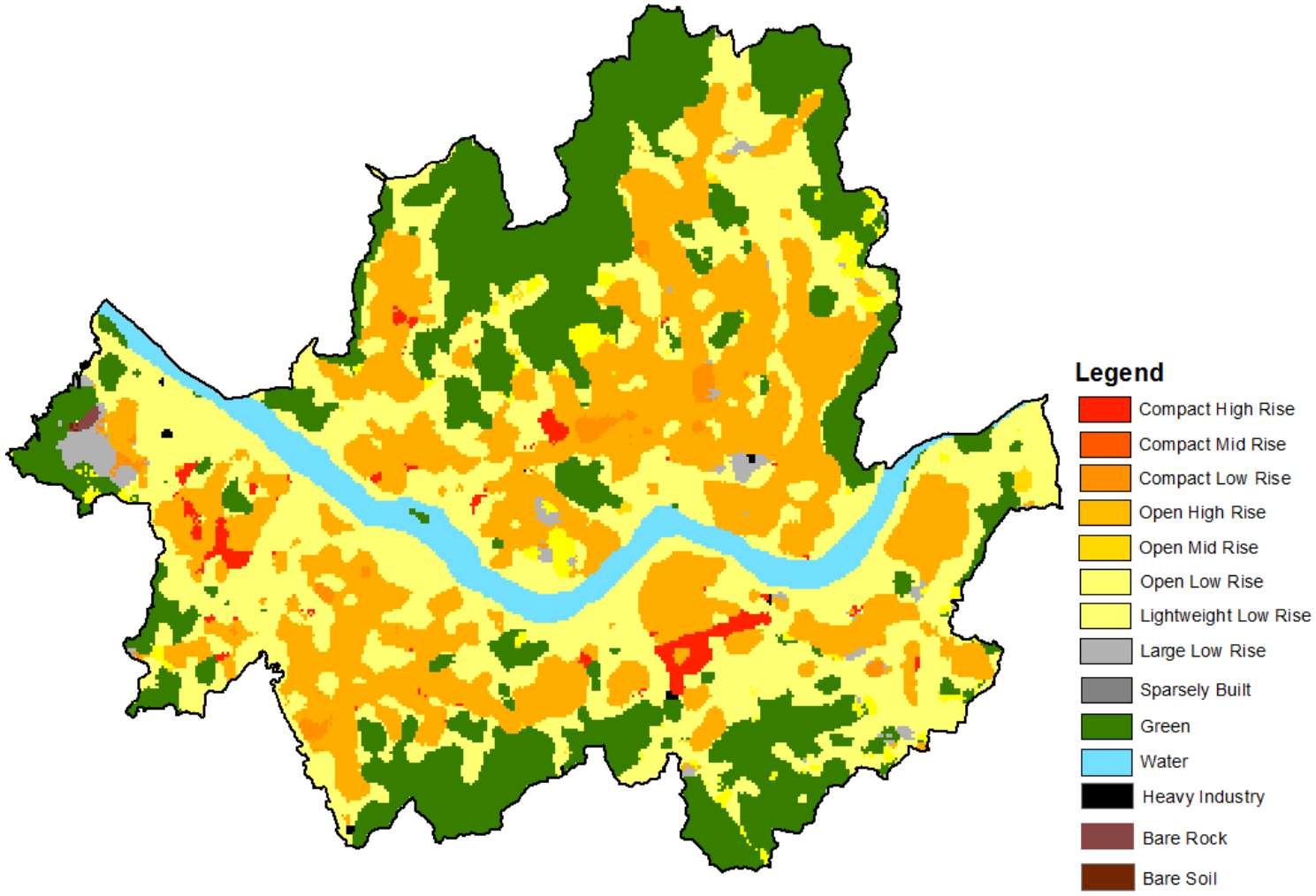
Sample Works

PARTH BANSAL

Classification of Seoul

Map of urban form in Seoul. Developed for spatial targeted heat wave intervention.

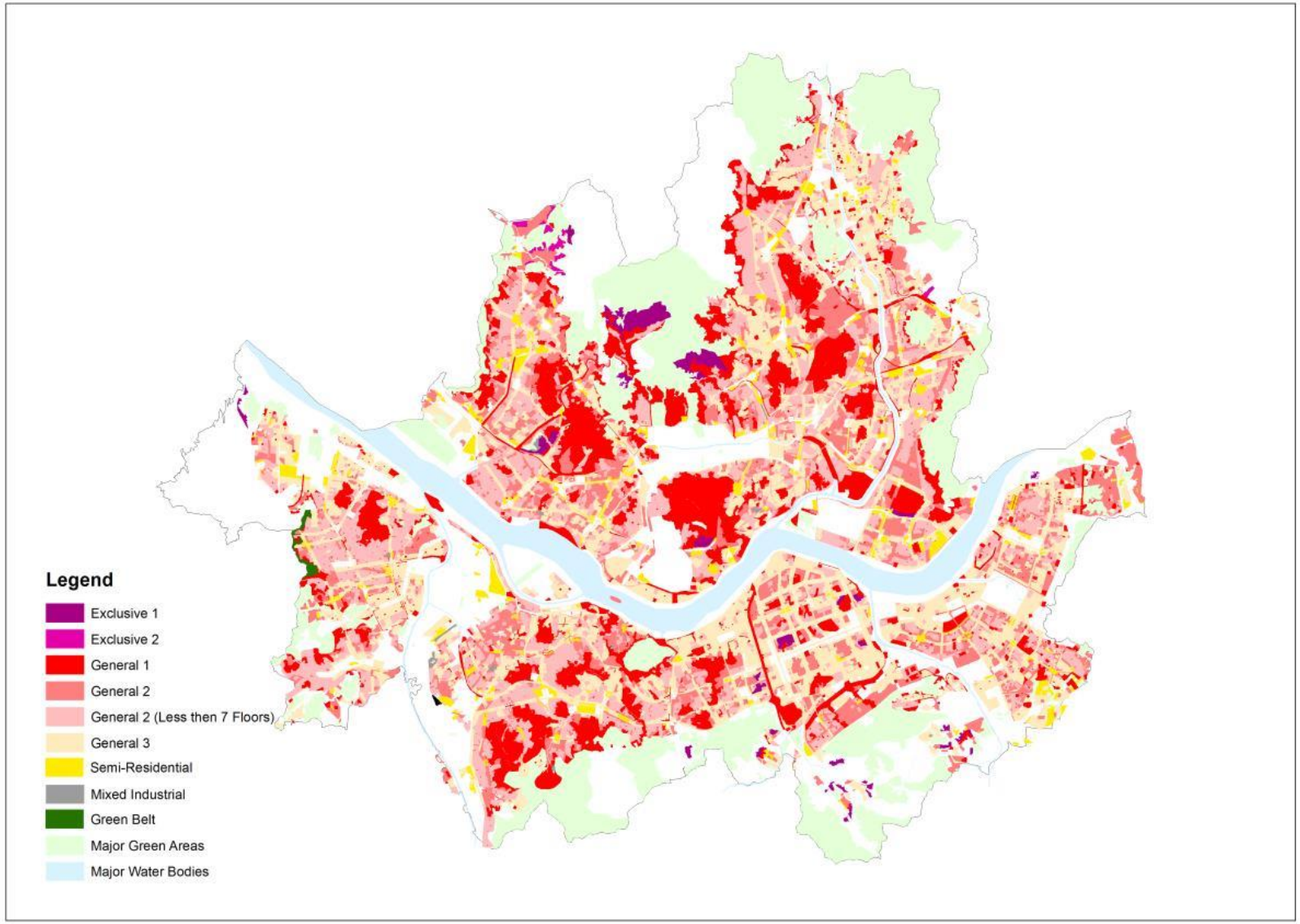
Developed using site observations and satellite imagery in ENVI & ArcGIS



Land Use of Seoul

Statutory Land Use Map. Used for comparison with previous map.

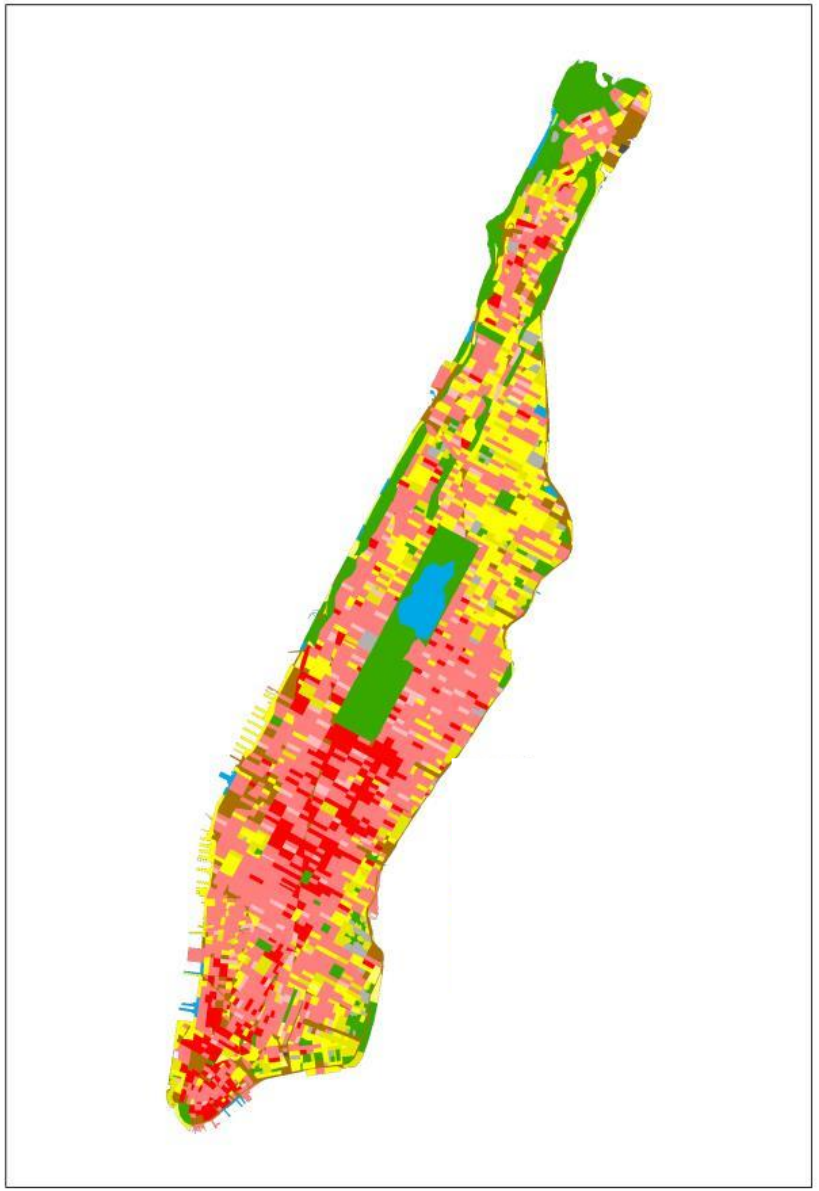
Developed from municipality datasets in ArcGIS.

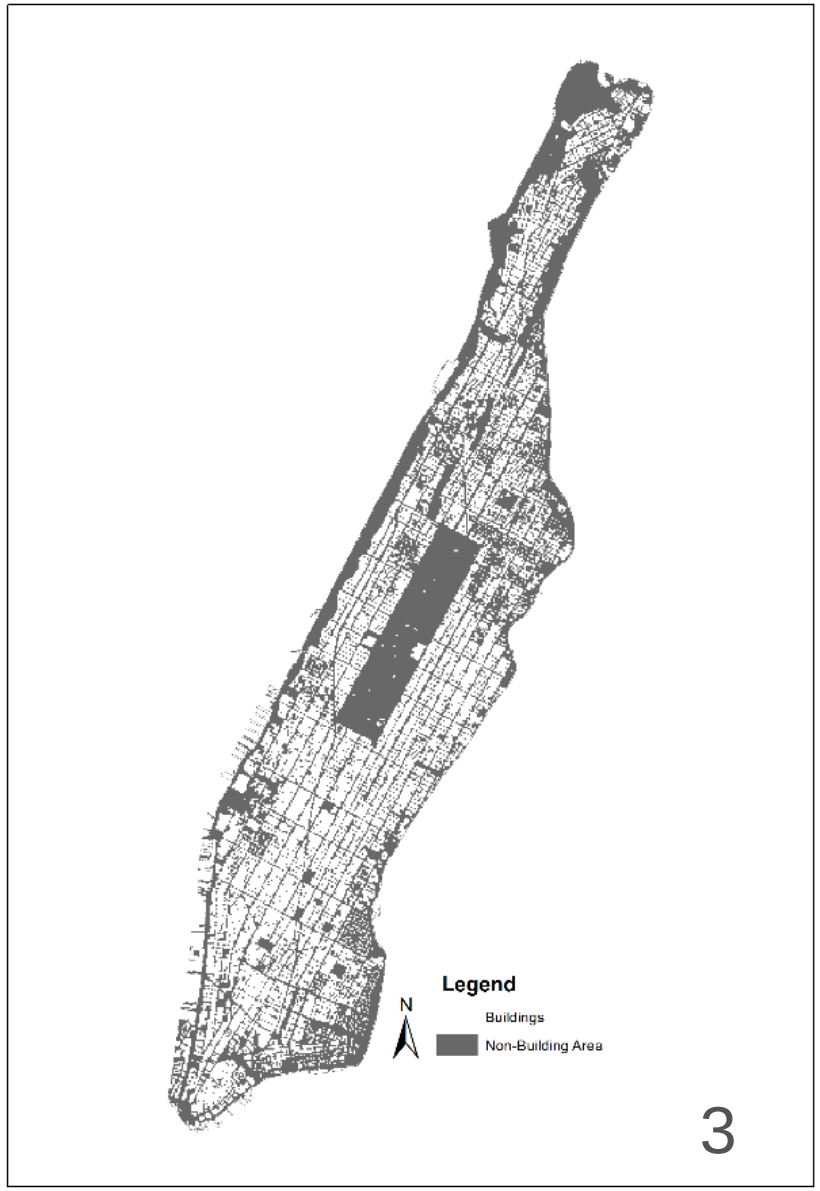


Classification of Manhattan

Similar Analysis using GIS data and separation of buildings.

Developed using Python and ArcGIS.

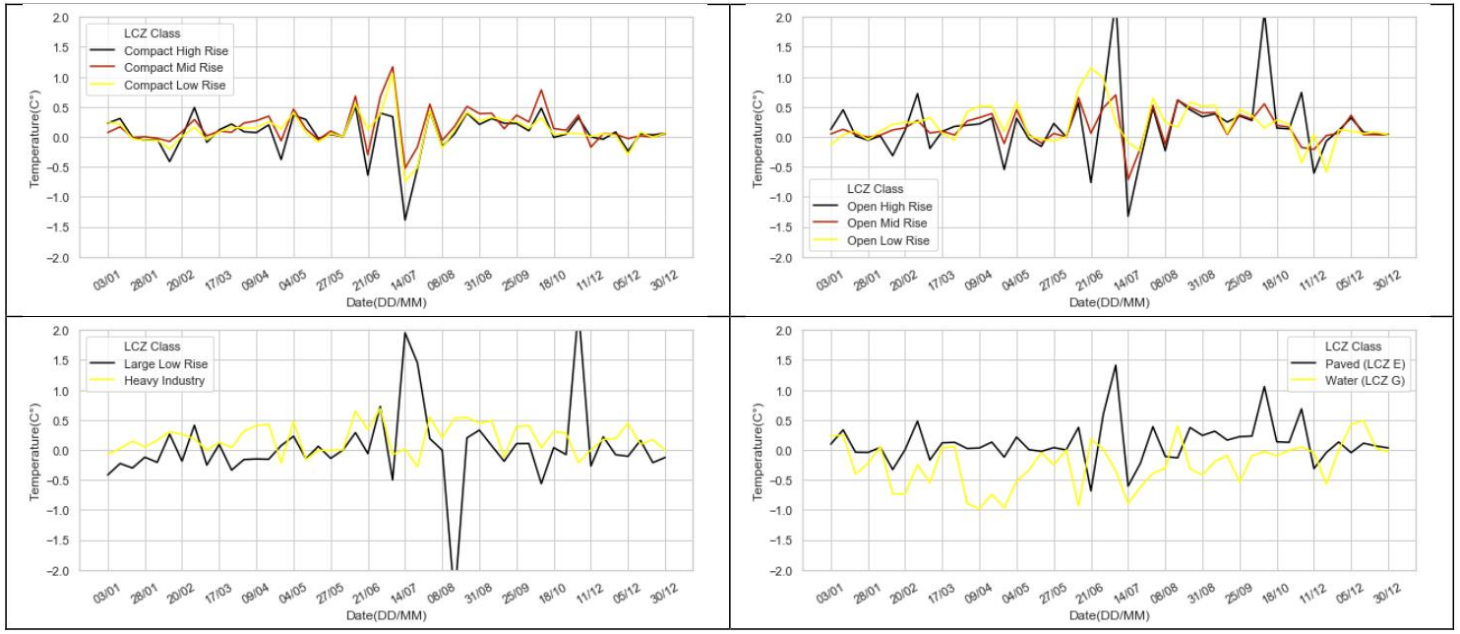


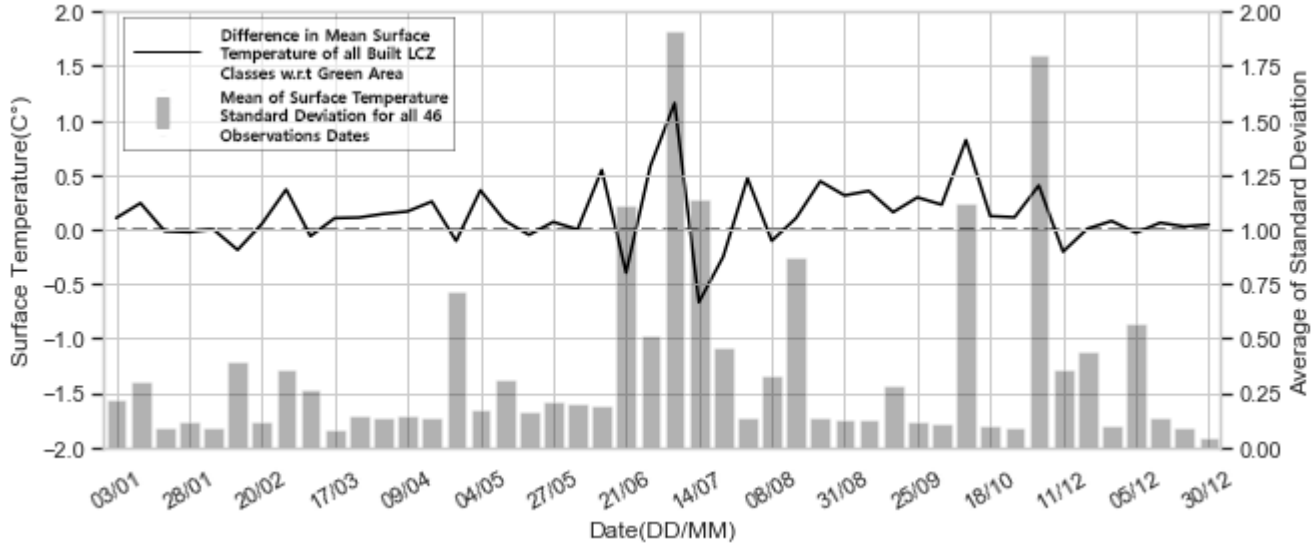


Temperature Differences

Investigation into differences in temperature based on different urban types identified in Manhattan.

Developed using Python.

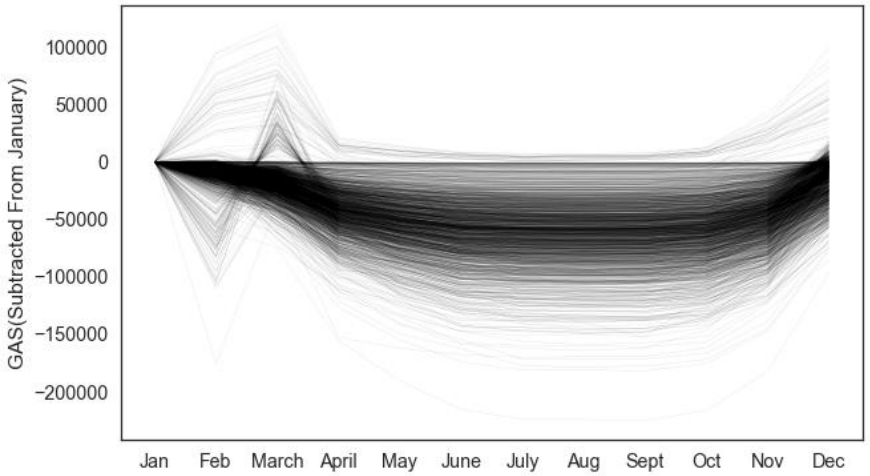


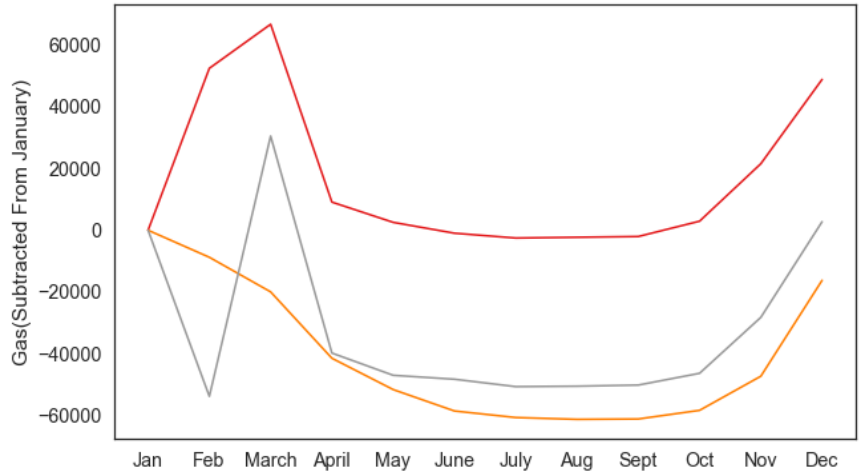


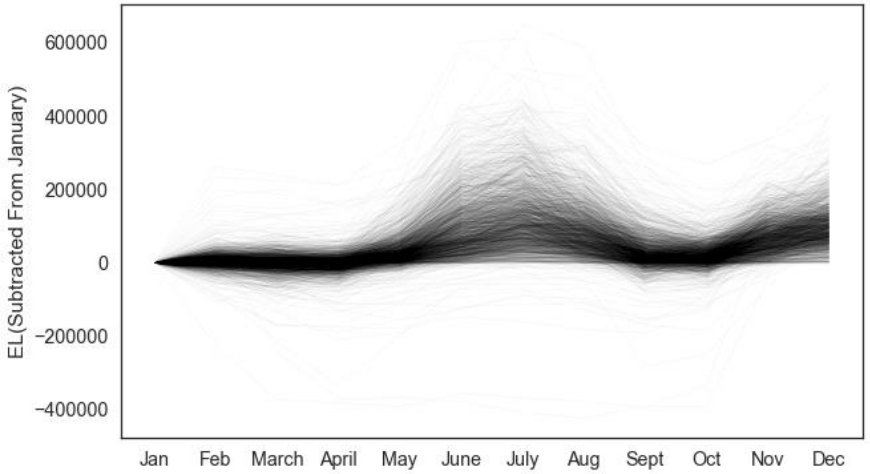
Gas and Electricity Consumption

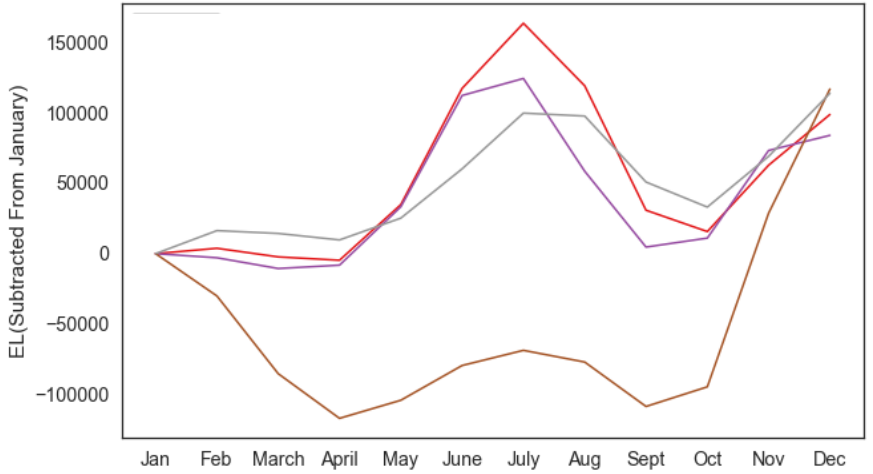
Investigation into different energy consumption patterns in urban area. Key configurations identified using time series clustering.

Developed using Python.





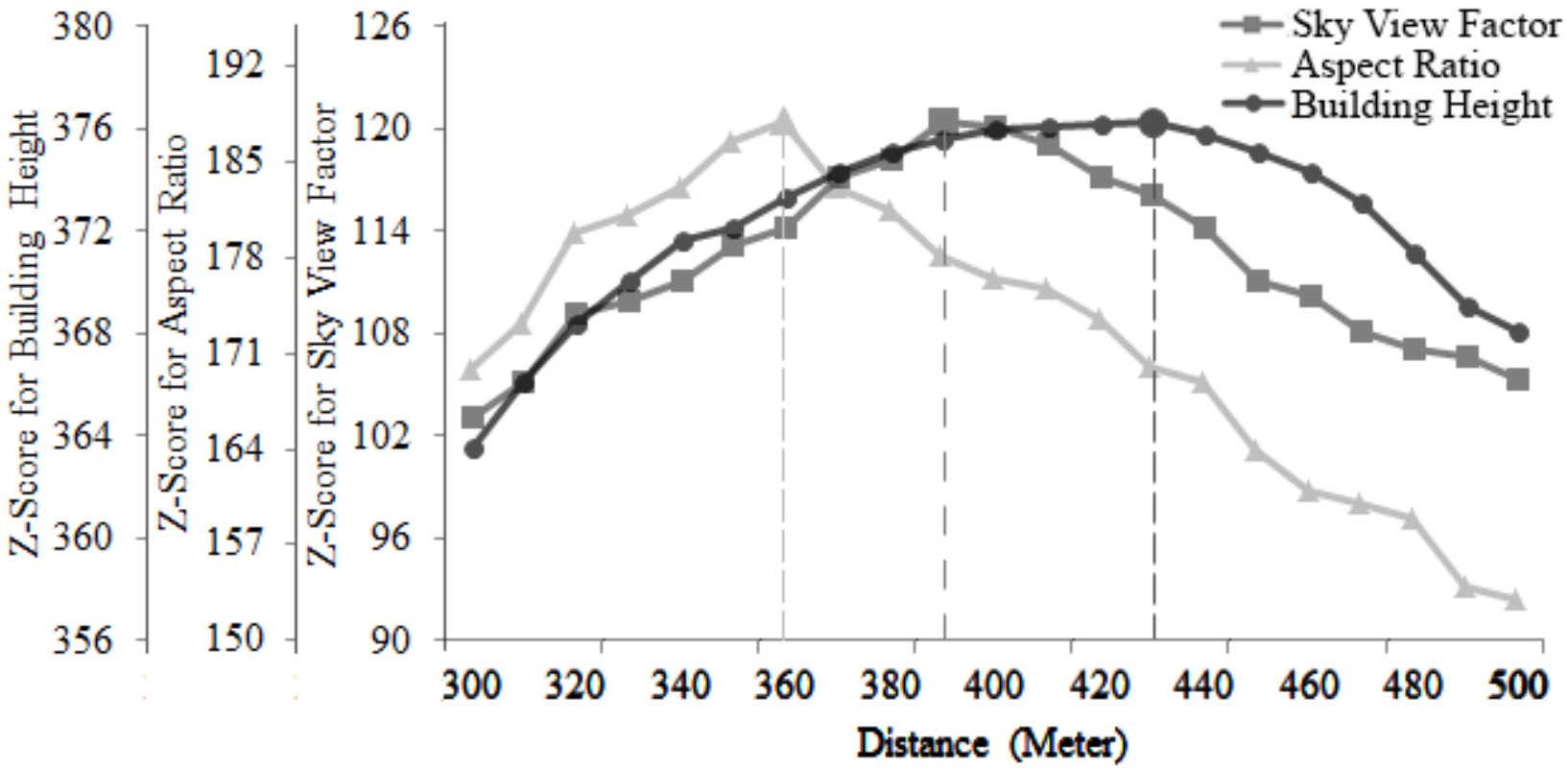




Spatial Autocorrelation

Identification of spatial autocorrelation (similarity over distance) for various urban parameters.

Developed using ArcGIS and Python.



Article

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An Exploration of Classification Methods for Identifying Mixed Zones in GIS-based Local Climate Zones (LCZs) Mapping

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Abstract

Local Climate Zones (LCZs) have been a key instrument in the development of thermal profile of the urban areas. Consequently, Urban Heat Island (UHI) studies have moved from urban-rural comparison to built form based assessment. Although remote sensing based LCZ is more popular, GIS based classification has been an area of interest due to finer details of urban morphology in GIS datasets. Since GIS based classification uses LCZ class parameters, due to their heterogeneous profile, part of study area often fails to satisfy all the criteria for any of the LCZ class,. Thus, this research explores C-Means based LCZ classification using the case of Seoul, South Korea, which is validated using surface temperature. The results show that only 26.35% of Seoul's area satisfies LCZ classes' parameters. For unclassified areas, C-Means not only list out mixed LCZ classes, but also the pure classes extracted are more accurate as compared to Random Forest based classification.

Keywords: Local Climate Zones, Mixed LCZ, LCZ Classification

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Smart and Healthy within the 2-degree Limit

Estimating Impact of Green-Blue Infrastructure on Air Temperature Using Remote Sensing

Case Study of Sabarmati Riverfront, Ahmedabad, India

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ABSTRACT: With the availability of high quality remote sensing data, the phenomena of urban heat island has been well documented over the past two decades. Various mitigation measures, including changes to urban form, construction material, etc. have been suggested; however, these factors tend to be static and have a long gestation period. Water and forest body have higher specific heat compared to urban built up and thus have a lower surface temperature during the afternoon, when the temperature generally peaks. Many indigenous civilizations have used this 'cooling effect', but the effectiveness of water and forest bodies on cooling is poorly understood. This study uses remote sensing data, specifically, thermal imagery from Landsat 7 and 8 satellites to calculate the quantity and range of cooling due to the combined presence of water body and green strip along the water's shore. The study finds that in the studied area, the cooling effect ranges from 1.1 to 3.9˚ C but with a maximum effective range of 360 meters under the favourable wind conditions. The short range of cooling effect raises questions if green-blue infrastructure can be an effective way to combat UHI in the dense urban area where land is scarce and expensive.
KEYWORDS: Urban Heat Island, Green Blue Infrastructure, Sabarmati Riverfront

Thank You

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