

Our project is the Urban Heat Island effect (UHI). The UHI effect causes urban areas to be significantly warmer than nearby rural regions due to factors such as high building density, limited vegetation, fewer water bodies, and excess heat from industry and transportation. These temperature differences can lead to higher energy consumption, infrastructure stress, and severe health risks. Vulnerable groups, including young children, older adults, outdoor workers, and low-income communities, are especially at risk from extreme heat exposure.

Our project aims to develop a neural network model to predict the severity and distribution of the UHI effect across urban areas. Using structured datasets, our model will analyze near-surface air temperature measurements and environmental characteristics to identify key contributors to urban heating. Important predictive factors include vegetation coverage, proximity to water, and urban density, all of which are known to impact localized temperature variations. Unlike traditional statistical approaches, we are using neural networks because they can capture complex, non-linear relationships in the data, which ultimately improves prediction accuracy.

Our approach involves cleaning and processing the dataset, selecting the most relevant features, and fine-tuning the neural network model for optimal performance. By recognizing patterns in temperature variation, our model will provide valuable insights into the causes of UHI and help forecast heat-intense zones in cities. The results will assist urban planners and policymakers in designing effective mitigation strategies, such as expanding green spaces and optimizing urban layouts. This study highlights the role of machine learning in addressing environmental challenges and creating more climate-resilient cities.