Group B-1 | Fine Scale Urban Weather Data Acquisition by Using Urban Weather Generator Model

COA SHOWCASE

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This project develops a neighborhood-scale dataset of temperature and humidity for the city of Houston. Extreme heat poses significant environmental and health risks, impacting both the psychological and physiological well-being of individuals. These impacts often disproportionately affect marginalized and disenfranchised communities due to the unequal distribution of extreme heat severity and heat mitigation measures in urban areas. Neighborhood-scale planning is essential for addressing climate change through adaptation strategies as neighborhoods are usually homogeneous for urban physical morphology and social economic status. Developing accurate climate data, especially regarding thermal environmental factors such as air temperature, humidity, at the neighborhood scale is crucial for assessing the current and future impacts of climate change locally, while there is a lack of weather data at the neighborhood level because collecting data at a neighborhood scale can be challenging because of time, resources and privacy concerns. To bridge this gap, this project employs the Urban Weather Generator (UWG) model to generate neighborhood-scale canopy temperature and humidity data. We use a 500 by 500 meter grid to define neighborhood size in this study. Then, the spatial variability of the urban air temperature and humidity for the city of Houston is analyzed. This dataset is expected to enable a comprehensive analysis of neighborhood heat variation, identify regions requiring targeted interventions for microclimate design, and explore how local microclimates affect broader weather patterns.