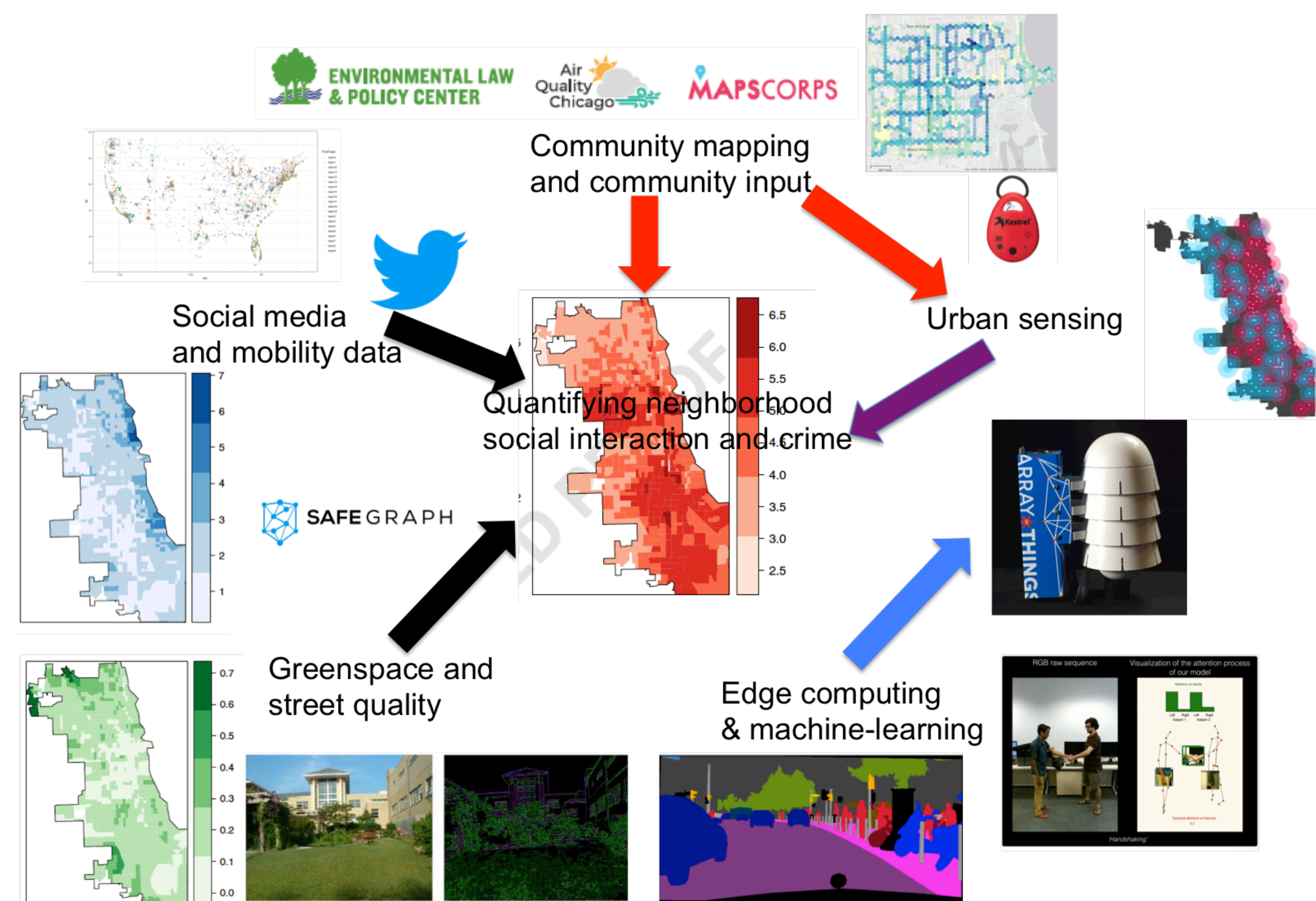


Understanding the Impact of Social and Physical Environment Factors on Crime Using Urban Sensing and Machine-Learning

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Project Goal: Understanding how different physical environment (e.g., greenspace, disorder, heat and air quality) and social environment factors (e.g., street activity) affect neighbor social cohesion and crime



Intellectual Merit: 1) Testing extant sociological and psychological theories relating social cohesion and physical environment variables such as disorder and greenspace to crime; and 2) applying causal inference models and AI-optimized systems to examine to what extent ambient image and sound data can be used to determine the character of social interactions and overall neighborhood cohesion. This could transform social science research by measuring complex social and physical environment variables at scales never before investigated. This will also push the boundaries of ML algorithms embedded in intelligent distributed sensor networks.

Progress to date: 1) quantifying how number of park visits and neighborhood street activity relate to crime, 2) obtaining air quality, heat mapping, subjective measures of social cohesion from our community partners, 3) discussed pros and cons of urban sensing with our community partners, 4) setting up initial ML algorithms of indoor social interactions, and 5) quantifying disorder from Google streetview images.

Immediate Broader Impacts: Results from some initial work will already uncover relationships between park usage, greenspace, street activity and crime. We will also have new data about air quality, heat and subjective measures of neighborhood social cohesion that can be use to inform neighborhoods and to highlight potential points of community intervention.

Long-term Broader Impacts: Results of this research could inform ways in which the physical environment could be altered to improve social cohesion and potentially reduce crime. In addition, this research could uncover patterns of social interaction and how different contexts affect interaction.

Next Steps: Developing and instituting an outdoor sensor network on the University of Chicago campus to conduct experiments on social interactions and to train ML algorithms.