Scalable Techniques to Study the Equitable Distribution and Condition of Sidewalks across the US

Recipient/Grant (Contract) Number: 69A3552348310

Center Name: Pacific Northwest Transportation Consortium (PacTrans)

Research Priority: Improving the Mobility of People and Goods

Principal Investigator(s): Jon Froehlich (UW)

Project Partners: Disability Rights Washington, Easterseals, SDOT, Prof Yochai Eisenberg at UIC

Research Project Funding: $75,000 federal; $75,000 non-federal match

Project Start and End Date: 8/16/2023 – 8/15/2025

Project Description: Sidewalks form the backbone of cities: at their best, they provide a safe, off-road pathway for pedestrians, support environmentally friendly mobility, help interconnect mass transportation services like bus and rail, and promote local commerce and recreation. For people with disabilities, accessible sidewalks provide even more critical support for mobility, physical health, and overall quality of life. And yet, unlike their road counterparts, there is a lack of high-quality sidewalk datasets and fast, inexpensive, and reliable sidewalk assessment techniques—which fundamentally limits how we study and plan equitable urban infrastructure and mobility.

Highlighting this data disparity, in a stratified sample of 178 US cities, while 90% of cities published were found to have street data, only 34% had data on sidewalks, and even fewer included curb ramps, sidewalk condition, and obstructions. Examining ADA accessibility in US cities, only 54 of 401 municipalities (13%) studied were found to have published sidewalk transition plans and only seven met the minimum ADA criteria. In a smaller, independent interview study of government officials, PI Froehlich et al. identified that cities struggle with sidewalk data collection, community engagement, resource provisioning, and insufficient analysis tools. This lack of data and tools for sidewalks fundamentally limits scientific research in urban mobility and equitability, the ability for communities, advocacy groups, and local governments to understand, transparently discuss, and make informed planning decisions, and how sidewalks are incorporated into everyday mapping tools like Google Maps.

In this proposal, building on extensive preliminary work by this research team, we propose two overarching aims: first, to extend our research on scalable techniques to locate and assess sidewalks using crowdsourcing and artificial intelligence (Crowd+AI) by comparing our crowdsourced data to official government datasets; second, to advance understanding of the geospatial equity of sidewalks and their condition. Our recent successes with Project Sidewalk—a remote sidewalk data collection tool that combines crowdsourcing and computer vision to map sidewalks and their condition developed by PI Froehlich—serves as the key enabler of our grant.

US DOT Priorities: This project contributes to the **safety, equity, and climate and sustainability** US DOT Strategic Goals. Accessible sidewalks are fundamental to equitable human mobility in cities; however, there is a lack of high-quality datasets on the *location* and *condition* of sidewalks in the US and,

commensurately, studies examining the socio-spatial patterns of sidewalk infrastructure. Our proposed work advances understanding of the strengths and weaknesses of crowdsourced-based virtual audits *vs.* professional on-the-ground assessments and provides the first cross-city assessment of sidewalk equity in the Pacific Northwest to help identify key areas for improvement and renovation.

Outputs: Our research will directly contribute to PI Froehlich's large-scale open-source Project Sidewalk system (https://projectsidewalk.org), help inform urban planning and equitable sidewalk policies in partner cities, and make fundamental methodological contributions related to infrastructure assessment. All data and code related to this proposal will be open sourced and study findings will help inform local government policies and urban planning.

Outcomes/Impacts: Our study comparing virtual audits to government data will advance understanding of the strengths/weaknesses of crowdsourced-based virtual audits *vs.* professional on-the-ground assessments. Our sidewalk equity study will provide the first cross-city assessment of sidewalk equity in the Pacific Northwest and help identify areas key areas for improvement/renovation. Our findings will also further uncover benefits/drawbacks of crowdsourced infrastructure assessment.

Final Research Report: *will provide upon completion of the project*