Equitable New Mobility: Community-driven mechanisms for designing and evaluating personal delivery device deployments

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New mobility technologies are on the rise in cities across the US, with micromobility platforms and autonomous delivery robots occupying the sidewalks of many cities. Amid the enthusiasm around what these devices could mean for the future of transportation and the circulation of essential goods are concerns about who stands to benefit from these technologies.

Community Identified Problem:

The increasing presence of new mobility technologies across municipalities will have lasting impact on the equity and accessibility of public space. Our research develops community-driven approaches to the design and governance of personal delivery devices (PDDs).

Intellectual Merit:

This project contributes: 1) empirical findings on the **factors that promote or hinder the deployment of new mobility technologies**, with particular focus on the adaptations required to make PDDs equitable in their local contexts (e.g., device design iteration, oversight), 2) **failure analysis techniques** to inform government decision-making around new mobility, 3) **equity metrics** to evaluate deployments, and 4) a **community-centered design and development process** for mobility devices.

Current Activities and Outcomes:

- Conducted 8-month ethnographic study of PDD pilot in Pittsburgh, including interviews with city staff, representatives of the PDD company, and residents
- Developed simulation environment and failure mode analysis games to test device designs and engage with community members in conversation around PDDs' impact
- Prototyped a community feedback station to collect ongoing, in-situ recommendations from residents
- Deployed survey examining food access and the travel needs of PA residents

Simulation: VR environment to model different form factors or behaviors such that community members can offer feedback prior to a pilot
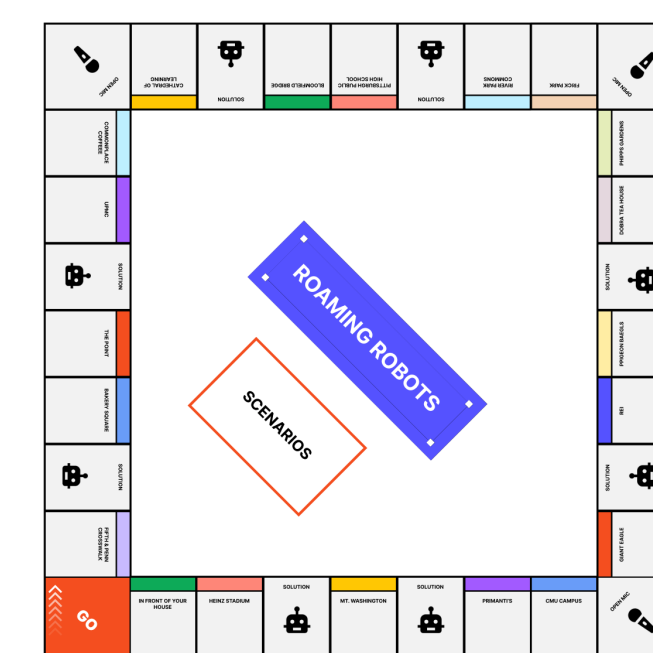
Failure Mode Analysis: Shared experiences like workshops and games allow for residents and policymakers to join in discussion about mitigating adverse outcomes, and imagine preferred uses

Ethnography: Residents developed folk theories and rarely engaged with PDDs during the City-sponsored pilot, but they were more likely to interact when the robots became stuck

Immediate Impact on Society:

- PDDs on sidewalks disproportionately impact elder residents and those with mobility impairments. Our work examines potential for community-centered deployments and equitable distribution of benefits.
- Our analysis of the PDD pilot has helped inform local policy, and was featured in a report to the Pennsylvania Department of Transportation

Sustainability:

- Our workshop series fosters broad, community-based discussions and activities, and is produced with corresponding facilitation guides for local communities across the nation to adopt.
- Our ongoing work collects and analyzes data on the physical properties of PDDs (e.g., size, speed), which can be taken up by industry and regulators.

Next Steps:

- Our survey analysis will inform the development of equity measures to evaluate future deployments
- We are collaborating with our partners on a full proposal focused on how Quality of Life is impacted in communities where co-designed new mobility devices are deployed