Android App Prototype for Youth Participatory Action Research

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Abstract

Reliable pedestrian networks are essential for community members to access local resources, travel to work, and a variety of other essential needs. Due to funding disparities for maintaining sidewalks' quality, adding features to make sidewalks accessible (such as curb ramps and accessible pedestrian signals), and ensuring that the pedestrian experience is safe by monitoring/updating posted speeds to match the flow of traffic. Equitable adjustments in this funding requires documentation of the disparities and a lot of the communities affected by funding disparities also lack data on the current state of pedestrian environments. In this study, we seek to provide a prototype for future use in a Youth Participatory Action Research (YPAR)[1] project. The Android app developed through our research collects information about users' location, the accessibility of the intersection they are at, their previous experiences with this intersection, and various conditions of their environment.

Introduction

This project is an extension of the lab's OpenSidewalks (OSW) project. In order to identify characteristics of the pedestrian environment, and locate where users are, the app connects with Open Street Maps (OSM). OSM is a useful tool to identify specific characteristics of pedestrian-centric transportation. However, there are gaps in reporting of such characteristics between different neighborhoods and locales. In order to start the journey of remedying these gaps, this research seeks to provide a prototype for an app to receive input from community members on the current state of pedestrian-centric transportation in their communities. Ultimately, this app can be used either for broad collection of data via crowdsourcing citizen scientist networks[2] or through community-led initiatives to better the pedestrian network, such as a Youth Participatory Action Research Project.[1]

In designing this app, a central research question emerged. While aiming to collect reliable and replicable data from untrained community participants. When using databases of contributors, such as SciStarter, the participants must be able to determine what the app is asking of them, as there is no one from the project with them to guide them through data collection. This produces a central research question of how we, as researchers, can get accurate information from our participants on subjective questions.

Identifying accessibility barriers at intersections can require eyes that are attuned and trained to find such barriers. This is not feasible for projects that involve citizen scientists- the only priming and preparation we could give them was contained within the application itself.

How can we collect accurate information from participants not priorly tuned to issues of accessibility?

Testing and Usability

Due to COVID 19, the ability to conduct rigorous testing was hampered. Initial testing was conducted with three participants, all reporting at the same intersection. The participants used the application to collect data at different times of the day.

All participants reported that the application flowed intuitively, meaning that they knew exactly what was being asked of them at each step. As all three were not previously trained in identifying features of accessibility, clarity in what was being asked was pertinent to them being able to participate in data collection.

In their reports on the intersection, the participants all responded in agreeance regarding our subjective question of interest, which asked them to identify whether the the flow of traffic seemed to be going above, at, or below the posted speed limit. One participant incorrectly reported the speed limit, which complicates these results. Overall, the consistency in reporting seems promising for future iterations of the application, particularly when thinking about collecting more specific information about the accessibility of intersections from untrained participants.

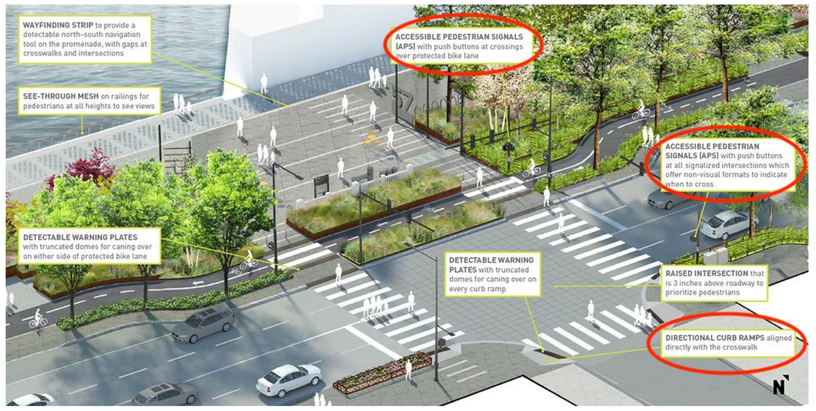


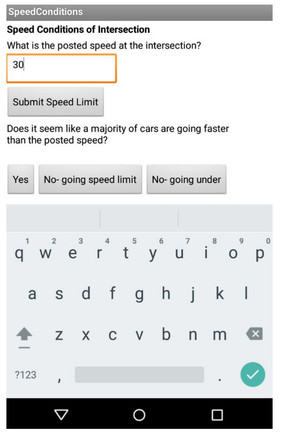
Figure 1: Rendering of a Seattle intersection with boxes pointing out various accessible figures. Red circles were added to denote the features discussed in our application: directional curb ramps and accessible pedestrian signals.[4]

Approach

The application prototype was built out to be compatible with the interfacing for a citizen scientist network[1] with the hope that community-led initiatives could use the application as a basis to collect both 1) data regarding accessibility of pedestrian environments and 2) other information relevant to community interests/issues. The application itself is an android application that was created using MIT's AppInventor[3] so that editing of the prototype would be accessible to individuals with limited technical backgrounds.

In order to get users to be able to contribute regarding the accessibility of the pedestrian environment they were in, we had to experiment with asking specific questions that helped guide them towards considering the accessibility of their environments. For example, utilizing images to help users identify various aspects of the intersection, such as APS signals and curb ramps, proved to be successful in some situations. When gathering subjective information, such as the safety of the environment due to car speed, asking narrow questions helped reach consensus amongst participants.

Key Application Pages



Left Image: Screenshot of the page asking users the speed limit and speed of traffic, aimed at testing the reliability of asking untrained participants narrow, yet subjective, questions.

Right Image: Screenshot of page describing accessible pedestrian signals (APS). The page describes aspects of an APS and includes an image example of an APS, asking the user what type, if any, of APS is present at their intersection.

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Conclusions

This research provided a foundation for an Android application that can be adjusted by community leaders in future YPAR projects. Utilizing images throughout the application helped attune users to different accessibility barriers in the pedestrian environment. While further testing is required in order to provide sufficient results regarding participants' accuracy for more subjective or nuanced questions, preliminary testing showed a general consensus amongst users. The modular nature of this application provides a prototype for collaborating community groups to gather data on the topics of their choice, including the accessibility of local pedestrian environments.

References

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