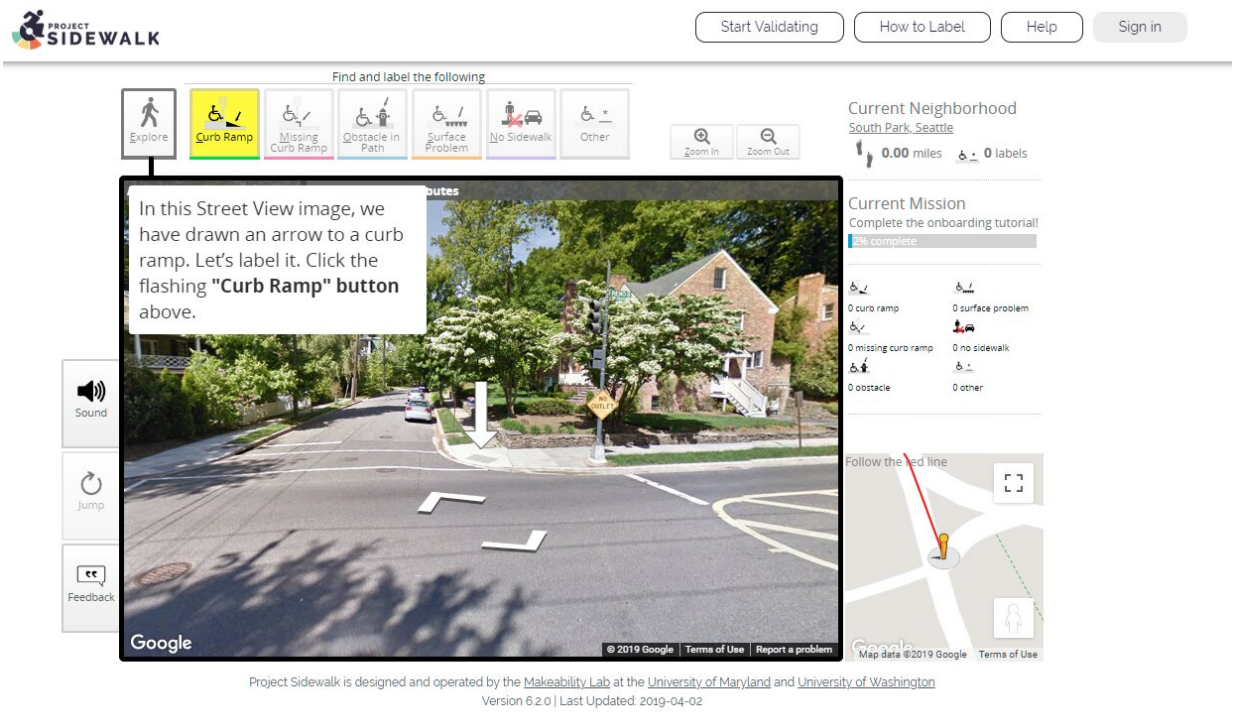
Project Sidewalk helps users map accessibility around Seattle and other cities

April 18 2019, by Sarah Mcquate



Project Sidewalk uses an "onboarding" process to teach players how to manipulate the map and about common accessibility issues. Credit: University of Washington

About 3.6 million adults in the United States use a wheelchair to get around, according to census data.

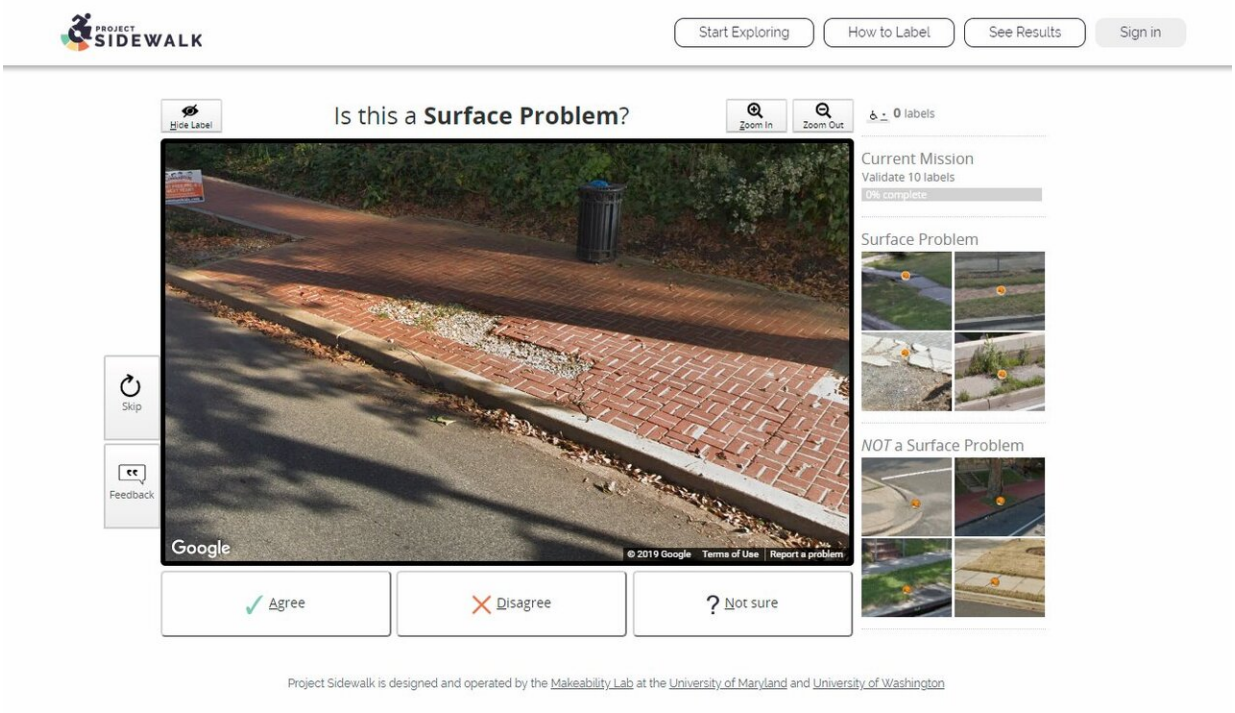
But unless you're one of those people, you might not know how hard it is to get around your city.

Now people can help map out accessibility here in Seattle. University of Washington researchers have led the development of Project Sidewalk, an online crowdsourcing game that lets anyone with an internet connection use Google Street View to virtually explore neighborhoods and label curb ramps, missing or rough sidewalks, obstacles and more. Project Sidewalk first launched in Washington, D.C., and it's now available in Newberg, Oregon—near Portland—and Seattle. The team will present its results from the Washington, D.C., deployment May 7 at the 2019 ACM CHI conference on Human Factors in Computing Systems in Glasgow, Scotland.

"A lot of people think this is something where you walk around your neighborhood and take pictures of accessibility problems with your smartphone," said corresponding author Jon Froehlich, an assistant professor in the Paul G. Allen School of Computer Science & Engineering. "But Project Sidewalk is not like that at all. There's no assumption that you have any physical experience with what you're reporting on. That is the key difference. Anyone can do it from anywhere, as long as they have a web browser."

To get started on Project Sidewalk, the team interviewed people with mobility impairments to learn about how accessibility—or a lack of it—affects their lives. From there the researchers came up with a method to use crowdsourcing to collect street-level data about accessibility in cities.

Project Sidewalk relies on volunteers to log accessibility issues across a city. So the team used a video game model to make it more fun. Players go on missions where they audit 500 to 1,000 feet of a city at a time.



The team developed a new verification "mini-game," in which players verify 10 labels that someone else placed. Credit: University of Washington

"Your first mission is a guided mission," Froehlich said. "We have to teach you how you walk around and how to label things. But then we also need to help you understand what accessibility means: What is a curb ramp? What does it mean to have a missing curb ramp?"

Then players are sent out on solo missions—they're either dropped into the city in an area where there aren't already a lot of labels, or they can choose to go to a specific part of the city. For their first few missions, players receive helpful tips about the interface and shortcuts to make their labeling faster. Project Sidewalk also displays a progress bar that shows players how far they've gone on a mission.

"We've found that people love seeing that progress bar," said first author Manaswi Saha, a doctoral student in the Allen School. "They say it makes it more fun and feel more like a game."

After the team launched the Washington, D.C., version of Project Sidewalk in August 2016, 797 players added 205,385 labels to the city's streets over the 18-month deployment. Players placed labels accurately about 72% of the time and were most likely to find and label curb ramps.

"We're still working on analyzing the data," Saha said. "But when we look at all the labels on the map, we can immediately start to see which portions of the city might be having issues."

Players also made a variety of common errors, such as labeling a driveway as a curb ramp or labeling surface problems on the street when the sidewalks were fine. These errors prompted the team to develop a new verification "minigame" in the Seattle and Newberg versions of Project Sidewalk, in which players verify 10 labels that someone else placed.

"I want it to be like Super Mario Brothers 2, which has these fast little minigames that pop up between levels," Froehlich said. "It gives people time to breathe and do something different. It's something you could do on the bus."

Because the data from Project Sidewalk is available to anyone, the researchers envision that it could serve multiple purposes, from helping government officials decide which areas to investigate first to enhancing the independence of people with mobility impairments.

Data from Seattle's Project Sidewalk could inform other accessibility projects in the area, Froehlich said. For example, AccessMap, which

provides directions for pedestrians and wheelchair users looking to avoid hills, construction sites and other accessibility barriers, could use data from Project Sidewalk to be able to create better directions.

Eventually the team would like to have computers use machine learning to help people add labels on Project Sidewalk and make accessibility audits go faster. The researchers hope to use the Project Sidewalk data to train an algorithm that would teach computers how to do their own audits.

"My ambitious vision is for anyone in the world to click on their city and have our system provide a visualization and an accessibility assessment," Froehlich said. "It shouldn't matter if you live in Paris, France, Beijing, China or Cairo, Egypt. If Google Street View has driven there, you should be able to get a map visualizing the city's sidewalk accessibility."

More information: DOI: 10.1145/3290605.3300292

Provided by University of Washington