Wayfinding for People with Visual Impairment

Aside from its core mission to educate, the Department of Geography and Regional Science at the University of Graz, Austria, is also tasked with researching and advocating urban sustainability. This has come to include helping people with visual impairment or blindness get around on foot independently. To attain that goal, the university decided to design a geographic information system (GIS) web app to help visually impaired people plan their trips within the city.

The Challenge

The project team had to work on app development, adapt an app-to-screen reader for the visually impaired, and build a geospatial dataset that meets the navigational needs of people with visual impairment or blindness.

Although the city of Graz has about 1,100 miles of streets, it did not have a geospatial dataset for its sidewalks. Based on surveys and interviews, the team determined that the dataset would need to identify navigational aids, such as walls or fences, to guide blind people along routes. Data should also include lampposts and mailboxes that could serve as landmarks. And the web app would also need data to let users know about crosswalks as well as challenges along a route including narrow sidewalks, bicycle traffic, and intersections.
The project team, led by Professor Susanne Zimmermann-Janschitz, PhD, with support from Sebastian Drexel, BSc, and the team from the University of Graz’s Department of Geography and Regional Science, partnered with Esri distributor SynerGIS Informationssysteme GmbH to kick off the ways2see web app project. Funding was secured from the Austrian Research Promotion Agency (FFG). End-user needs assessment was performed by the Odilien-Institut Graz, an organization that trains and cares for people with visual impairment or blindness.

The Solution
After determining the specific needs of its visually impaired or blind users, the ways2see project team began to catalog the geospatial data it needed. Sidewalks were generated using open government data and extended with information such as surface condition or ramps, which had to be mapped in the field. The team evaluated the technology it would need and selected Web AppBuilder for ArcGIS to build the app.

Using Web AppBuilder for ArcGIS, the ways2see app team was able to reduce development time, as it did not have to build the app from scratch. Web AppBuilder for ArcGIS comes with workflows and widgets that the team could customize and extend as needed. It also offers built-in support for multiple operating systems and devices, thus allowing for optimization of the ways2see user experience.

The Results
Potential users in Graz are testing the ways2see app and using it to plan trips within the city. Feedback from beta users will help the development team identify missing functionalities, fix problems, and improve the app for different operating systems.

In just over a year, the team launched a beta version of ways2see and developed a framework that can be easily adapted by other cities using their own local datasets.

“If you want to do something for people with disabilities, success is defined in a completely different way—not in terms of money or business but by helping [them] to gain more independence and individuality through inclusion,” said Zimmermann-Janschitz.

“The overall idea behind ways2see is to create a GIS for all people, whether or not they have disabilities.”

Susanne Zimmermann-Janschitz
University of Graz, Austria