CITYLAB

How to Make Transit More Accessible to the Visually Impaired

New signage and NaviLens technology have been rolled out in Barcelona, Madrid, and Murcia city to help visually impaired people navigate public transportation.

Aisha Majid

19 de julio de 2019 16:16 CEST

In Barcelona's Plaza España, a man uses a new system that works with a smartphone to help visually impaired people navigate public transport. *NaviLens*

SHARE THIS ARTICLE
Share
Tweet
Post
Email

When you are blind or partially sighted, everyday tasks can present a challenge, not least of all finding your way around the city. Things such as locating the ticket machine in a railway station or knowing if your bus has just pulled into the bus stop can be tricky or even impossible to do without help. But since 2018, brightly colored tags have been popping up in Barcelona, and more recently in other Spanish cities to simplify navigation for people who are blind and partially sighted.

Paired with a mobile phone, they are part of a system known as NaviLens developed by the Mobile Vision Research Lab at the University of Alicante and the technology company, Neosistec. Designed to be used alongside traditional sight aides such as canes and guidedogs, NaviLens aims to help visually impaired people feel more independent when moving around the city.

> “It’s like using the camera of the phone as the eyes of a visually impaired person.”

In this article
0751538D
WORLD HEALTH ORGANIZATION
Private Company

LIVE ON BLOOMBERG
Watch Live TV >
Listen to Live Radio >
Bloomberg Television

58
safety inventions are developed
HYUNDAI
How Hyundai Advances Korea’s Inventive Spirit
Hyundai's driving technology safeguards the masses.
Learn More

Following the pilot on a small section of the transport network, Barcelona is extending the NaviLens system to its 2,400 bus stops and 159 metro stations as part of broader efforts to make the city's transport network more accessible. In 2019, public transit in Madrid also began limited use of the system, and it is also available in Murcia city.

Using a free app and the camera in their smartphones, users scan their environment to locate the tags which are strategically positioned in bus stops and metro stations by elevators, platforms, stairs, escalators, and ticket machines–anywhere a user needs to take a navigation decision or hear other useful information.

Cities are changing fast.
Keep up with the CityLab Daily newsletter
The best way to follow issues you care about

○ Bloomberg may send me offers and promotions.

By submitting my information, I agree to the Privacy Policy and Terms of Service and to receive offers and promotions from Bloomberg.

Enter your email
Sign Up

CITYLAB

More from
CITYLAB

A Modernist Architect's Home Is Threatened by Modern Developers

How the American Drive-In Staged a Comeback

Let's Not Go Back to 'Normal'

Where Calling the Police Isn't the Only Option

The tags, which are made up of colored squares on a black background, provide users with the kind of information a sighted person would usually take for granted. For instance when approaching a metro station equipped with NaviLens, users access the app and hold up their phones to scan for a tag that will play an audible message on their device telling them at how many meters and in which direction they will find an elevator going down into the station. As they approach the elevator, the user is continually updated with their distance from it.

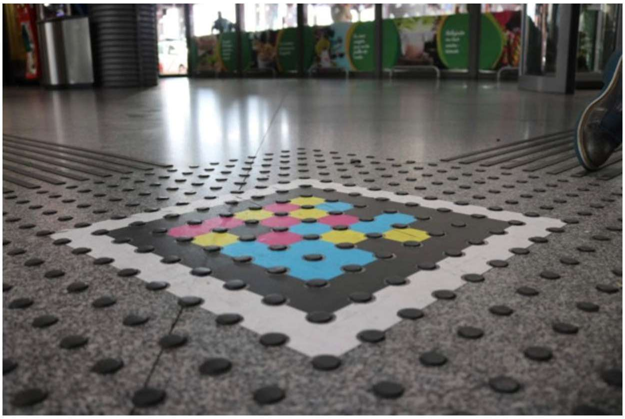
Once inside the station lobby, a user could then wave their phone to sweep the environment for a tag that lets them know in which direction and how far to walk to reach the ticket vending machines, before scanning the space again for further tags that will help them plot a step-by-step route through to the platform they need, just as a sighted person would do by reading signboards.

Paid Post
A Defining Moment for Global Business
TBD Media

Forty-eight-year-old Barcelona-resident Juan Nuñez began losing his sight 10 years ago as a result of a rare, degenerative disease. "Using the metro or bus network became a big challenge. I had to learn the layout of the metro stations by heart," he says.

But an unanticipated change, such as a relocated bus stop is sometimes all it takes to throw a visually impaired person off their memorized route. A former engineer, Nuñez says he is a fan of new technologies and now regularly relies on a host of mobile apps to help him get around. "It's easier as it gives you the information you need in the areas you feel lost. For example, there are tags on elevators that will tell you if the elevator is broken or working," says Nuñez.

At Madrid's main railway station, Atocha, they are experimenting with using the tags on tactile paving–patterns of textured bumps on the ground that share warnings and information with visually impaired pedestrians.



Tactile paving indicating a tag users can access for information in Madrid's Atocha station. *NaviLens*

Usually tactile paving can only provide a visually impaired person with general information such as notifying them that they've reached a spot in the station where there's a turn off to a platform. A visually impaired person wouldn't however, know which platform they've reached without having previously learned the layout of the station or asking a passerby. When a NaviLens tag is placed on an area of tactile paving users can scan the tag to know which platforms the turn off leads to. They will also be told whether they need to turn left or right since the system detects from which direction a user is approaching and tailors the message that's played back.

Once a tag has been located and centered using audio prompts, a user can choose to listen to the information that's stored in the tag by shaking their wrist. The information is played in the default language of the user's phone.

> An unanticipated change, such as a relocated bus stop is sometimes all it takes to throw a visually impaired person off their memorized route.

"We've tried to simulate the same behavior as human vision," says Javier Pita, CEO of NaviLens. "It's like using the camera of the phone as the eyes of a visually impaired person."

The system's ability to play back information in multiple languages has however, also found it an audience among non-visually impaired tourists visiting Barcelona from places such as Japan who have been using the system as a way to translate directional signboards in the transit system into their own languages.

The tags can be programmed with any kind of information from navigation directions to details about special promotions in a station's coffee shop. The tags can also provide real-time information such as live bus schedules which a user can listen to as they approach a bus stop as well as alerts of service disruptions.

One of the keys to the success of the system is getting the placement of the tags right to make them easy for visually impaired users to find. For this Transports Metropolitans de Barcelona (TMB), the city's public transport service, enlisted the support of ONCE, Spain's national organization for the blind.

Unlike with QR codes, users don't need to know exactly where a tag is to be able to read it. A tag measuring 20 x 20 centimeters (7.9 x 7.9 inches) can be detected from 12 meters (39 feet) away, even in motion and without having to focus the phone's camera.

Robin Spinks, a partially-sighted technology expert at the United Kingdom's Royal National Institute of Blind People (RNIB) has been trying out NaviLens in RNIB's London office. For him, the system's advances on the QR code are a huge plus.

"The key thing is that the system is unlike traditional QR codes which are difficult for blind or partially sighted people to locate," he says.

Advances in communications technology have made a significant difference to the lives of people with visual impairments–253 million in the world, by a World Health Organization estimate–as an ever-increasing number of tools for navigation are available on the market.

Among them is U.S. app Aira, which is available for free in some supermarkets across the United States and several airports across the world. Aira allows visually impaired users to connect over the web to a trained live agent who can use the phone's camera to see what the user is seeing and guide them like a second pair of eyes. Another popular app, BlindSquare uses GPS to describe obstacles in the environment, places of interest and street intersections to users as they travel.

Many apps however, rely either on an internet connection or GPS which only works indoors with special beacons. Bluetooth beacons can be more costly to put in place along an extensive transport network. Raul Casas of the universal accessibility team at Barcelona transport says that the fact that NaviLens can be used without having to install special beacons was one of its advantages for them.

Spinks, who has been testing a number of new technologies, is impressed by NaviLens' potential for wider use in cities.

"The key thing with NaviLens is it's a low cost sustainable system that's reliable," he says. "Navigation is a challenge for every single blind or partially sighted person–it's one of the most fundamental challenges we face in day-to-day life and anything that can be done to help in that is beneficial."

Have a confidential tip for our reporters?

GET IN TOUCH