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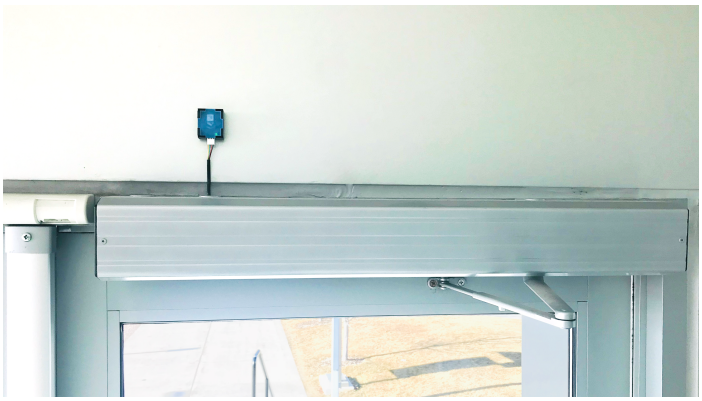
Portal Entryways: A wireless device that opens disabled-accessible doors when a user approaches

The Challenge: People with physical disabilities who use disabled-accessible doors with push-buttons often face a variety of challenges. For example, they risk injury if the door starts to close before they've had time to safely pass through it. Other times the button is not conveniently located for them to be able to push it and they may need to ask someone for assistance. After learning about an injury that a friend suffered when trying to enter an automatic disabled-accessible push-button door with her wheelchair, the Portal Entryways team decided to learn more about the risk factors and inconveniences that people with mobile disabilities may face when using disabled-accessible doors. They conducted 73 in-person interviews and surveyed 267 people with mobile disabilities. Their questions mainly focused on user experience with the disabled-accessible push-buttons. 79% percent of interviewees said the current push-button automatic doors are often still inaccessible. Through research, surveys, and interviews the team then validated their assumptions that entering and exiting buildings was often inaccessible and posed risks of injury to users.

In their discovery process, the team also learned that facility managers struggle with keeping their buildings accessible, since existing wheelchair accessible door options are either too expensive, not interoperable with different brands of door motors, or are incapable of meeting the specific physical needs of different people. While there are disabled-accessible push-button doors, automatic sliding doors, and motion-based activation technologies to open doors, all require hours to install, replace or update. Frequently, the accessibility features on doors are unusable because they are broken or the battery has died. Most surprisingly, facilities

Figure 1: The Portal wireless receiver (left) that is installed on doors, and the smartphone app (right).



managers often have to wait until a user alerts them of an issue before they are able to fix a broken piece of accessible door hardware. This is because existing accessible door options do not actively provide information to facilities managers so that issues can be resolved in real time, and the managers are unable to track the locations of their accessible entryways.

Figure 2: The Portal wireless receiver installed on a door.

The Solution: To solve these issues, the team invented Portal, a wireless device that opens disabled-accessible doors when a user approaches with the Portal smartphone application. The system consists of a small wireless receiver that is installed on doors, coupled with a smartphone app and web interface designed to help two different users: people with mobility-related disabilities and facilities managers.

The team developed a proprietary advertising and connection method that allows an unlimited number of users to open doors hands-free. The user downloads the Portal app onto their smartphone, which runs in the background throughout the day and uses only 1-2% of battery. Facilities managers install Portal's Bluetooth low energy receiver device on their doors, which takes about five minutes to complete per door. When a user approaches a door with the Portal receiver installed on it, the Bluetooth signal will wake up the app in the background on the user's phone. The app will then communicate with the receiver via Bluetooth to approximate the distance that the user is from the door, and when the user is within the pre-set opening distance, the receiver will signal the door to open. While the user is within this opening distance, the app continues to tell the receiver to hold the door open until the user has safely passed through.

As the team was designing Portal, they started to learn about how different types of doors are classified and the regulations associated with them. They discovered that national building code did not allow automatic disabled-accessible doors to be opened with a smartphone app. The team reached out to the committee that updates the building code, and after reviewing the Portal product and seeing the need that it solved, the committee updated this national code to reflect a definition that would allow the Portal device to be installed and used on automatic disabled-accessible doors.

Portal is universally interoperable with almost any door motor associated with a disabled-accessible push-button door, and it is easy and quick to install. Furthermore, the software is updated wirelessly and facilities managers can use a web portal to view the location and status of their entryways in order to keep their doors continuously operable.

Commercialization: Based on market research that the Portal Entryways team conducted, they discovered that there are approximately 25 million doors with automatic door motors worldwide and that number is expected to increase by 7% every year due to changes in laws and standards requiring accessible entrances. They further determined that $23 billion dollars is spent every year installing and maintaining these entryways. Portal Entryways already has their product on the market, with devices currently being installed on 294 doors across 13 facilities. The team filed for a provisional patent in the summer of 2017 and a full utility patent in the summer of 2018, which they expect to receive by the summer of 2019.

Portal Entryways charges each facility a subscription-based fee, with the price varying on a per-project basis. The subscription includes free hardware replacements, and software updates and upgrades. The facility is given access to a web app where it can see the analytics of how many times the Portal installed doors are being used, and it can receive and respond to accessibility maintenance requests from people using the app. Portal Entryways also developed a facility maintenance mobile app that allows the installer to onboard the Portal receivers into their system, including calibrating the opening distance for each door, and saving the GPS coordinates of where the devices are installed.

The smartphone app is free for anyone to download and use. Aside from the intended users with mobility-related disabilities, the team believes that people using strollers, carrying large loads, or elderly people who would regularly use the push-button would also benefit from the Portal app.

The team will continue to focus on expanding their business and they plan to have close to 1,500 door devices installed by the end of 2019. Throughout the rest of 2019, they will continue working with more facilities and scaling up manufacturing. Their primary focus will be working with universities, but they eventually hope to install their devices in other types of facilities, such as corporations, government buildings, medical institutions, and shopping malls.