On Campus Accessibility / Automatic Door Controls

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Description

The On Campus Accessibility / Automatic Door Controls Project will develop a receiver box to interface with the automatic door opener system currently installed on automatic doors around campus, and a mobile application that will interface with the receiver box to allow users to remotely open equipped doors within a specified range from their mobile device. Access to the application's features will be controlled by the Office of Disability services, as the only individuals permitted to utilize the application will be those with a verified physical need. With regards to the structure and security of the application, verified users will be able to log into the application via Shibboleth, and open a nearby automatic door. Although the receiver box and application will open equipped automatic doors, they will not have the capability to unlock a locked door, thus maintaining building security. All in all, the Automatic Door Controls project will provide individuals who rely on these features a user friendly and more efficient system to open these doors, that will not only improve foot traffic flow, but improve accessibility and quality of life of its users as well.

Alternatives

The only alternative to our project is the current state of automatic door controls. Nearly all of the automatic door controls on campus are controlled via a stationary button that is often placed in an inconvenient or sometimes nearly inaccessible location. These locations require the user to go to greater lengths physically to open the door. Furthermore, in addition to these buttons being in poorly placed locations, they are often in high traffic areas. Thus, for the user to access the button, especially for those users using mobility aids such as power-chairs and scooters, normal foot traffic flow is heavily impeded, as other able-bodied individuals accessing the door simultaneously are forced to wait and/or move out of the button user's way while the door opens and the user repositions themselves to go through the door. The handful of remotely controlled doors on campus work well, but are not made more widely available due to the high cost and maintenance time. Thus, all in all, the current solutions are difficult to use and very impractical in their current setting.

Milestone Goals

Gain Approval from the RPI Administration

To implement the project on RPI's campus, approval from the Institute, as well as the Office of Disability Services, and FIXX will be required.

Goals

- Pitch the idea formally to the proper Institute personnel and gain their approval
- Meet with the Office of Disability Services to discuss the implementation plan
- Discuss installation and maintenance plans with FIXX

Stretch

- Pitch the idea to other nearby colleges (Russell Sage, HVCC, etc.) to test the program at other locations

Develop Receiver Box to Interface Between the Door Control and the Mobile Device

The receiver box should be a small, low-cost device which can function alongside current push-buttons or wireless transceivers.

Goals

- Allow connection to central door control server either wirelessly or through an ethernet connection
- Highly document all setup procedure

Stretch

- Devices should not only be cheap, but require as little setup as possible.
    - Use as few parts as possible
    - Simple setup procedure

Develop a framework for the mobile application and administrative server

The users should be able to connect from either a mobile device or laptop computer. The administration should have the ability to add or restrict usage to current students, and update the list of currently active doors.

Goals (Users)

- Display pictures and maps of door locations to help in recognition
- (For mobile app) use GPS to suggest nearby doors
- Log in via RPI authentication service (Shibboleth)
- Built-in links to contact FIXX, office of student services, etc.

Goals(Admin)

- Log all users, ensure only those with permission use the app

- Log all opening of doors remotely
- Ability to restrict user access on a per-door level (For secure areas)
- View statistics and report unusual use patterns to detect abuse of the system

Stretch

- Connect logging and access restrictions with current card-scanning system
- Alerts for maintenance or offline doors (via a ping-like system)

Overarching Goals

These are part of the goals for every deliverable we produce on the project.

- Ensure new features ship with appropriate documentation & test coverage
- Ensure that all features are well-documented internally, to prevent over reliance on one person
- Continuous Integration
    - Have tests run on every pull-request
    - Don't merge PRs with broken tests