Unlock Anywhere

Anderson, Ethan

My disabled grandmother has difficulty locking and unlocking her door, raising concern regarding her security. The goal of my project was to build a low cost device that would fit her existing lock and allow her to control it from a smartphone or tablet, as well as allow family members to remotely check and operate her door lock. I researched embedded controllers and decided to use a Raspberry Pi Model A, a Linux-based miniature computer. I connected a standard size servo motor to the Pi via the onboard IO pins and wrote a Python program for the Pi that controls its movement. The program contains lock and unlock functions, as well as continually monitoring the lock's position via a pressure switch (also attached to the IO pins). In addition, the Python program contains functions that automatically lock and unlock the door at user-specified times and optionally can send text or email alerts when the lock is moved. The functions contained in the program are accessed with a simple user friendly JavaScript-based web page, hosted by an onboard NginX Http web server. This web interface is password protected and can be used with any JavaScript-enabled web browser. The interface allows the user to operate the lock, schedule automatic actions, and check the lock's status with a visual readout. The device connects to the home's WiFi network and can be accessed either from the local network or remotely with the use of port forwarding. The overall cost of production was just over $50 and requires no ongoing service fees or planned maintenance. As well as being inexpensive, the device offers more features than any commercially available product. I believe the device is a good solution for my grandmother as well as others desiring a low cost way to remotely control their door locks.

Awards Won: