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Date: 11/14/2013

Subject: ECE 402 – Progress Report #3

Doorlock Homes

Doorlock Homes is a motor controlled locking system for a deadbolt on a standard door. The system is implemented using a Raspberry Pi, an AVR, a small motor, and a standard deadbolt door lock. The Raspberry Pi acts as a secure web interface which listens for commands. Once a command is received the Raspberry Pi then communicates with the AVR microcontroller to trigger the desired result. Upon receiving the command from the Raspberry Pi the microcontroller is used to control the DC motor position by using contact button feedback, which results in locking or unlocking the deadbolt mechanism. The process takes less than 10 seconds starting when the Raspberry Pi and stopping when the deadbolt has been moved to the proper position. The current version of Doorlock Homes meets all qualifier specifications.

Future Improvements

The list of possible development options beyond the current specifications is a long one. A more complex logging system will be set in place. This means that user logins can be controlled by the primary user or administrator. The administrator can set times that certain users can unlock the door. If the user tries to log in during a time where he or she is not supposed to, then they are blocked and the attempted action will be logged for the admin to see. This can be implemented using a database table for permissions, although development is still being planned. Alongside of this more complex logging system will be the development of a guest pass system. The administrator can add a guest that can perform actions for a certain amount of time. This will be implemented with a separate database table for guest users and the PHP code will need to query both databases to find if a user is permitted to act.

Previously mentioned improvements are intended to be implemented. Ideas will be pulled from the next few and developed based on team interest. The raspberry pi may be turned in to a central server to monitor several household features. The pi currently communicates through Bluetooth to the AVR, so a temperature sensor, humidity sensor, and/or motion sensor can be organized to also talk wirelessly with the raspberry pi. The users can then issue a command to see the temperature or humidity in their house, and a command will be sent through a python Bluetooth script to the corresponding modules. Another possibility is integrating a webcam with Doorlock Homes. If the doorbell is rung, a picture is taken of the visitor and relayed to the website for users to see. Based on the image, users can choose to unlock the door or leave it locked. This brings in facial recognition as well. Using OpenCV libraries, users may be recognized by the Raspberry pi and the door can be unlocked automatically.