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Proposal for the development of RaspiGuard

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<https://github.com/V-Socrates/RaspiGuard>

Executive Summary

As a student in the Computer Engineering Technology program, I will be integrating the knowledge and skills I have learned from our program into this Internet of Things themed capstone project. This proposal requests the approval to build the hardware portion that will connect to a database as well as to a mobile device application. The internet connected hardware will include a custom PCB with the following sensors and actuators, moisture sensor and magnetic contact switches.. The database will store the status of the sensors, log activity information, and will be used to store user accounts for application authentication.. The mobile device functionality will include the ability to monitor sensor state, change alarm settings, create and modify account information, add and remove monitoring units, view activity logs, as well as receiving notifications of sensor activity, and will be further detailed in the mobile application proposal. I will be collaborating with the following company/department : Vlad and Kelly in the prototype lab regarding the housing and deployment of the system. In the winter semester I plan to form a group with the following students, who are also building similar hardware this term and working on the mobile application with me Vivek Socrates, and Karel Tutsu. The hardware will be completed in CENG 317 Hardware Production Techniques independently and the application will be completed in CENG 319 Software Project. These will be integrated together in the subsequent term in CENG 355 Computer Systems Project as a member of a 2 or 3 student group.

Background

The problem solved by this project is installing a home security system can be costly, but needing one and not having one can cost you more. Fortunately you won't have that dilemma with RaspiGuard. RaspiGuard is a cost-effective and easy to install security system that you can easily setup and deploy on your own. A bit of background about this topic is RaspiGuard is a home security/surveillance system that is used to monitor a room remotely using our android application. The current operational functionality is door and moisture sensors. We are currently working on the functionality of light sensors as well as various other sensors..

Existing products on the market include [1]. I have searched for prior art via Humber's IEEE subscription selecting "My Subscribed Content"[2] and have found and read [3] which provides insight into similar efforts.

In the Computer Engineering Technology program we have learned about the following topics from the respective relevant courses:

- Java Docs from CENG 212 Programming Techniques In Java,
- Construction of circuits from CENG 215 Digital And Interfacing Systems,
- Rapid application development and Gantt charts from CENG 216 Intro to Software Engineering,
- Micro computing from CENG 252 Embedded Systems,
- SQL from CENG 254 Database With Java,
- Web access of databases from CENG 256 Internet Scripting; and,
- Wireless protocols such as 802.11 from TECH152 Telecom Networks.

This knowledge and skill set will enable me to build the subsystems and integrate them together as my capstone project.

Methodology

This proposal is assigned in the first week of class and is due at the beginning of class in the second week of the fall semester. My coursework will focus on the first two of the 3 phases of this project:

Phase 1 Hardware build.

Phase 2 System integration.

Phase 3 Demonstration to future employers.

Phase 1 Hardware build

The hardware build will be completed in the fall term. It will fit within the CENG Project maximum dimensions of 12 13/16" x 6" x 2 7/8" (32.5cm x 15.25cm x 7.25cm) which represents the space below the tray in the parts kit. The highest AC voltage that will be used is 16Vrms from a wall adaptor from which +/- 15V or as high as 45 VDC can be obtained. Maximum power consumption will be 20 Watts.

Phase 2 System integration

The system integration will be completed in the fall term.

Phase 3 Demonstration to future employers

This project will showcase the knowledge and skills that I have learned to potential employers.

The brief description below provides rough effort and non-labour estimates respectively for each phase. A Gantt chart will be added by week 3 to provide more project schedule details and a more complete budget will be added by week 4. It is important to start tasks as soon as possible to be able to meet deadlines.

New moisture sensor due to current moisture sensor reading being imprecise.

Concluding remarks

This proposal presents a plan for providing an IoT solution for Our product will be a small unit that is wall mountable and can be used to monitor door activity, moisture of plants and other various information that is currently being worked on.. This is an opportunity to integrate the knowledge and skills developed in our program to create a collaborative IoT capstone project demonstrating my ability to learn how to support projects such as the initiative described by [3]. I request approval of this project.

References

[1] Williams, M. B. (2017, September 09). Raspberry Pi Security System with Motion Detection / Camera. Retrieved February 03, 2018, from <https://www.hackster.io/FutureSharks/raspberry-pi-security-system-with-motion-detection-camera-bed172>

[2] Institute of Electrical and Electronics Engineers. (2015, August 28). IEEE Xplore Digital Library [Online]. Available: <https://ieeexplore.ieee.org/search/advsearch.jsp>

[3] Dechuan Chen and Meifang Wang, "A home security Zigbee network for remote monitoring application," 2006 IET International Conference on Wireless, Mobile and Multimedia Networks, hangzhou, China, 2006, pp. 1-4.

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keywords: {MSP430F135 micro-controller;Zigbee;remote alarming;security system for house;wireles network},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5195407&isnumber=5195326>