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Proposal for the development of Active House

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https://github.com/kylesyCENG317/Active-House-

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 luminosity sensors, gas sensors, temperature sensors, current sensors, water flow sensors. The database will store The database will store log in credentials and data picked gathered by the sensors. The mobile device functionality will include The mobile device functionality is to show the data from the database in the app and will be further detailed in the mobile application proposal. I will be collaborating with the following company/department none. 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 Our group includes Vishwas Malhotra and Oliver Duarte and Kyle Sy. 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 The problem that our project solves revolves entirely inside a room. Due to errands we have to attend to, we are forced to leave the comforts of our room. While this project doesn't allow users to attend to their agendas without leaving their rooms; it brings their rooms with them so they won't have to worry what's going on inside their rooms-- to some extent.. A bit of background about this topic is This project is a collection of sensors that will allow the user to pickup different elements inside a room. It was inspired by having the issue of being away from your room and wanting to monitor it. This is a sophisticated system that includes a raspberry pi and arduino. The communication between the arduino and the raspberry pi occurs with two xbee shields attached to the arduino and the pi. The sensors include: lux sensors which is used to measure the luminosity, water flow sensor which measures the volume of water in liters per second, gas sensors which detects different kinds of gasses in the room, temperature sensor which measures the temperature in any temperature based unit of measurement, current sensors which measures current in amperes..

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.
The purchases for this project includes a raspberry pi, the sensors mentioned above and arduino which total to $300.00

Concluding remarks

This proposal presents a plan for providing an IoT solution for The sensors will be attached to arduino as a PCB hat and the arduino will post the gathered data to a firebase database which will then be used to update the mobile application.. 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] none

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

[3] none