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Proposal for the development of IoT for SensorsEffectors

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<https://kwitaszek.github.io/SmartWatch/>

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. The database will store watch usage time, pedometer step count, previously entered GPS destinations and heart rate. The mobile device functionality will include GPS navigation, measuring the temperature, pedometer and heart rate monitor and will be further detailed in the mobile application proposal. I will be collaborating with the following company/department: Humber Media. 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: Antonio Zuleta. 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: Depending on the situation it may be inconvenient or even impossible to use your cellphone and get information you might need on the fly. This can include cramped spaces like public transport or just heavy activity where holding your phone in your hand is not convenient such as exercising. A bit of background about this topic is: Many companies including Apple and Samsung have looked for ways to make the user be able to access the information they need as fast and as conveniently as possible. This leads to the development of new devices that make each task easier to perform as well as making these devices more convenient for everyday life. One of the most popular devices of this type is the smart watch which gives user access to features that used to be exclusive to smart phones with the convenience of a watch being strapped to their wrist, meaning the user does not need to hold the device constantly and can use their hands if needed without letting go of the device..

Existing products on the market include [TinyScreen: Built Your Own Smartwatch-. (2015, December 28) Retrieved from <http://www.iphoneness.com/cool-finds/tinyscreen/>]. I have searched for prior art via Humber's IEEE subscription selecting "My Subscribed Content" [] and have found and read [<https://humber.summon.serialssolutions.com/2.0.0/link?t=1568133851994>] 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-labor 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.

-Soldering Kit

-TinyScreen Oled Shield

-PCB

-Tinyduino

-Bluetooth

Concluding remarks

This proposal presents a plan for providing an IoT solution for: The Smart Watch provides a convenient solution for users that may not be able to constantly hold their smart device in their hands. The special portability of the watch allows users to keep close and use it whenever they need without being inconvenienced. This position allows for the watch to track the user's heart rate and steps taken which allows for some convenient functionality. . 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] TinyScreen: Built Your Own Smartwatch -. (2015, December 28). Retrieved from <https://www.iphoneness.com/cool-finds/tinyscreen/>

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

[3] <https://humber.summon.serialssolutions.com/2.0.0/link?t=1568133851994>