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Proposal for the development of IoT for Automotive UI

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https://github.com/qu0cquyen/Automotive_UI

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 Temperature Sensor (DS18B20). The database will store Temperature value of Engine, Speed, GPS location, Blood Pressure, Oxygen and Heart Rate. The mobile device functionality will include Indicating patient's health information. Showing current ambulance's location. Emergency call. Engine Temperature value. and will be further detailed in the mobile application proposal. I will be collaborating with the following company/department Professor Dennis Kappen.. 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 Kevin Lieng, Seung Min Song. 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 Currently, the traditional way of transferring a patient's data between paramedics and doctors is considered too slow. Doctors usually have to wait for paramedics to arrive at the hospital in order to get the patient's status such as heart rate, blood pressure, oxygen and so on.. A bit of background about this topic is Aside from showing essential information such as speed, temperature and vehicle's location of a car dashboard, displaying patient's medical information can help the paramedics and doctors better predict and prepare before the patient arrives to the hospital or during the transfer process. By implementing those sensors above and having them show on a dashboard as well as conveying vital patient health information through application can assist both paramedics' and doctors' initiatives..

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.

Raspberry Pi 3, Temperature Sensor (DS18B20),

Concluding remarks

This proposal presents a plan for providing an IoT solution for Paramedics will be more flexible in transferring the patients by monitoring patient's health information. Once paramedics get the health information on their dashboard, this information then will be uploaded and updated on the phone application. Doctors can have an overall patient's status while using the application. This way the doctors can get everything prepared before the patient arrived at the hospital.. 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] Drews, E. (2017, November 16). Car Dashboard UI & UX Concepts. Retrieved from <https://medium.com/inspiration-supply/car-dashboard-ui-ux-concepts-d135959d963f>

(n.d.). 2019 A-Class Sedan. Retrieved from <https://www.mercedes-benz.ca/en/vehicles/class/a-class/sedan>

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

[3] Applin, S. A., Riener, A., & Fischer, M. D. (2015, October 28). Extending Driver-Vehicle Interface Research Into the Mobile Device Commons : Transitioning to (nondriving) passengers and their vehicles. Retrieved from <https://ieeexplore.ieee.org/document/7310907>