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Proposal for the development of Lumi Monitor

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https://github.com/simransaini1999/Lumi-Monitor

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 Light Sensor, Sound Sensor, Motion Sensor. The database will store Login info, amount of sleep, sound recordings, time the child has been fed. The mobile device functionality will include Turn on/off the lumi, listen to songs, change the colors of LED and view data on the amount of sleep and will be further detailed in the mobile application proposal. I will be collaborating with the following company/department Humber College School Of Media Studies and Information Technology. 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 Kyle Voduris and Gino Seridon. 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 lumi monitor will allow parents to monitor their baby through a 2 way connection between the lumi monitor and an app on the phone. The app will allow the parents to sense if their baby is awake and this will be with the use of the motion sensor. Also the parent will be able to adjust the lighting of the lumi monitor and can listen if the child is making any noises by using the mic on the monitor.. A bit of background about this topic is Light sensor will detect the brightness of the room and adjust the level of light of the LED. The LED is going to be a multicolor LED so the colors of the LED can be chosen through the app. Also the brightness of the LED can be controlled through the app. The Parents can also play songs through the app by using the speakers on the lumi monitor. Therefore the volume can also be adjusted on the app. Inconclusion there will be data stored in the app as the amount of time that the child has cried, amount of sleep and time the child will be needed to be fed and etc..

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, arduino, RGB LEDS, Speaker, Motion Sensor, light Sensor

Concluding remarks

This proposal presents a plan for providing an IoT solution for This will allow parents to monitor their children by using an app. The app will allow multiple adjustemnts so the parents would not have to go and keep checking on their child if he/she is awake.. 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] Ehara, R. (2015, January 6). Listnr: Your Listening Assistant. Retrieved from https://www.kickstarter.com/projects/797220287/listnr-your-listening-assistant

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

[3] W. A. Jabbar, H. K. Shang, S. N. I. S. Hamid, A. A. Almohammedi, R. M. Ramli and M. A. H. Ali, "IoT-BBMS: Internet of Things-Based Baby Monitoring System for Smart Cradle," in IEEE Access, vol. 7, pp. 93791-93805, 2019.