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Proposal for the development of Solar Capstone

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https://github.com/RaphaelNajera/Sunlight_Sensor

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 Solar Panels, PV3. The database will store the data retrieved from the four solar panels PV1, PV2, PV3, and PV4.. The mobile device functionality will include information retrieved from the database from the four solar panels. This will give the audience a visual aspect of how much solar energy has been collected and depleted. and will be further detailed in the mobile application proposal. I will be collaborating with the following company/department Kerry Johnston, Humber College Institute of Technology & Advanced Learning North Campus, Prototype Lab, and Humber College Sustainable Energy and Building 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 Raphael Najera, Johnson Liang, and Adrian Caprini. 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 Solar power is clean renewable energy collected from the sun. As a result, by using solar energy it helps reduce greenhouse gas emissions and relying on fossil fuels. Fossil fuels is a heavily relied on source to produce energy however, it will deplete one day. Thus, solar energy should be invested into which has an unlimited supply.. A bit of background about this topic is The sun produces renewable energy where it is clean and does not generate harmful environmental emissions. If the properties are harnessed then that source of energy can be manipulated to produce electricity, heat, and other valuable energy properties. A solar panel is made of many cells which consist of a positive and negative layer. When the photons collide with the semiconductors on the panel it creates an electric field which are harnessed by the positive and negative layers. The produced energy is multiplied by the number of cells within a panel and the number of panels in a solar array..

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.
No other purchases are required for this project as we will be using solar panels located on the roof on the L-wing.

16X2LCD:

Maybe used to display collected solar data stored in the database. Otherwise data will be displayed in a mobile application.

Concluding remarks

This proposal presents a plan for providing an IoT solution for This concept could be used for homes and businesses that have installed solar panels on their roofs. This would show the data from the solar panels from the sunlight when they are running. With the information it retrieved the data will be stored in the database. The user will be able to retrieved the information by using the app on their smart phone. As a result, users will be able to keep track the amount of energy the solar panels have collected, CO2 avoided, and energy depleted.. 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

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

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