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***Proposal for the development of RFID Reader***

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**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 sensors and actuators for RFID card reader/writer. The database will store the status of the IC card. The mobile device functionality will include reading and writing permissions/access to the card, and will be further detailed in the mobile application proposal. I will be collaborating with the computer engineering department. 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 (N/A). 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 RFID card reader will determine a pass or fail signal when detecting the supported RFID card. Whether the card is accepted or not, it will provide evidence that the RFID is able to read the data off the card and show the correct output. This serves the purpose of security access.

A bit of understanding with the RFID comes from the 1920s. The Radio Frequency IDentification (RFID) was developed as a radar using radio broadcast technology. The device serves the purpose of distinguishing identity when coming close proximity to the radar. In order for it to work wirelessly, it will read radio waves as form of information. During World War II, the RFID was used to determine for approaching planes in order to identify the enemy/ally. As of today, the RFID is a very common device with modern technology as it is used everywhere. The RFID provides excellent performance in terms of security access. (Ex: Retail theft prevention, door access, RFID tag scanning)

As part of this project, the use of previous knowledge from the Computer Engineering Technology program will be used to develop the RFID. The following courses that provides the relative information are:

* CENG 212 Programming Techniques in Java – Source Coding
* CENG 215 Digital and Interfacing Systems – Circuitry
* CENG 216 Intro to Software Engineering – Gantt Project and efficient project development
* CENG 252 Embedded Systems – Working with microcontrollers
* CENG 254 Database with Java – Database coding (SQL)
* CENG 256 Internet Scripting – Access with Database Servers
* TECH152 Telecom Networks – Wireless protocols

**Methodology**

*Phase 1 Hardware build*

The RFID build will require the devices of the Raspberry Pi 3 and an MFRC-522 RFID Writer/Reader. The device will be built inside a case powered by a 3.3V power supply, and have an SPI interface for the Raspberry Pi. This device will only be supported by the stock IC card in order to work with the module. The use of the IC Card will be required to read from the range of 0-60mm of the RFID sensor.

*Phase 2 System integration*

The system integration will provide a set of data provided by the card when being read.

*Phase 3 Demonstration to future employers*

This project will determine the skill of project development for beginning level security systems.

Along with the purchase of the Raspberry Pi 3, the MFRC-522 RC522 RFID Module kit will be used to work with this project. This kit includes:

- MFRC522 Chip

- RFID Card

- 3.3V Power Supply

- SPI Interface for Raspberry Pi

**Concluding remarks**

This proposal presents a plan for providing an IoT solution for home-made security access. 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 [2]. I request approval of this project.

**References**

[1] University of Arizona. (n.d.). *A Brief History of RFID.* Retrieved from http://www.u.arizona.edu/~obaca/rfid/history.html

[2] American Barcode and RFID. (n.d.). *What is RFID* *How does RFID Work?.* Retrieved from http://www.abr.com/what-is-rfid-how-does-rfid-work/

[3] University of Arizona. “A Brief History of RFID.” Internet: <http://www.u.arizona.edu/~obaca/rfid/history.html> [Sept. 14, 2017].

[4] American Barcode and RFID. “*What is RFID* *How does RFID Work?* “ Internet: http://www.abr.com/what-is-rfid-how-does-rfid-work/ [Sept. 14, 2017].