Humber College Institute of Technology and Advanced Learning

SmartDen Entry

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Declaration of Joint Authorship

We, Boswell Orendain, Hoang Phuc, and Sam Fatuga confirm that this work submitted is the joint work of our group and is expressed our own words. Any uses made within it of the works of any other author, in any form (ideas, equations, figures, texts, tables, programs), are properly acknowledged at the point of use. A list of the references used is included. The work breakdown is as follows: Each of us provided functioning, documented hardware for a sensor or effector. Boswell Orendain provided Humidity and Temperature Sensor (DHT-11),Ultrasonic Distance Sensor (HC-SR04) and Arduino Uno R3. Hoang Phuc provided Stepper Motor (ULN2003APG) and Arduino Uno R3 microcontroller. Sam Fatuga provided RGB LED (YSL-R596CR3G4B5C-C10) and the Stm32 microcontroller. In the integration effort Hoang Phuc is the lead for further development of our mobile application, Sam Fatuga is the lead for the Hardware, and Boswell Orendain is the lead for connecting the two via the Database.

Proposal

We have created a mobile application that interact with the sensors and effectors that the kids at *MakerKids(*a kids coding boot camp) already is familiar with and is using. This application allows the students to be able to view sensors data in real-time and control the effectors with an android mobile device.We have prototyped a small embedded system with a PCB (Printed Circuit Board) to be controlled by the mobile application. Our IoT capstone project will take place in a model of their classroom and we aspire that this will inspire the kids to keep pursuing their passion for Technology.

The mobile application that we have built is an android application that we named *SmartDen* and is programmed with Java and is available for download on the *Google Play Store*.We built this application in *Software Project*, a semester 5 course where we learned android application programming with *Android Studio*.We have built a seamless user interaction experience by following the *Android Design Guidelines*. The data that will be stored comes the following: firstname,lastname,email,password,sensor codes to register their sensor to their account, and sensor data. All of these data are all stored in our database hosted by Hostinger.com, a database hosting service. The users will be able to register an account to the application to be able to log in and is able to register their sensors and effectors via QR-Code.This application is intended to interact with the sensors and effectors of our prototyped small embedded system with a custom PCB board that is enclosed in a custom PCB Case (laser cut) that we have built in the *Hardware Production Technology*, semester 5 course.

Intended project key component descriptions and part numbers  
Development platform:   
Sensor/Effector 1: Humidity and Temperature Sensor (DHT-11)  
Sensor/Effector 2: Ultrasonic Distance Sensor (HC-SR04)  
Sensor/Effector 3: Stepper Motor (ULN2003APG)

Sensor/Effector 4: RGB LED (YSL-R596CR3G4B5C-C10)

Our project description/specifications will be reviewed by, Jennifer Turliuk, ideally an employer in a position to potentially hire once we graduate. They will also ideally attend the ICT Capstone Expo to see the outcome and be eligible to apply for NSERC funded extension projects. This typically means that they are from a Canadian company that has been revenue generating for a minimum of two years and have a minimum of two full time employees.

The small physical prototypes that we build are to be small and safe enough to be brought to class every week as well as be worked on at home. In alignment with the space below the tray in the Humber North Campus Electronics Parts kit the overall project maximum dimensions are 12 13/16" x 6" x 2 7/8" = 32.5cm x 15.25cm x 7.25cm.

Keeping safety and Z462 in mind, the highest AC voltage that will be used is 16Vrms from a wall adapter from which +/- 15V or as high as 45 VDC can be obtained. Maximum power consumption will not exceed 20 Watts. We are working with prototypes and that prototypes are not to be left powered unattended despite the connectivity that we develop.

Executive Summary

Our Internet of Things (IoT) capstone project consist of a smart phone application (Android) will allow its users to be able to lock door(s), change a color of a light bulb(s),detect when someone is nearby (security purposes),notify when someone has entered a room(s),view the temperature of a room(s). Every sensor will be provided with a corresponding code that they can scan with their phone through the application to be able to register to their accounts.