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ECE411 – Industry Design Processes
10/14/2020

Practicum Homework #2 – Collaboration Site and 3x Practicum Ideas

Collaboration Site: Github

The Repository can be located at https://github.com/Boldtkai/ECE411_Team6_Practicum

1) Smart Greenhouse

Project Function: An integrated system that will monitor the present condition of plants. These conditions include the moisture level of the soil and humidity of the surrounding area. If the soil reaches an inadequate state, then it'll pump the appropriate amount of water to the plant to maintain maximum plant life.

Sensors:

- Soil Moisture Level Sensor – Takes samples of the dampness of the soil to determine if the soil needs to be watered.
- Humidity Sensor (DHT11) – Measures the humidity and temperature of the surrounding plant area.
- Light Sensor (BH1750) – Measures the light intensity that's placed on the plant's surface.

Controller: Atmel Atmega328-pu will take samples of the sensor measurements and will control variable function when certain conditions occur.

Actuator:

- OLED Screen - displays the measured data at a given moment.
- Water Pump – If a certain condition is met then it will pump water into the soil to an appropriate level.

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2) Variable House Lights

Project Function: A system that controls the variable brightness of LED's as the user moves either towards or away from the system. This system will be designed to conserve energy by remaining in an off state unless a user is within the vicinity.

Sensors:

- PIR Motion Sensor - Works as a digital output to notify the system if there is detected motion within a closed area

- Ultrasonic Sensor (HC-SR04)- Detects the variable distance that a user is away from the system. This determines the appropriate level of brightness needed.
- Photoresistor - Turns on the light system if/when it reaches a certain level of darkness within the room. Could be associated with a push button press from the user to turn on/off this feature.

Controller: Atmel Atmega328-pu will constantly monitor conditions and change the light the light brightness if prospected conditions are met.

Actuator:

- Light Display: Most likely an LED that will change states based on the approximate distance a user is away from the item.

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3) Covid-19 Social Distancing Device

A monitoring device attached to the user's clothing. This system will detect when a 6' perimeter around the user. If the 6' perimeter has been breached then it will notify the user through a specific LED sequence and an audio recording.

Sensors:

- Multiple Ultrasonic Sensors (HC-SR04) - Establishes a 360 degree perimeter to maintain a 6' distance between the user and another person.

Controller: Atmel Atmega328-pu will monitor if a person enters the 6' perimeter and alert the bystander the failure to maintain their distance.

Actuators:

- LCD Screen - Displays whether they're maintaining a 6' distance or not
- Buzzer or Audio Speaker - To send auditory alerts that they're failing to maintain 6' after a certain period of time

Other Discussed Project Ideas

Propeller Clock - A clock that displays time by spinning a strip of LEDs to generate the illusion of floating numbers. The clock could potentially have more display options than just time.

Blind spot Detector - Modular blind spot detector that could be attached to a car without a preestablished blind spot detection system.