CS/EE 120B Custom Laboratory Project Proposal

Plant Saver
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Introduction

The purpose of the “Plant Saver” is to have a system that ensures that your plant is watered the perfect amount; not too much and not too little so that your plant does not die. When you go to water your plant, there will be a humidity sensor that can tell how humid the environment around your plant is so it will know how much you just watered your plant. There will be a display screen that will show/tell you the amount of humidity in the environment as well as tell you if you need to water your plant more if the humidity levels are too low; but, if the humidity levels are too high, it will tell you and it will immediately turn on the fan that will decrease the humidity in the plant’s environment. There will also be LED strip lights that will turn on when your plant is there to ensure your plant is getting some form of light. The system with the humidity sensor, fan, and the one with the lighting will all be running only if there is a plant in the environment; which there will be another ultrasonic sensor that will be able to tell if there is a plant in the environment and then it will turn on the switch to run all these systems if there is and turn off the switch if there is not. In short, the “Plant Saver” will make sure your plant gets lighting and the right amount of humidity and water so that your plant will survive and thrive.

Hardware Components

Computing
- Elegoo UNO R3 microcontroller

Inputs
- Ultrasonic sensor HCSR04
- Humidity sensor DHT11

Outputs
- Fan blade
- 3-6V motor
- L293D motor controller
- Relay 5V
- Display screen
- Led strip lights 9V

Basic Functionality

The baseline version of “Plant Saver” will have to include the complexities in order for the project to work. There will be a foam box where you would place your plant so that it can be in its own environment and have all the systems running for it, which are the lighting, watering, and humidity systems. When you go to water your plant, there will be a humidity sensor that can tell how humid the environment around your plant is so it will know how much you just watered your plant. This will be done by using the DHT11 Temperature/Humidity Sensor, which will be placed near the plant to do its detection (complexity 1). There will be a display screen that will show/tell you the amount of humidity in the environment as well as tell you if you need to water your plant more if the humidity levels are too low; but, if the humidity levels are too high, it will tell you and it will immediately turn on the fan that will decrease the humidity in the plant’s environment. This means that the humidity sensor will do its detection and send its results to display them on the screen for the results and it will have it written in words to output the saying of whether more water is needed, less is needed and the fan will turn on, as well as display the humidity amount. The fan will be spinning due to the 3-6V motor and the motor will be controlled by the L293D motor controller (complexity 2). The fan will spin until the humidity levels go down to the normal amount, which will be detected by the humidity sensor. There will also be LED strip lights above the plant’s environment that will turn on when your plant is there to ensure your plant is getting some form of light. The system with the humidity sensor, fan, and the one with the lighting will all be running only if there is a plant in the environment; which there will be another ultrasonic sensor that will be able to tell if there is a plant in the environment and then it will turn on the switch to run all these systems if there is and turn off the switch if there is not. Ultrasonic sensor HCSR04 will detect if there is a plant in the environment because it will detect if there is a plant in the box due to its distance detection of something being there (complexity 3). This will then tell the systems to work. The relay will turn the systems on when the ultrasonic sensor detects that there is a plant in the environment.

Complexities

1. 3-6V motor controlled by the L293D motor controller that will control the fan and spin it to reduce the humidity
2. Ultrasonic sensor HCSR04 that will sense if there is a plant in the environment to then know if it should tell the relay to turn on the systems
3. Humidity sensor DHT11 that will detect the humidity in the plant’s environment and know to have the fan turn on if needed and what to display on the screen for the user

(I was thinking that the relay and LED strip lights might be complexities, but I am not sure so I just did not list them in the complexities section, but they will definitely be a part of the project as described. I know that the 3 listed complexities are actually complexities since they are in the discussion slides for approved complexities.)