Group:

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Project Description:

    Self-Watering Plant

Materials:
- Arduino Uno
- https://www.adafruit.com/product/1150
- https://www.sparkfun.com/products/13322
- 1 220 ohm resistor
- 2 1k ohm resistors
- 2 buttons
- 1 PN2222A transistor
- 1 1N4001 diode
- Assorted wires

Comments:

Originally, I had planned on using a solenoid valve to control the flow of water being fed by gravity from some kind of elevated reservoir. However, I later learned that the particular valve I bought required around 3psi of pressure to open, which would require a pump and more complicated tubing. Instead, I bought a peristaltic pump and simply put either end in a tank of water and the plant's soil.

It was difficult to determine what value to set the BASE_VAL to (i.e. the value below which the pump should start) without doing research on different plant types and how quickly soil dries out. Most of the soil that I could find had pretty high readings, around 800 (out of ~900) so it was difficult to test without just manually setting values through code. The default values are 100 and 600 for cactus and normal modes respectively. Furthermore, I gave cactus mode a 10 second water time instead of the 20 for normal mode. Again, I don't know if these are optimal but they seem reasonable. Although I think as it is, it will probably only water every few days.

The 12V pump probably isn't necessary in this application, as it doesn't need to pump that quickly here, and there are 5V pumps available that would work with the Arduino. I also had to deal with the higher current by adding the transistor which involved a lot of tedious soldering, especially after I burned one of them out by wiring it backwards. Even with the resistor going to the Arduino, the transistor gets very hot when the pump is operating. I know that the one I used is rated for ~300 degrees Fahrenheit max but I wasn't able to measure how hot mine was

getting. It becomes too hot to touch from just 20 seconds of motor usage, so I would be concerned about programming one of these to run for long periods of time.

I enjoyed doing this project, and it has really rekindled my interest in doing Arduino projects. I'm also definitely going to get some housing for all of the hardware to clean it up a little bit so there aren't wires going everywhere.