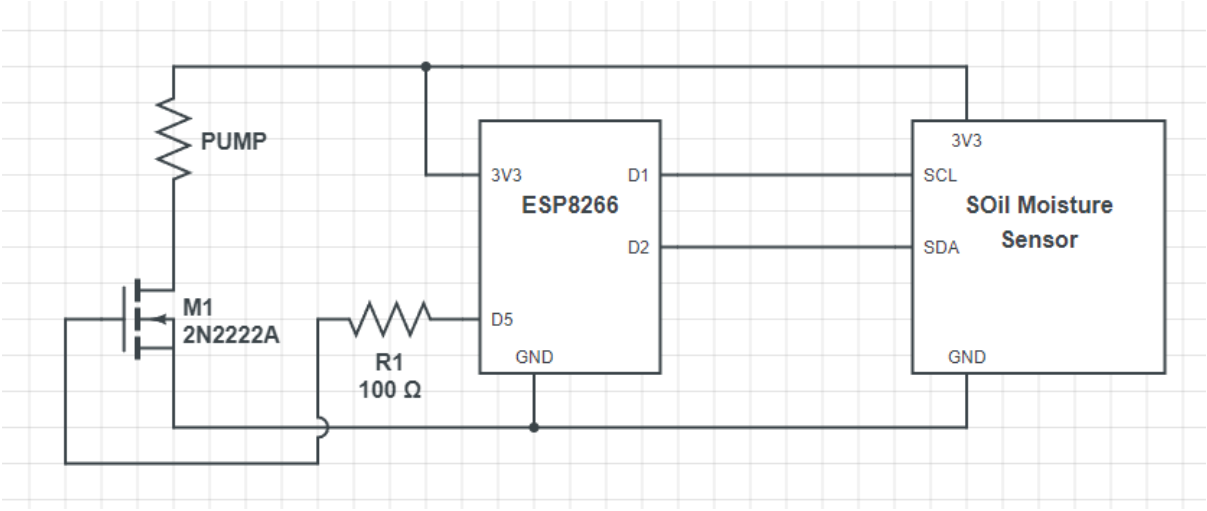
Project: IoT Auto Irrigation System

Description: Built an automatic irrigation system for room plants so that I don't have to check the soil moisture level and water it myself. This project is inherited from a class project, so I basically have all materials I need for this. I also want it to log the soil moisture level and room temperature.

Material:
ESP8266 NodeMCU;
Adafruit Soil Moisture Sensor;
3.3V Generic Water Pump;
2N2222A BJT;
100 Ohms Resistor;
Some Jumpers and Connectors;

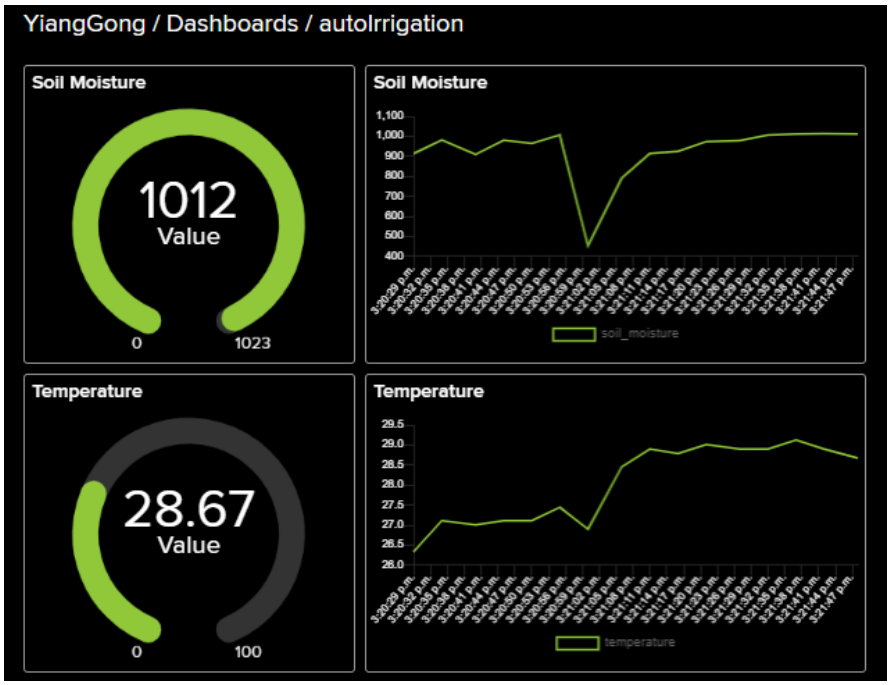
Schematics:



I used the ESP8266's 3V3 pin to provide power for the water pump because it only takes 100mA current, which the 3V3 has a max rating of 250mA. So, it's safe to do so only with small water pump like the one I used, and you don't have other power-hungry peripheral devices in your system.

I used the Adafruit IO to log the data and visualize it in dashboard. There is also a thermometer incorporated into the soil moisture sensor, so I take advantage of this feature and make this system also a room temperature monitor.

The 100Ohms resistor is used to limit the current entering the 2N2222A NPN transistor so that the MCU won't drive too much current at once.



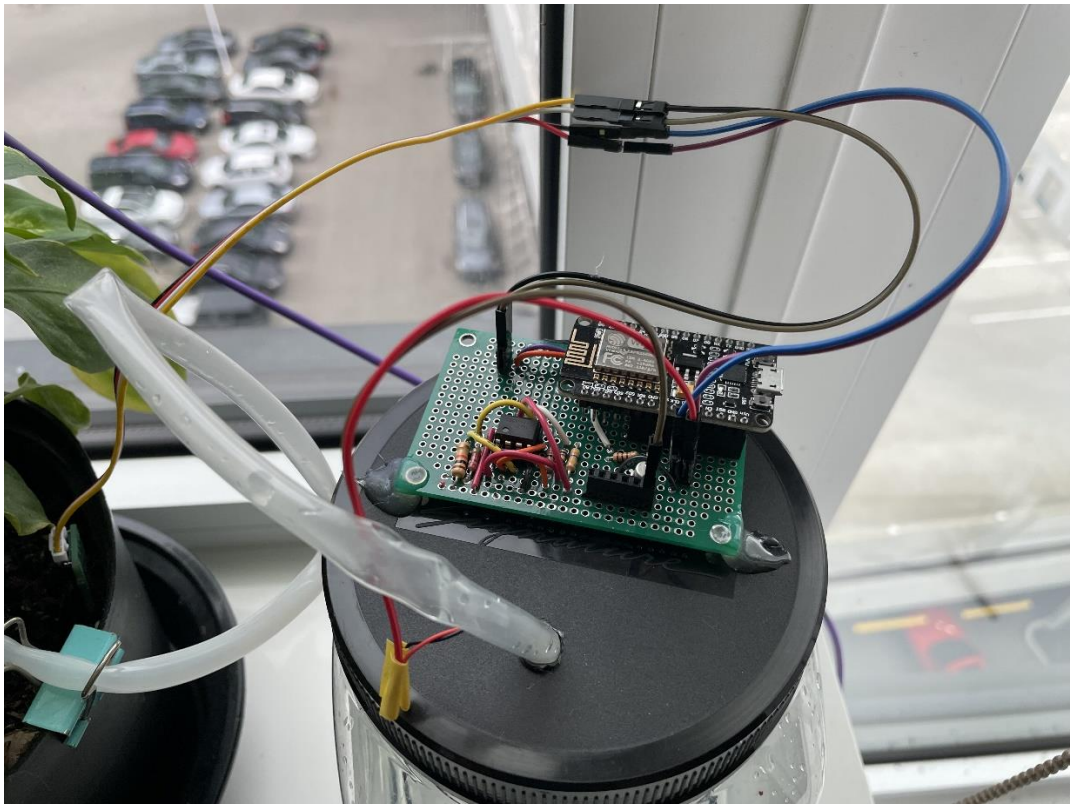
Code:

I developed the code part in Arduino IDE to take advantage of the soil moisture library. It is using the Adafruit IO library and Adafruit Seesaw library.

https://github.com/YiangG/Automatic_Irrigation_System

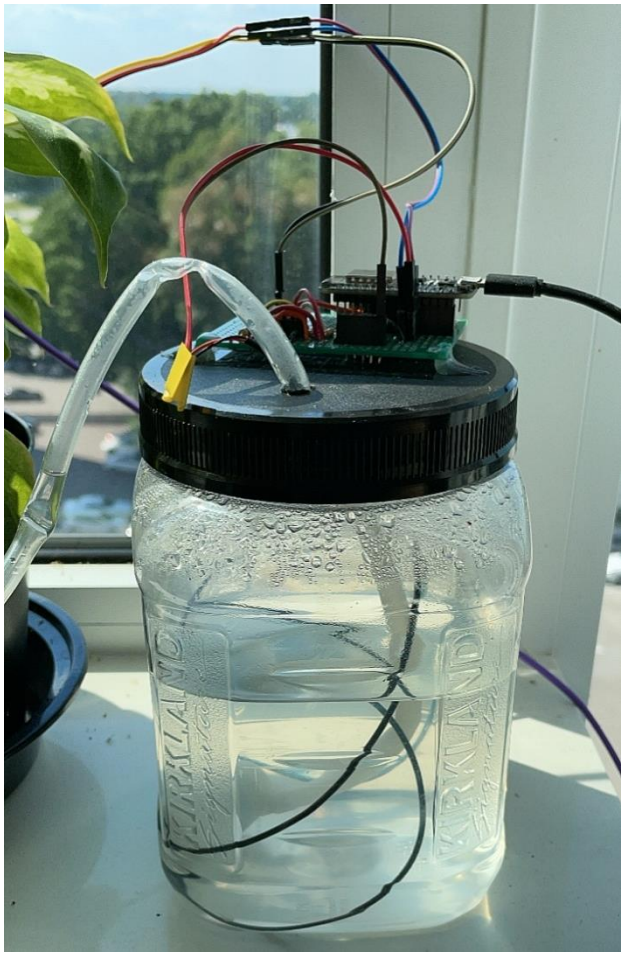
Assembly:

I tested out the system on a breadboard first and then solder it onto a perfboard.



I found an empty chestnut jar and decided to use it as a water tank for the pump and also the base of the device.

The pump is fully water proof so it can be emersed in water.



Result: This device successfully satisfies my demands of watering plants. So far this device has kept my plants alive for more than 3 months.