Building a Soil Moisture Sensor

Liquid Prep

Nov 8, 2020 | V 2.0.0

Sensor Description

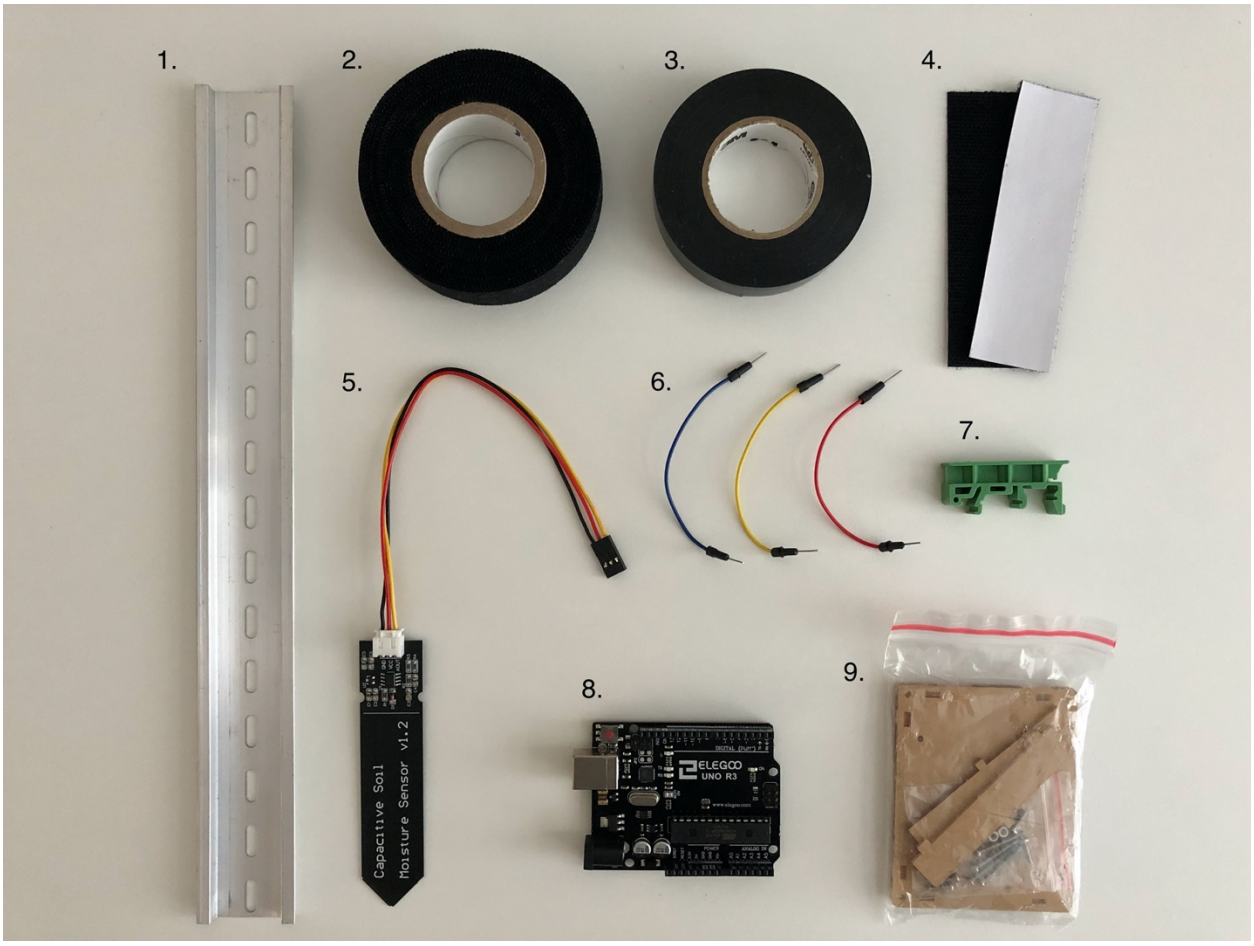
The soil moisture sensor allows a user to read their local soil moisture level around their crop.

Materials

Software

You will need the Arduino IDE to install the firmware on your Arduino device. Download here: https://www.arduino.cc/en/main/software

Hardware



1. Aluminum DIN Rail (12”) - https://amzn.to/3eEdT2G
2. Hockey Tape - https://amzn.to/3lnSM7i
3. Electrical Tape - https://amzn.to/3dY8YIY
4. Velcro Double Sided Tape - https://amzn.to/3k8VOLh
5. Soil moisture sensor - https://amzn.to/2MPbrtk
6. Jumper Wires (3 pcs) - https://amzn.to/2JQ6tyf

7. DIN Rail Bracket (2+ pcs) - https://amzn.to/36bHa12
8. Arduino Uno Microcontroller - https://amzn.to/2Yq9PeS
9. Arduino Uno Case - https://amzn.to/3kjKVGV

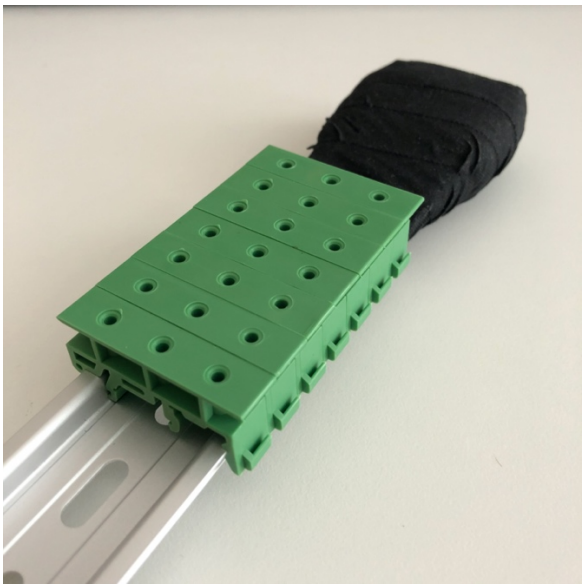
Assembly

1. Use hockey tape to create a comfortable handle on the Aluminum DIN rail.

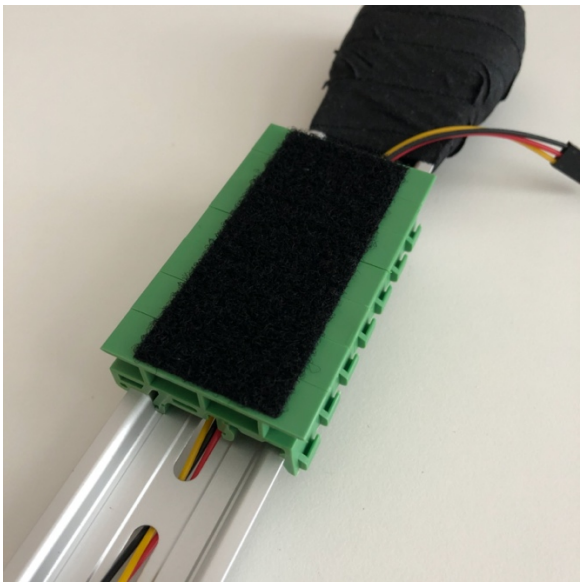
2. Use a hot glue gun to attach the soil moisture sensor on the end of the DIN rail opposite the handle. Be sure to not cover any portion of the moisture sensor that must be touching the soil.

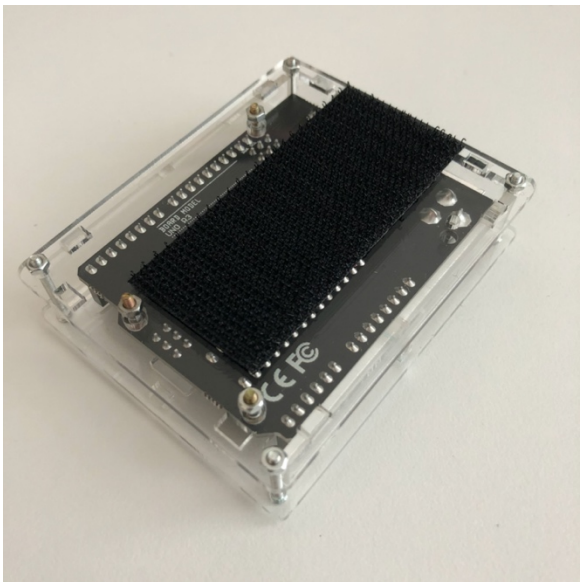
3. Build a case for you Arduino Uno microcontroller by following the instructions for your Arduino Uno case.

4. Attach the DIN rail bracket to the aluminum DIN rail. Use multiple brackets to create a flat surface. The Arduino Uno will be mounted to this.

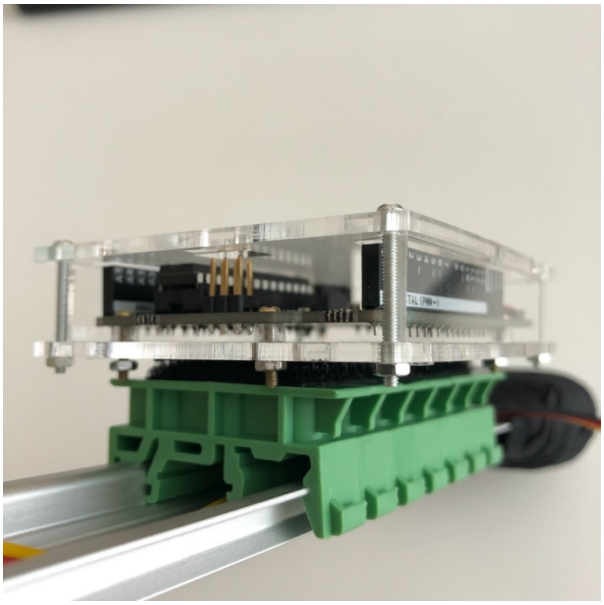


5. Attach one side of the double-sided Velcro tape to the back side of the Arduino Uno case, and the other half to the mounting brackets attached to the aluminum DIN rail.

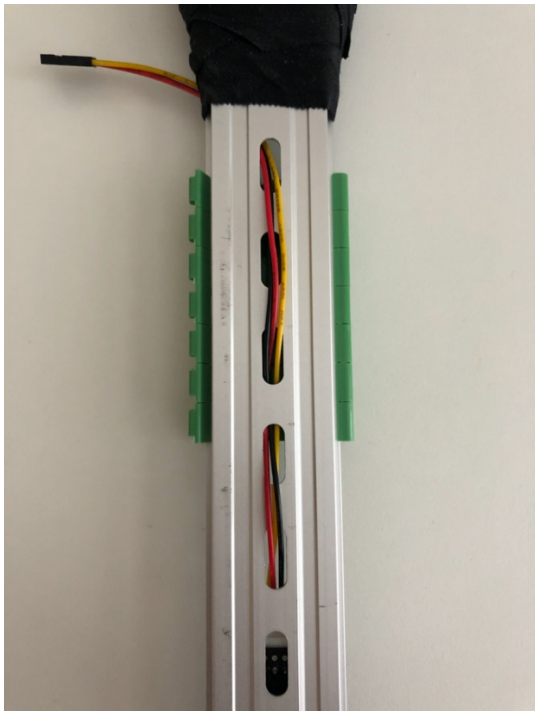


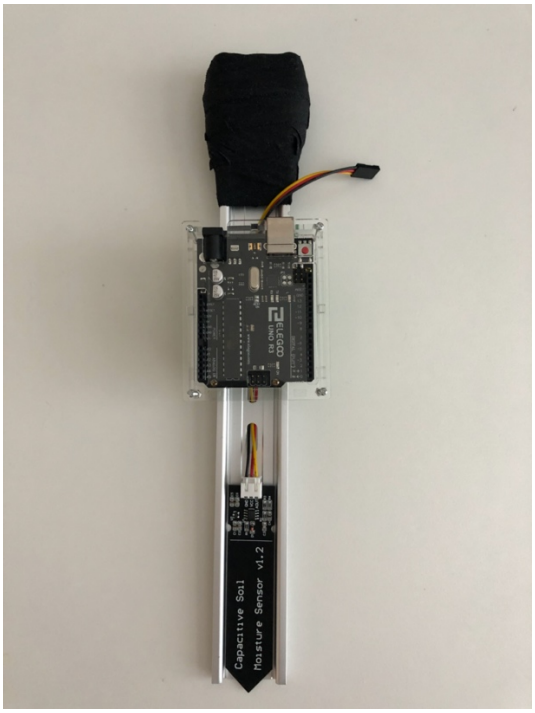


6. Attach the Arduino Uno to the DIN rail using the Velcro tape.

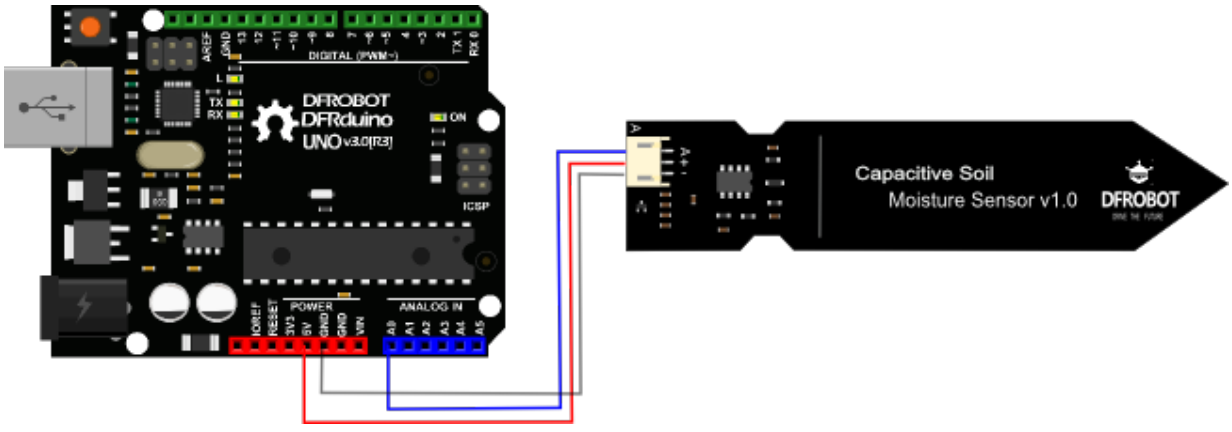


7. Use the holes in the DIN rail to guide the soil moisture sensor wires up to the handle.

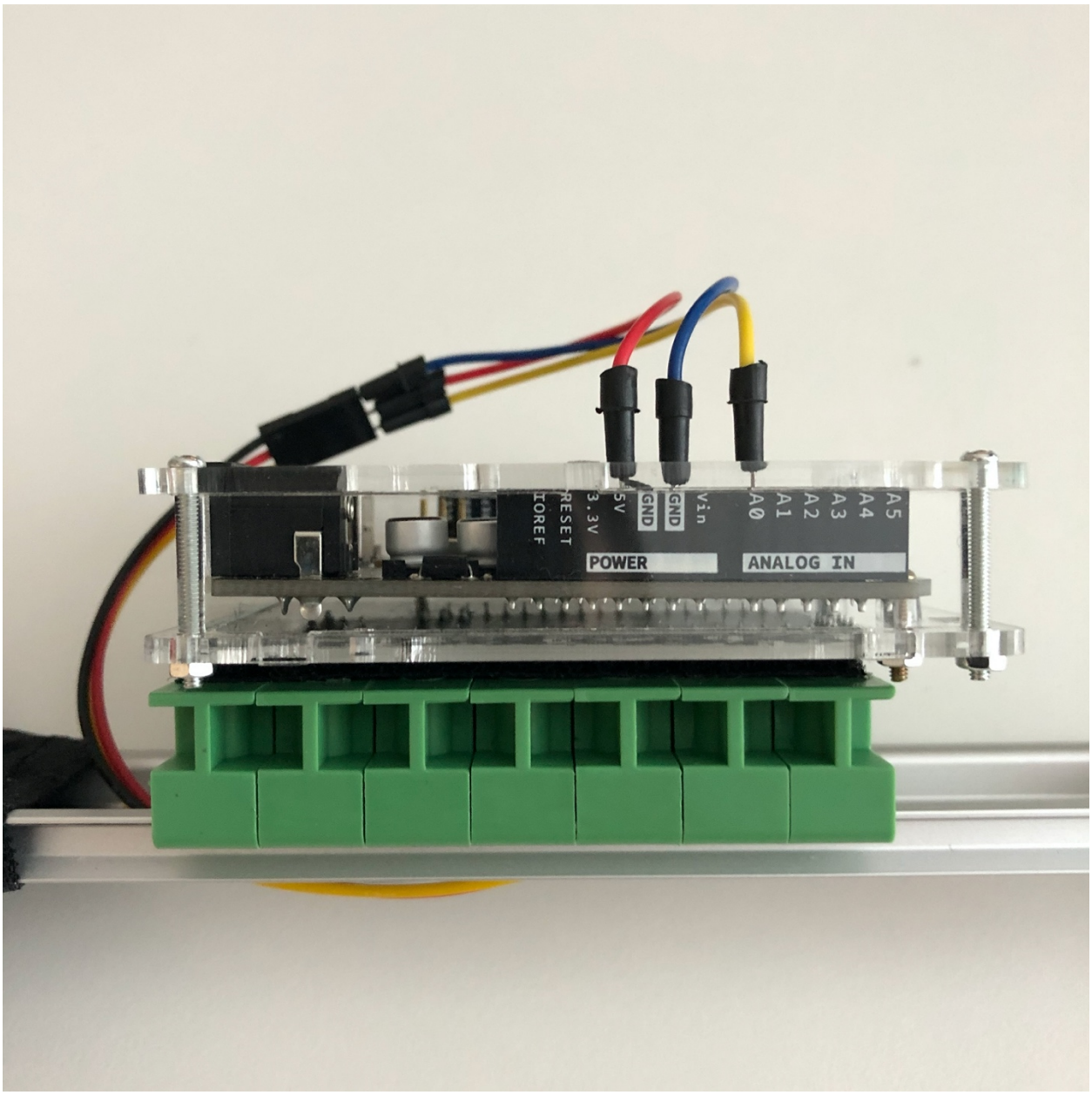




8. Connect the soil moisture sensor to the Arduino Uno as follows:

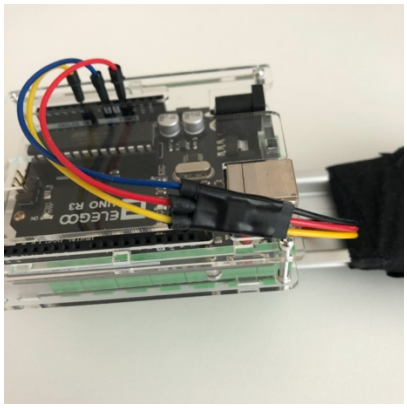
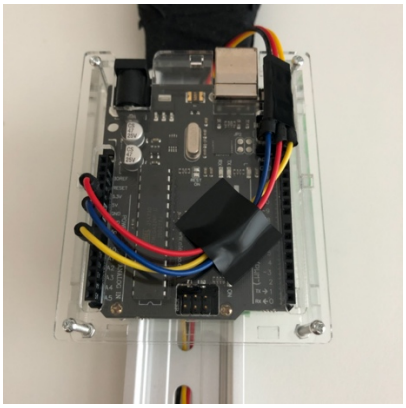
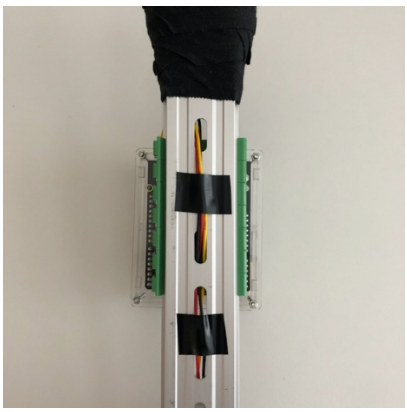


Connect the **AOUT** cable on the moisture sensor to **A0** port on the Arduino.
Connect the **VCC** cable on the moisture sensor to the **5V** port on the Arduino.
Connect the **GND** cable on the moisture sensor to the **GND** port on the Arduino.

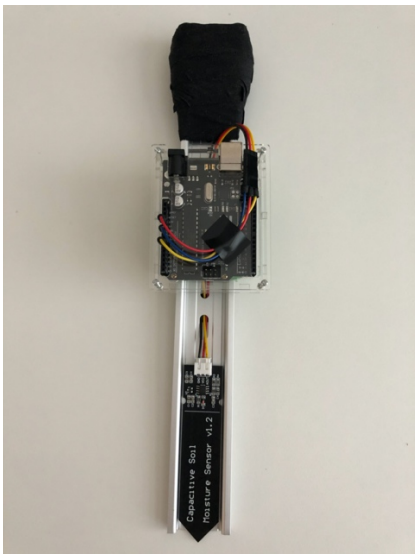


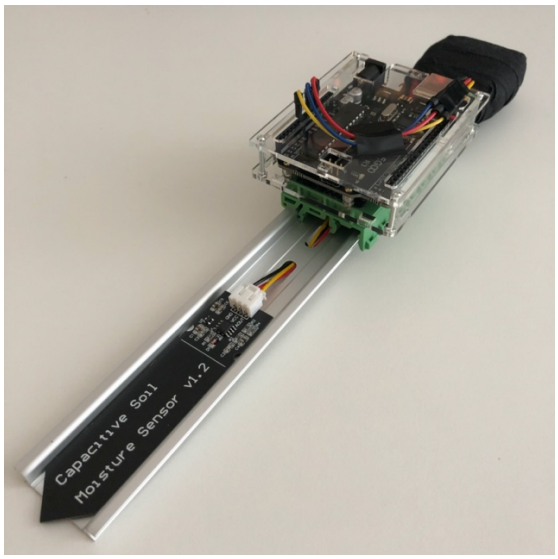
Note: if the sensor cables will not directly plug into the Arduino Uno ports - use the jumper wire cables to extend the wires from the moisture sensor so that the sensor can connect to the Arduino Uno. If you are using a long aluminum DIN rail, attach multiple jumper wire cables in series to extend the wires from the soil moisture sensor up to the Arduino Uno ports.

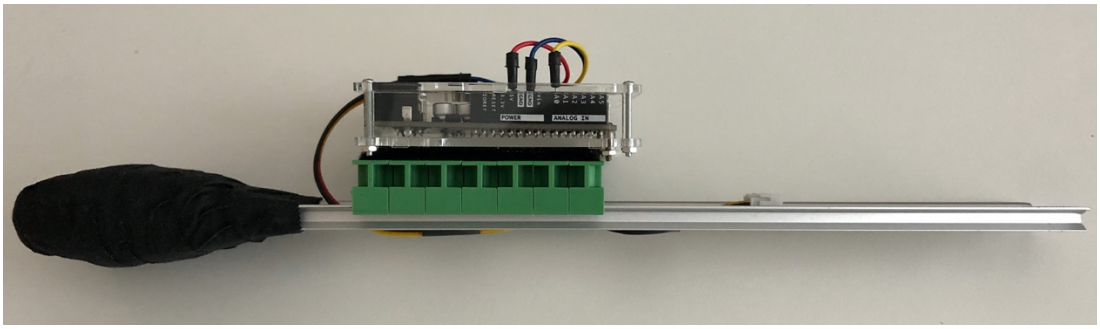
9. Use electrical tape to seal connections between wires. It's recommended that you try and cover as much wiring and exposed ports as possible with electrical tape to improve the sensors durability and water resistance.

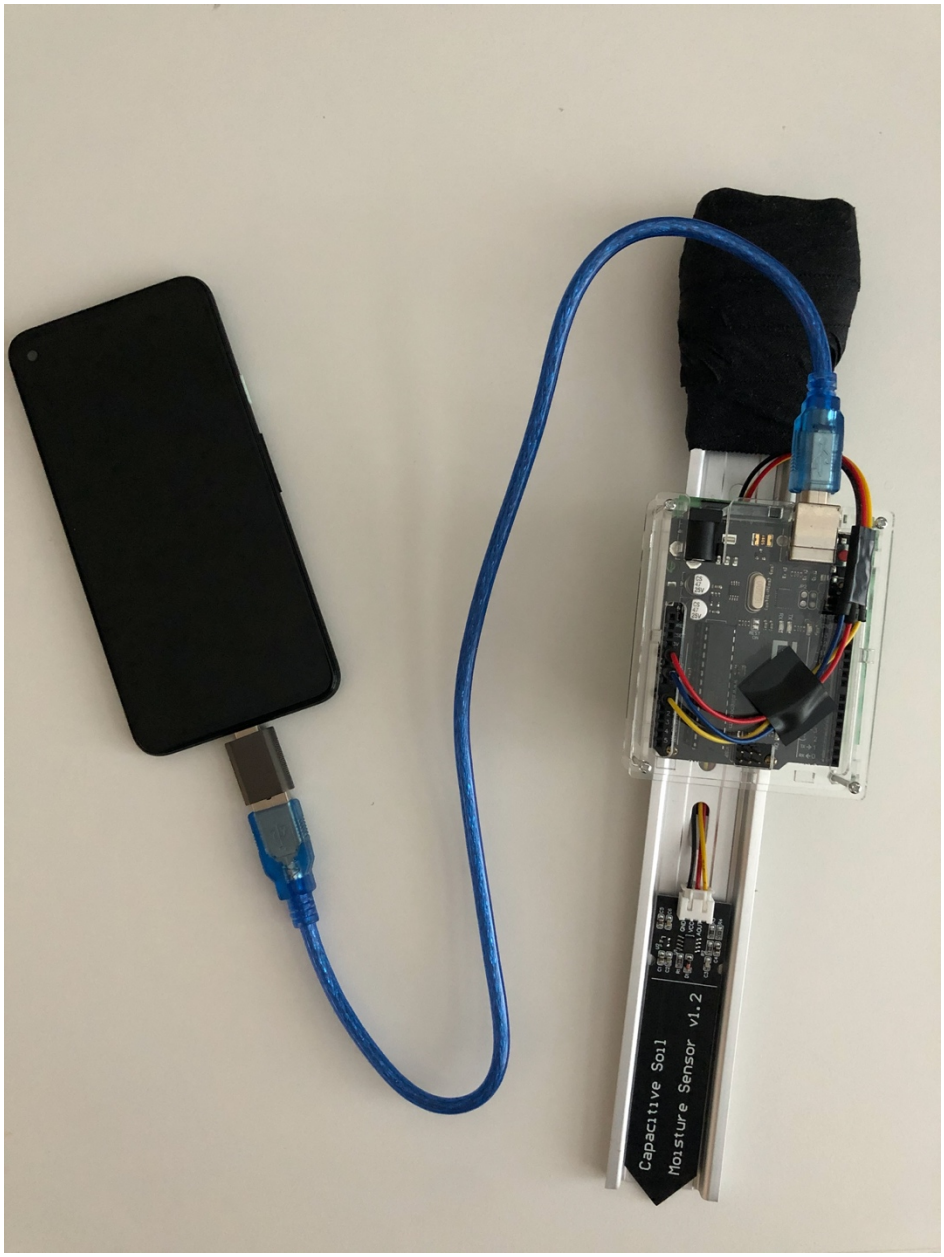
10. The completed soil moisture sensor stick should look something like this:







11. The soil moisture stick can be connected to a phone or computer by using the cable that came with the Arduino Uno microcontroller. (Adapter for your specific phone/computer may be required).

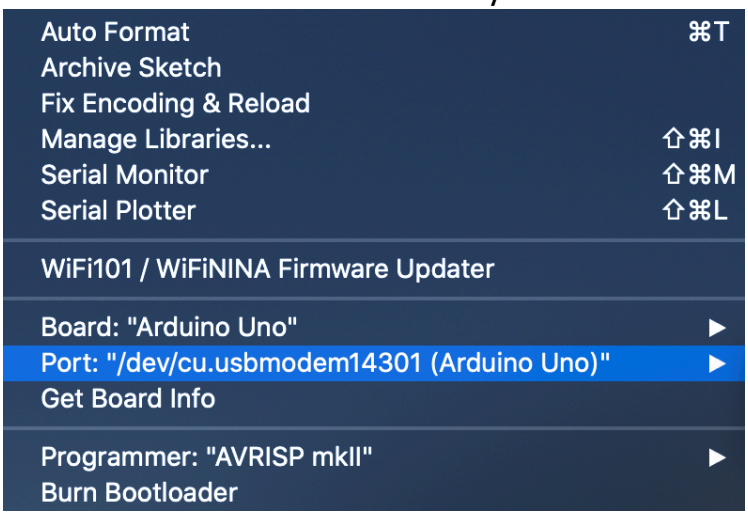


Installing Firmware

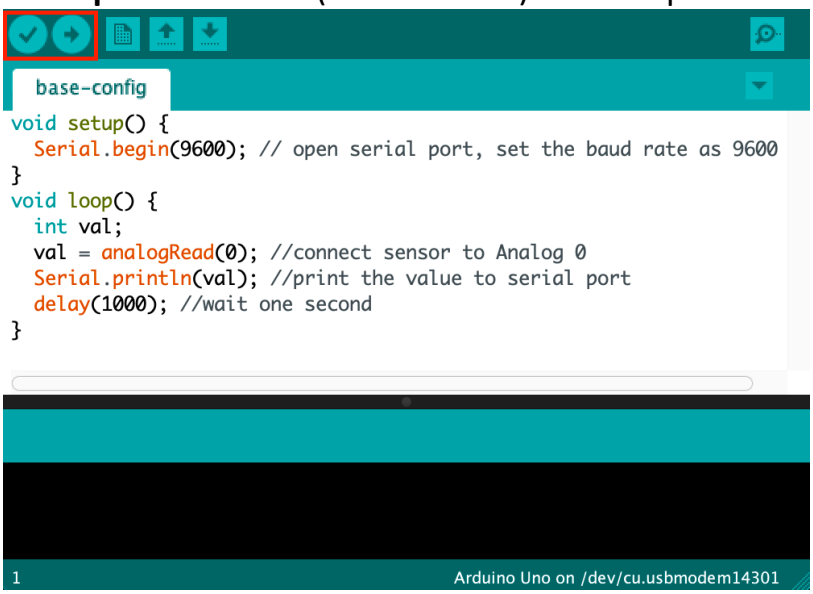
1. Clone the Liquid-Prep GitHub repository found here: https://github.com/Code-and-Response/Liquid-Prep

2. Open the **base-config.ino** file using the Arduino IDE: https://github.com/Code-and-Response/Liquid-Prep/tree/master/soilSensor/base-config/base-config.ino

3. Plug in the Arduino to your computer using a USB cable and ensure your device is selected under **Port** in your Arduino IDE tool settings



4. Install the firmware onto your Arduino Uno device by clicking the **Verify** and **Upload** buttons (in that order) in the top left side of the screen



5. Your sensor should now be running. You can verify by checking its serial output in the Arduino IDE tools: