Smart Farmer - IoT Enabled Smart Farming Application
SPRINT - 1

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IOT BASED SMART FARMING SOIL SENSOR WITHOUT WI-FI

```
/*
Plant Watering Sytem

The circuit:

- Water pump

Power supply: 4.5~12V DCInterface: Brown +; Blue -

- Temperature/moisture sensorPower supply: 3.3-5v

- Moisture sensor Power supply: 3.3-5v

*/


#include "DHT.h"

#define DHTPIN 2   // what digital pin we're connected to #define

DHTTYPE DHT22 // DHT 22 (AM2302), AM2321

DHT dht(DHTPIN, DHTTYPE);

const int SOIL_MOISTURE_SENSOR_PIN = A0;const int

WATER_PUMP_PIN = 4;

const int dry = 520;const int wet = 270;

const int moistureLevels = (dry - wet) / 3;
```

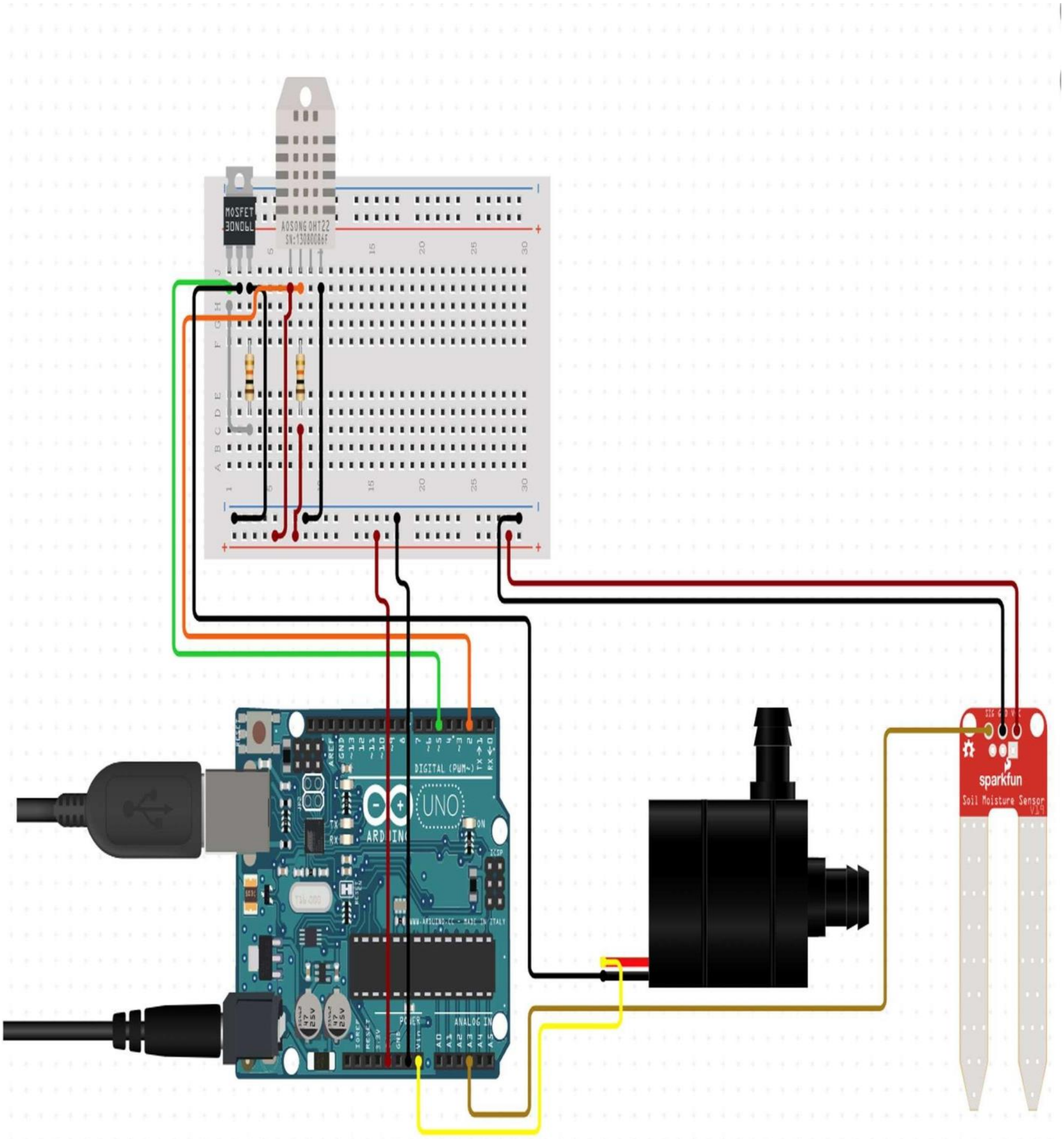
```
// TODO: Should we have a counter so if it waters for X times, then take abreak?

// OPTIMIZE: how dry to start watering and for how long.const int

soilMoistureSartWatering = 400;

const int soilMoistureStopWatering = 300;

// 60 seconds

const long waterDuration = 1000L * 60L;

// 60 seconds

const long sensorReadIntervals = 1000L * 60L;

// 2 hr

const long waterIntervals = 1000L * 60L * 60L * 2;

long lastWaterTime = -waterIntervals - 1;

boolean isWatering = false;

void setup()

{

Serial.begin(9600); pinMode(WATER_PUMP_PIN, OUTPUT);

waterPumpOff();dht.begin();

}

void loop()

{

mainLoop();

}
```

```
void mainLoop() {
float temperature = getTemperature();

float humidity = getHumidity();
long soilMoisture = analogRead(SOIL_MOISTURE_SENSOR_PIN);
Serial.println("Soil Moisture: " + readableSoilMoisture(soilMoisture)
+ ", " +soilMoisture);
Serial.println("Temperature: " + String(temperature) + " *F");

Serial.println("Humidity:" + String(humidity) + " %");


if (millis() - lastWaterTime > waterIntervals)
{

waterPlants(soilMoisture);lastWaterTime = millis();
}
delay(sensorReadIntervals);
}


void waterPlants(int soilMoisture) {
// Should this take a moving avg of the soilMoisture?
 // Can get outliers on the right after watering.if (soilMoisture >
soilMoistureSartWatering)
{ isWatering = true;
```

```
 } else if (soilMoisture < soilMoistureStopWatering)
 {isWatering = false;
 }
 Serial.println(isWatering ? "Starting to water" : "Skipping water");
if (isWatering) { waterPumpOn();delay(waterDuration);
 waterPumpOff(); Serial.println("Done watering");
 }
 }
String readableSoilMoisture(int soilMoisture){if (soilMoisture <= wet)
 {
return "Water";
 } else if (soilMoisture > wet && soilMoisture < (wet +
 moistureLevels))
 {
 return "Very Wet";
  } else if (soilMoisture > (wet + moistureLevels) && soilMoisture <
 (dry -moistureLevels))
  {
 return "Wet";
 } else if (soilMoisture < dry && soilMoisture > (dry - moistureLevels))
 {
 return "Dry";
 }
 else
 {
```

```
return"Air";
}
}
float getTemperature() {
// Read temperature as Fahrenheit (isFahrenheit = true)

float temperature = dht.readTemperature(true);
if (isnan(temperature)) {
Serial.println("Failed to read from DHT sensor!");
}
return temperature;
}
float getHumidity() {
float humidity = dht.readHumidity();if (isnan(humidity)) {
Serial.println("Failed to read from DHT sensor!");
}
return humidity;
}
void waterPumpOn()
{ Serial.println("Water pumpon");
digitalWrite(WATER_PUMP_PIN, LOW);
}
void waterPumpOff()
{ Serial.println("Water pumpoff");
digitalWrite(WATER_PUMP_PIN, HIGH);
}
```

OUTPUT:


MOSFET
30N06L
AOSONG DHT22
SN:13080086F
SIG GND VCC
sparkfun
Soil Moisture Sensor
V19
DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN