

HACK IN HUB HACKATHON

"IoT in Agriculture"

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Problem Statement:

IoT in Agriculture

Smart Farming!

To bring automation in the field of farming.
Farmer can control farming activities like
irrigation, fertilization, Crop monitoring etc
using an android application (IoT based).



Why is IoT in Agriculture chosen?

- Facts and Challenges Faced:
 - a. Food - main source of energy; mainly comes from agriculture
 - b. World population in the next 30 years - exceeds 9.7 billion
 - c. Demand for food/harvest increases
 - d. Decreasing number of farmers to do farming and less manpower
 - e. **Natural factors:** Global warming, Irrregular rain patterns, floods, drought, pests, insects, nutrient deficiency diseases, poor irrigation facilities, soil erosion and so on





HOW IoT BECOMES A SOLUTION FOR THIS PROBLEM?



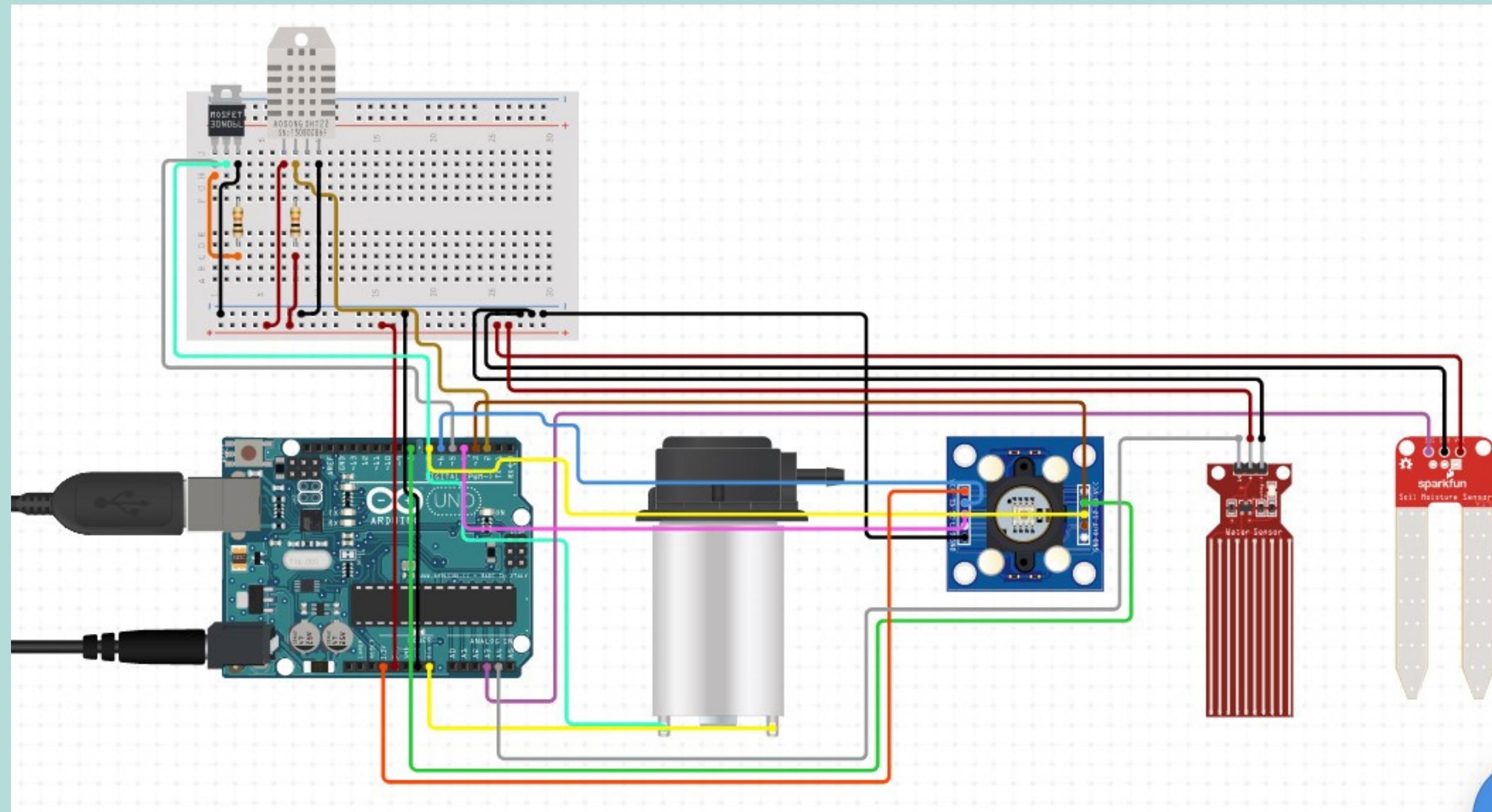
- 01.** The ease of internet connectivity and cloud computing has made it possible to incorporate IoT solutions in farming.
- 02.** Features: Data collection, Process Automation, Better Control, Cost management and waste reduction
- 03.** While the IoT sensors can collect data on a large scale, the analytics tool can extract meaningful information to make better decisions for the farmers.
- 04.** Applications: Climate condition monitoring, Smart Greenhouse, Agricultural Drones, Data Analytics, Cattle management etc



Solution made by Uykti:

- Our project aims at delivering an optimal and better solution (as a IoT device) for the famers to know more about the farming patterns and parameters like soil moisture level, humidity, colour of the leaves which have a lot of impact in the plant/crop growth
- **Main features:** Field irrigation and determination of suitability of soil for farming based on moisture, humidity and temperature levels and detection of plant diseases based on the colour of the leaves

PROJECT MODEL DESIGN



THREE MODULES OF THE PROJECT

- Soil Aridity
 - Part-1: Soil moisture
 - Part-2: Temperature and Humidity of soil
- Smart Irrigation
- Plant Disease detection

PROJECT
MODULES

Soil moisture level survey reports

Soil Moisture Thresholds for Specific Ground Textures			
Ground texture	FC (%)	PWP (%)	TAW (%)
Sand	12	5	7
Loamy sand	18	8	10
Sandy loam	23	10	13
Loam	29	13	16
Silt loam	32	16	16
Sandy clay loam	38	17	21
Sandy clay	34	19	15
Clay loam	31	19	12
Silty clay loam	30	16	14
Silty clay	42	21	21
Clay	42	23	19

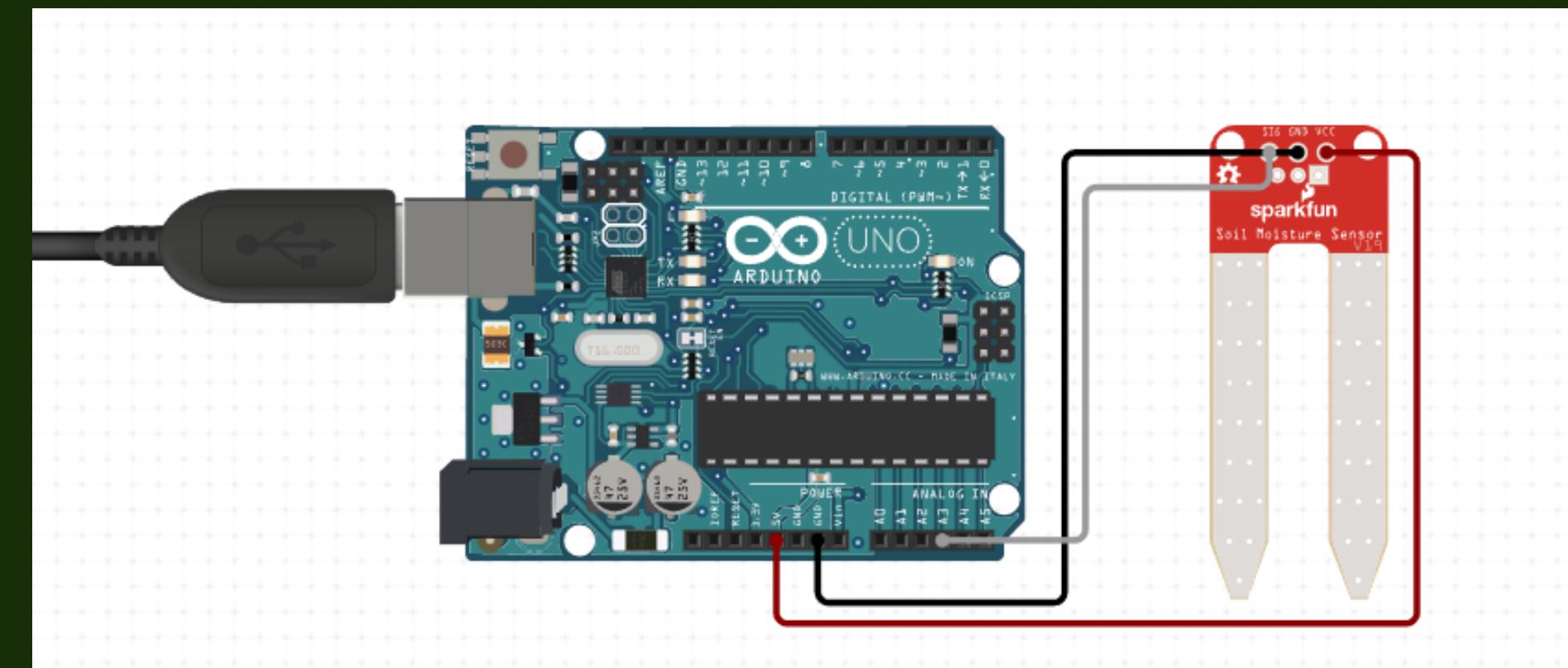
Soil moisture level survey reports

Table 1. Ranges of available water by soil texture (PNW Irrigators Pocket Guide).

Soil Texture	Available Water Capacity (AWC) in/in
Coarse Sand	0.2–0.8
Fine Sand	0.7–1.0
Loamy Sand	0.8–1.3
Sandy Loam	1.1–1.6
Fine Sandy Loam	1.2–2.0
Silt Loam	1.8–2.5
Silty Clay Loam	1.6–1.9
Silty Clay	1.5–2.0
Clay	1.3–1.8
Peat Mucks	1.9–2.9

MODULE - 1 PART-1

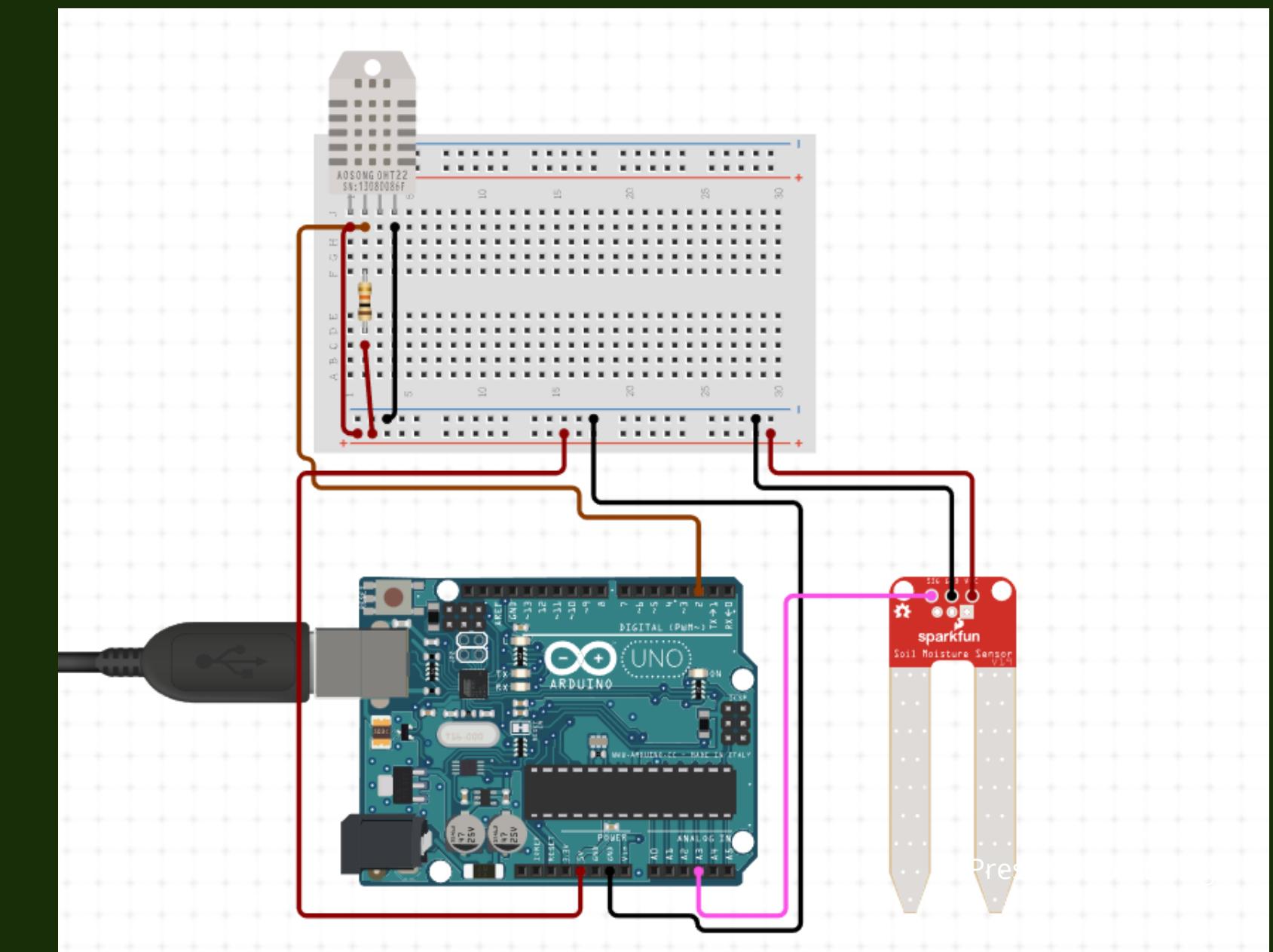
SOIL ARIDITY





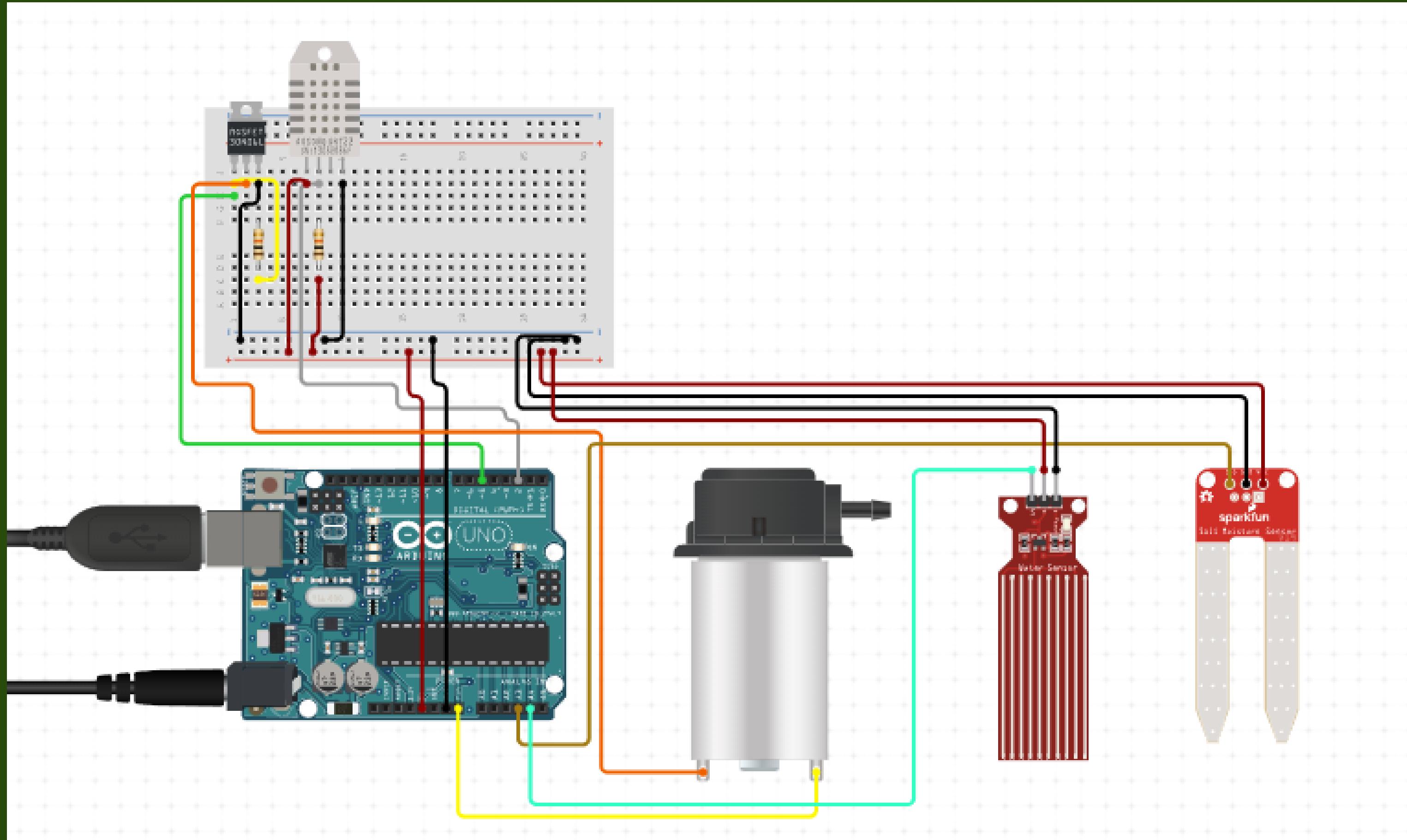
MODULE - 1 PART-2

SOIL ARIDITY



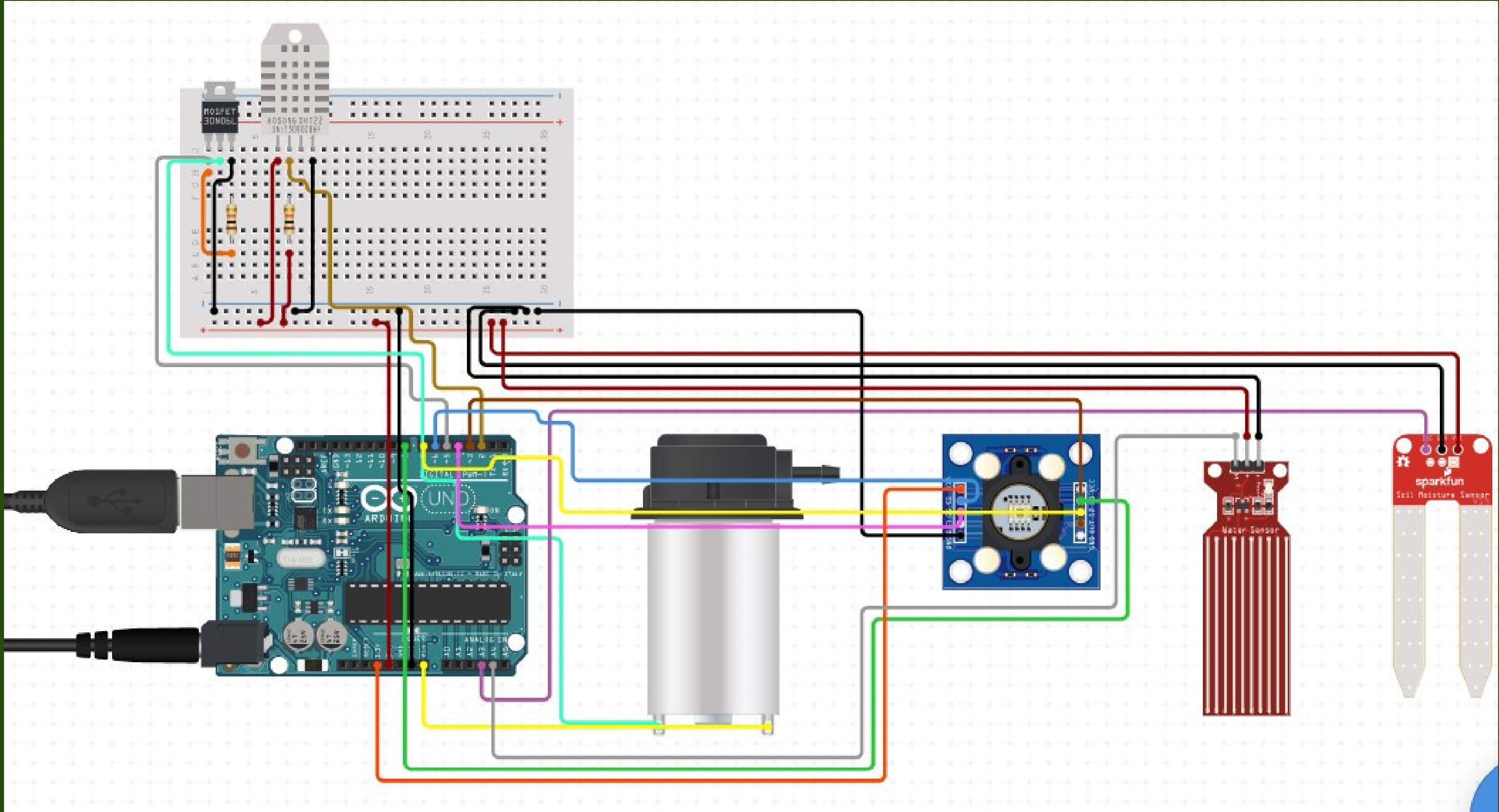
Module 2

- Smart Irrigation - Detection of Rain and irrigating the field accordingly



Module 3

- Plant Disease Detection -
Identification of plant
diseases by analyzing the
colour of the leaves



Future scope

It can be applied in a large field with multiple sensors to identify the infected plants to be plucked off and using many moisture sensor we can detect the moisture and hardness of the whole area to determine the hardness of the ground whether to grow a particular plant

ANALYTICS PART:

All the datas are pushed into ThingSpeak cloud for future analysis.

It can be used to know the annual consumption of water by each plant.