THE BREAKTHROUGH IN AGRICULTURE...

SMART AGRICULTURE SYSTEM

Meet The Group

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ABSTRACT

- Agriculture plays vital role in the development of economy in the country. In India about 70% of population depends upon farming.
- One of the solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture.
- The highlighting features of this project includes smartcontrol and intelligent decision making based on accurate real time field data.
- This IOT system for smart agriculture is powered by Arduino and includes a DC motor, GSM module, temperature, moisture, and water level sensors. It notifies the phone via app of the levels. When the water level falls, sensors detect it and a water pump is immediately started and if the temperature rises above a threshold. All of this is demonstrated in IOT.

INTRODUCTION

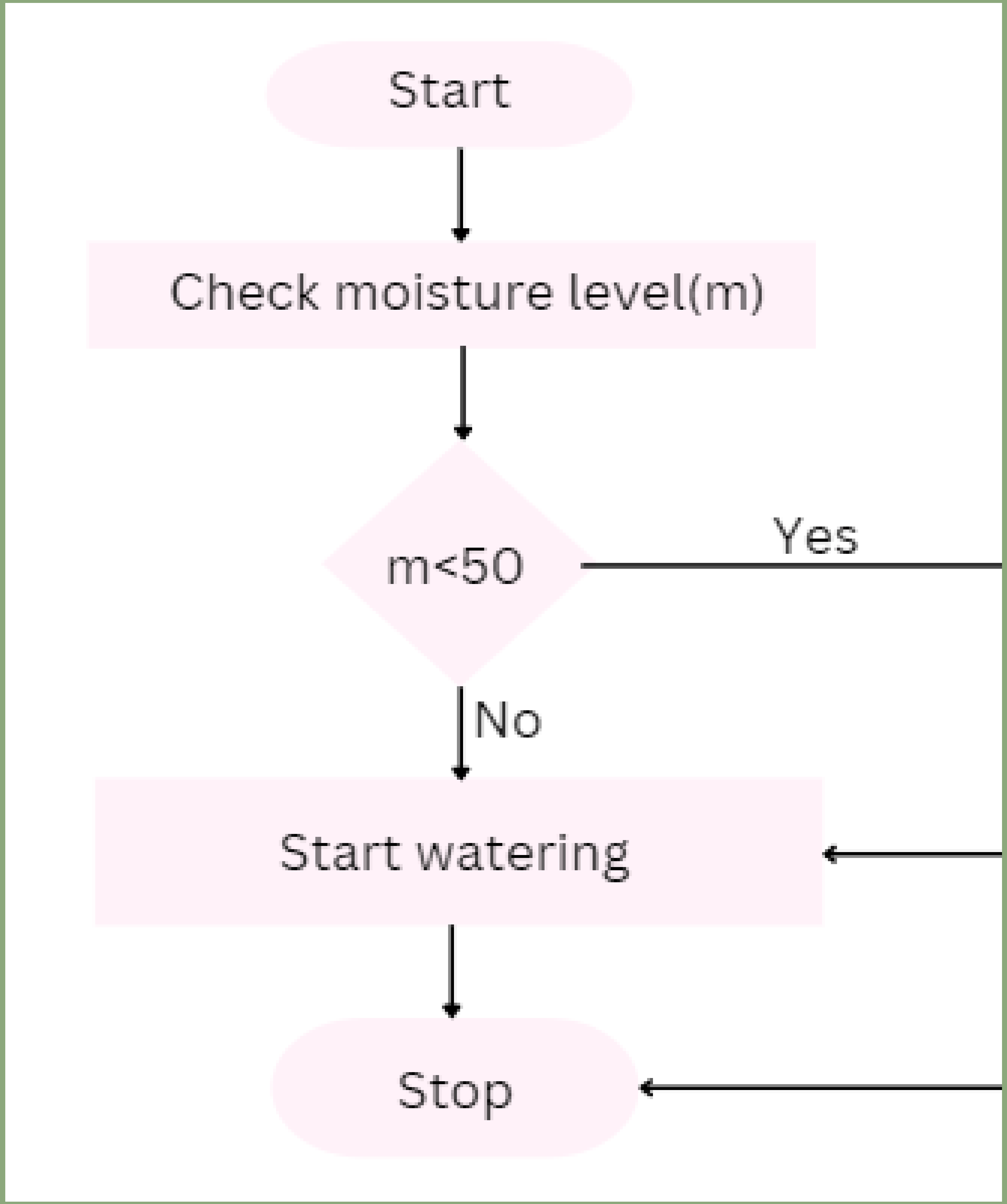
- Agriculture s the heart of many countries and soil is the main important element of agriculture. There are different soil kinds and each kind has different features for different crops. In this field, now a day's different methods and models are used to increase the quantity of the crops. So the main purpose of this system is to create a model that helps farmers to know which crop should take in a particular type of soil. The model only suggests soil type and according to soil type it can suggest suitable crops. In this, different classifiers are used and according to that the model suggests the crop.

PROBLEM STATEMENT

This project is inspired to be beneficial for the farmers who work in agricultural areas where they are totally reliant on the rain and bore wells to irrigate their land. Organic farming heavily relies on historical soil health metrics including temperature, pH, and soil moisture. IoT applications can help with irrigation pump management, opening and closing water flow gates, and data logging the state of the soil's health for both the present and the future. Additionally, with the aid of IoT apps, remote farmers may have access to live advise from professionals or experts based on recorded soil health data.

PROPOSED IDEA

WORK FLOW DIAGRAM:



MODULES DESCRIPTION

- Relay is an important part of this model. They work as interfacing between electronic circuits and mechanical circuits. Basically relay is a switch which is operated by a relatively small amount of electric current. Relays produce a very high voltage when switched off. This will damage the other components in the circuit.
- The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the air surrounding the plant and sends out a digital signal on the data pin.
- Water pump is used to provide water whenever needed. It can be controlled by interfacing it to a microcontroller. The water pump is turned ON/OFF by sending signals as required.

- **Soil moisture sensors measure the moisture content in the soil. The sensor measures the water content indirectly by using properties of soil like, such as electrical resistance and dielectric constant. Technologies used in moisture sensors include neutron moisture gauges, electrical resistance of soil and frequency domain sensors such as capacitance sensors. The moisture sensor is inserted in the soil, in order to measure the moisture content of the soil. If there is less water in the material then less electricity will be generated by the soil which indicates resistance is more, therefore moisture level in the soil is low.**
- **SOFTWARE: Arduino IDE, Blynk App**

COMPARISON STUDY

EXISTING SYSTEM:

It only include simple automatic irrigation system using wifi module based on moisture content

PROPOSED SYSTEM:

- **Automatic irrigation system using wifi module depending upon the moisture content.**
- **Mathematical model to give the score to the soil depending upon moisture, ph and temperature to predict which crop can be grown.**

IMPLEMETATION

The main components of the model are Arduino UNO, temperature sensor, soil moisture sensor, water pump, relay, esp8266 microcontroller and Arduino IDE. We make Arduino connections to relay, sensors and water pump. Arduino allows water pump to on or off automatically. The relay ground is connected to Arduino ground and relay input to Arduino digital pins. Water pump provides water needed by the plant to survive. This model smart plant watering system is programmed using Arduino IDE software such that it waters the plants based on moisture sensor. It checks soil moisture level, and if it low it triggers the water pump and it will be on until moisture level reaches the threshold.

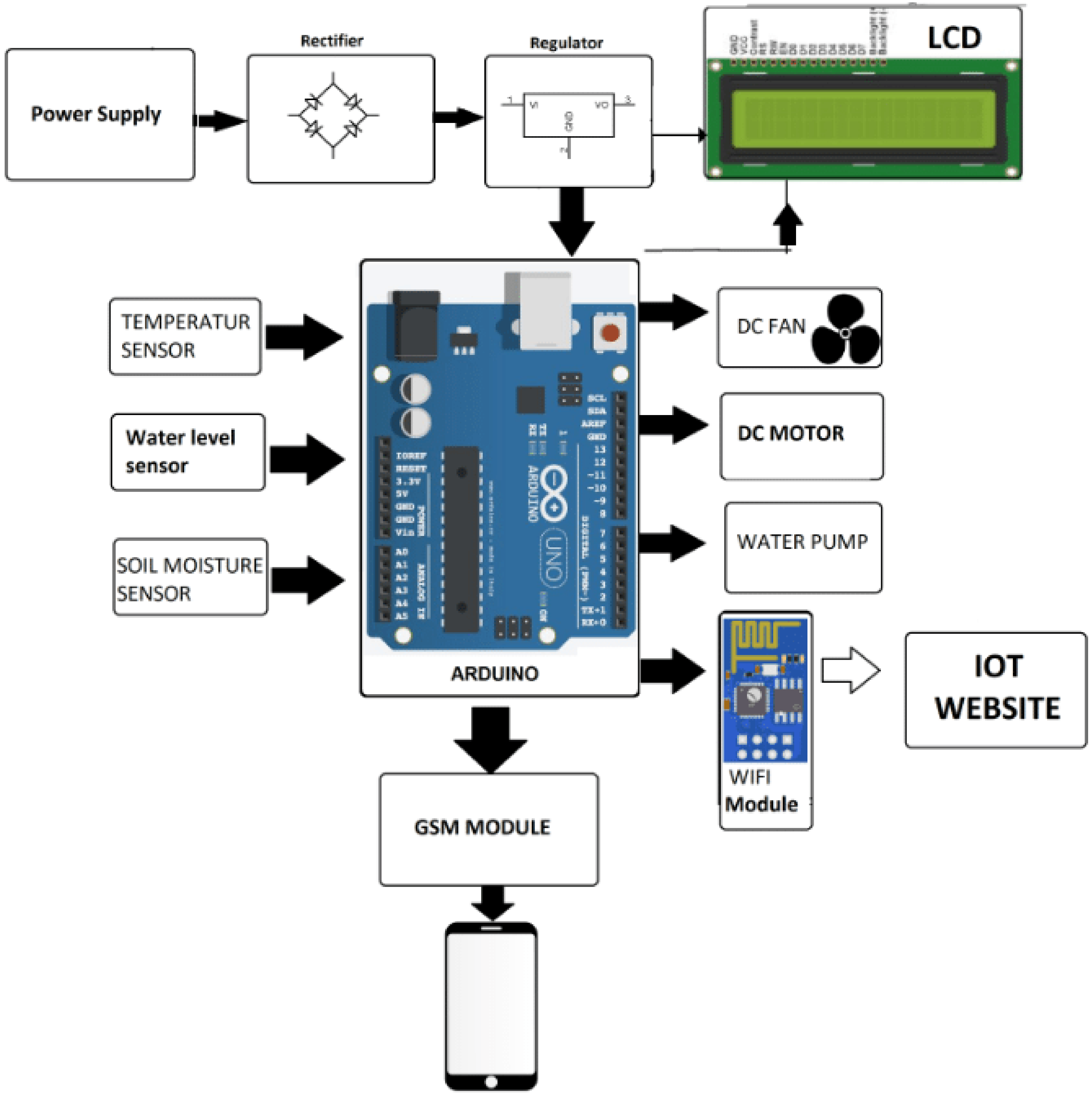
CODE

```
#define BLYNK_PRINT Serial
#include <SPI.h>
#include <BlynkSimpleEsp8266.h>
#include <DHT.h>
char auth[] ="lbAPkx4iO2W4q7YVX_o3BjMsfOhh2c3I";
char ssid[] = "random";
char pass[] = "12345678";

#define DHTPIN 2
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
SimpleTimer timer;
float H=0;
float T=0;
void sendSensor()
{
float h = dht.readHumidity();
float t = dht.readTemperature();
H=h;
T=t;

if (isnan(h) || isnan(t)) {
Serial.println("Failed to read from DHT sensor!");
return;
}
Blynk.virtualWrite(V5, h); //V5 is for Humidity
Blynk.virtualWrite(V6, t); //V6 is for Temperature
}
void setup()
{
Serial.begin(9600);
dht.begin();
timer.setInterval(1000L, sendSensor);
Blynk.begin(auth, ssid, pass);
//sensors.begin();
}
int sensor=0;
int relativeHumidity=0;
int Troom = 25;
int phneutral = 7;
int ph = 0;
float minRelativeHumidity = 60.0;
float maxRelativeHumidity = 80.0;    // Range of optimal humidity
values for rice crop
float phMin = 6.0;
float phMax=6.4;                     // Range of optimal PH values
for rice crop
float Tmin = 10, Tmax = 12;                     // Range of optimal
Temperature values for rice crop
float minOptimalValue = 0;
float maxOptimalValue = 10;
float measuredValue = 0;
void sendTemps()
{
sensor=analogRead(A0);
relativeHumidity=145-map(sensor,0,1023,0,330);
delay(1000);
maxOptimalValue = 0.0625*(Tmin-Troom) + 0.5*(phMin-phneutral)
+ 0.4375*(maxRelativeHumidity/10);
minOptimalValue = 0.0625*(Tmax-Troom) + 0.5*(phMax-
phneutral) + 0.4375*(minRelativeHumidity/10);
measuredValue = 0.0625*(T-Troom) + 0.5*(7.3-phneutral) +
0.4375*(relativeHumidity/10);
Serial.print("Minimum Optimal Value : ");
  Serial.println(minOptimalValue);
  Serial.print("Maximum Optimal Value : ");
  Serial.println(maxOptimalValue);
  Serial.print("Measured Value : ");
  Serial.println(measuredValue);
if(measuredValue>=minOptimalValue                              &&
measuredValue<=maxOptimalValue)
{
  Serial.println("Conditions are suitable for planting the required
crop");
}
else{
  Serial.println("Conditions are not suitable for planting the required
crop");
  digitalWrite(5,HIGH);
}
Blynk.virtualWrite(V2,relativeHumidity);
delay(1000);
}
void loop()
{
Blynk.run();
timer.run();
sendTemps();
}
```

ARCHITECTURE AND BLOCK DIAGRAM

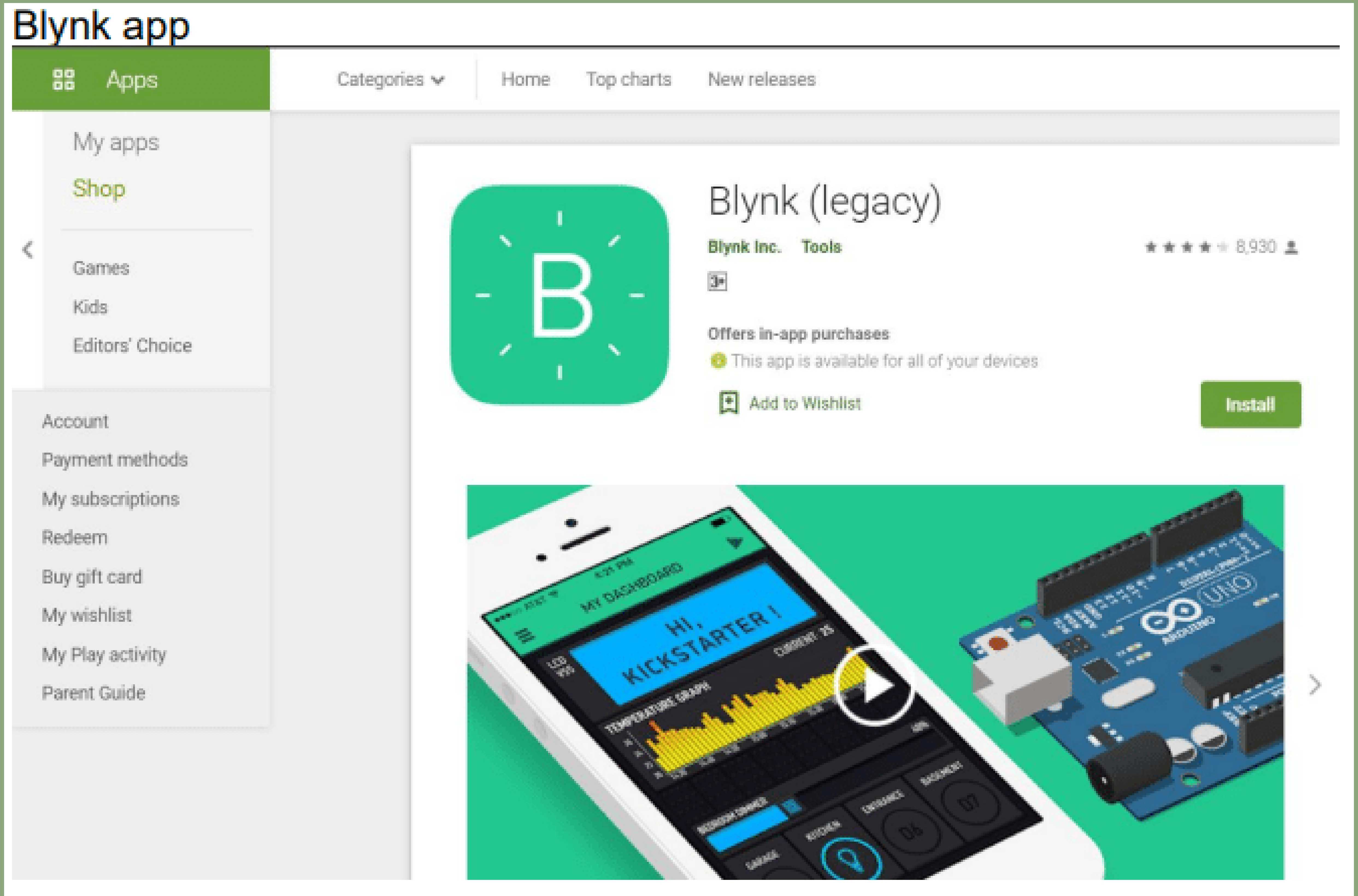


LITERATURE SURVEY

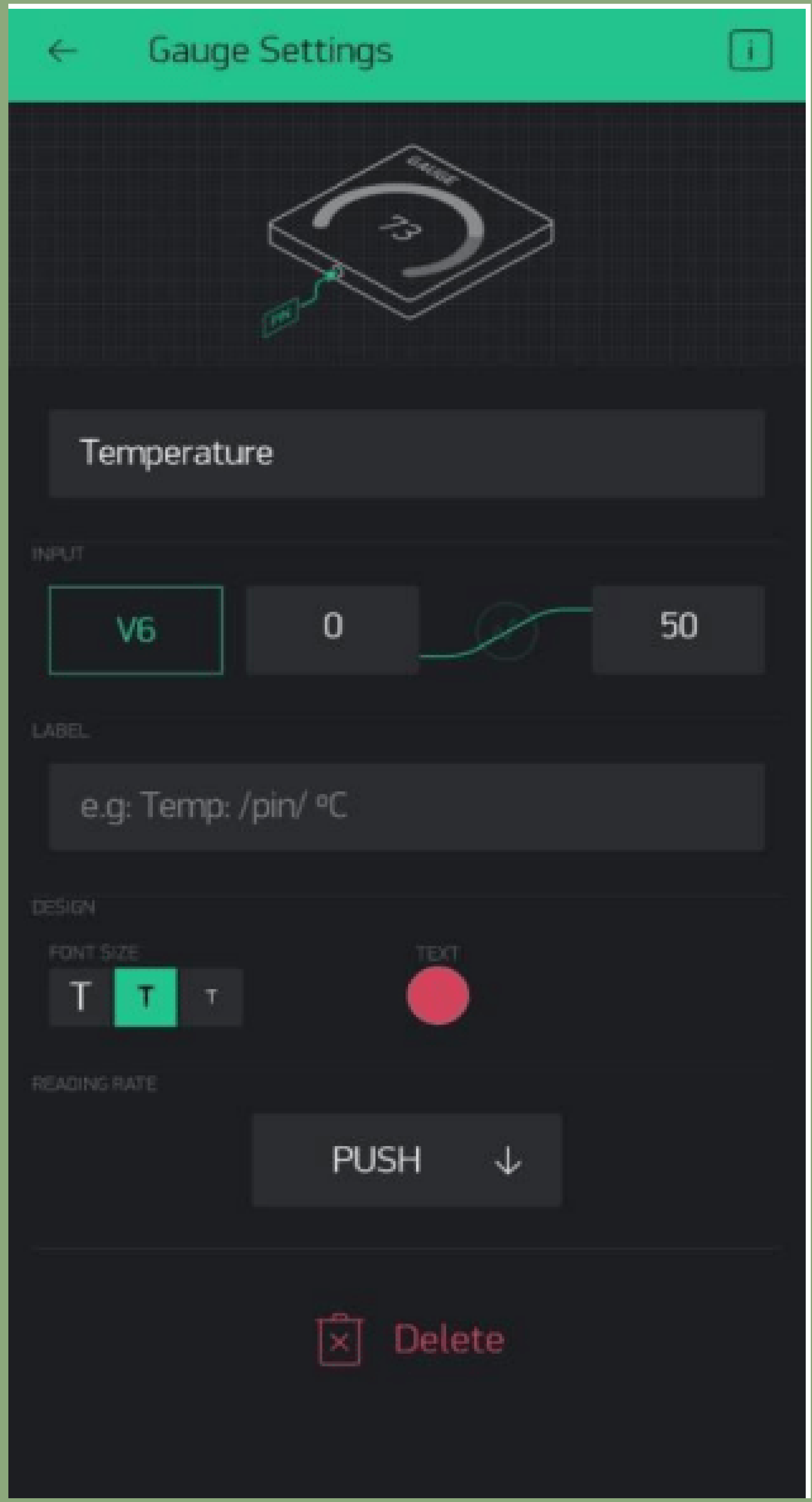
AUTHOR	PROJECT TITLE	REVIEW PROS AND CONS
Yin Yin Nu	Automatic Plant Watering System using Arduino UNO	Used only single sensor and internet of plants is not implemented
Parwinder Singh Bains	Modeling and Designing of Automatic Plant Watering System Using Arduino	Implemented successfully Used only single sensor

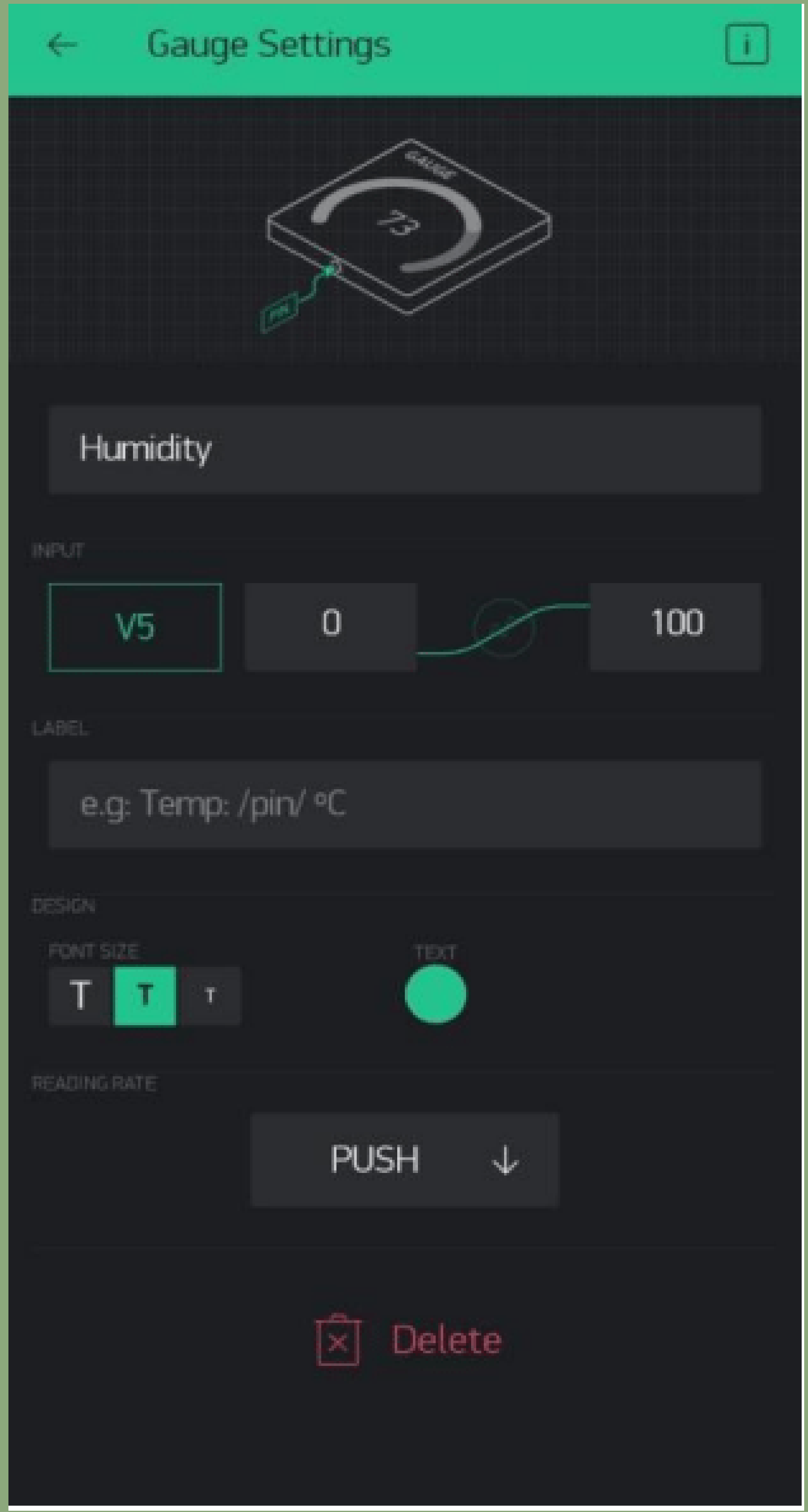
SCREENSHOTS

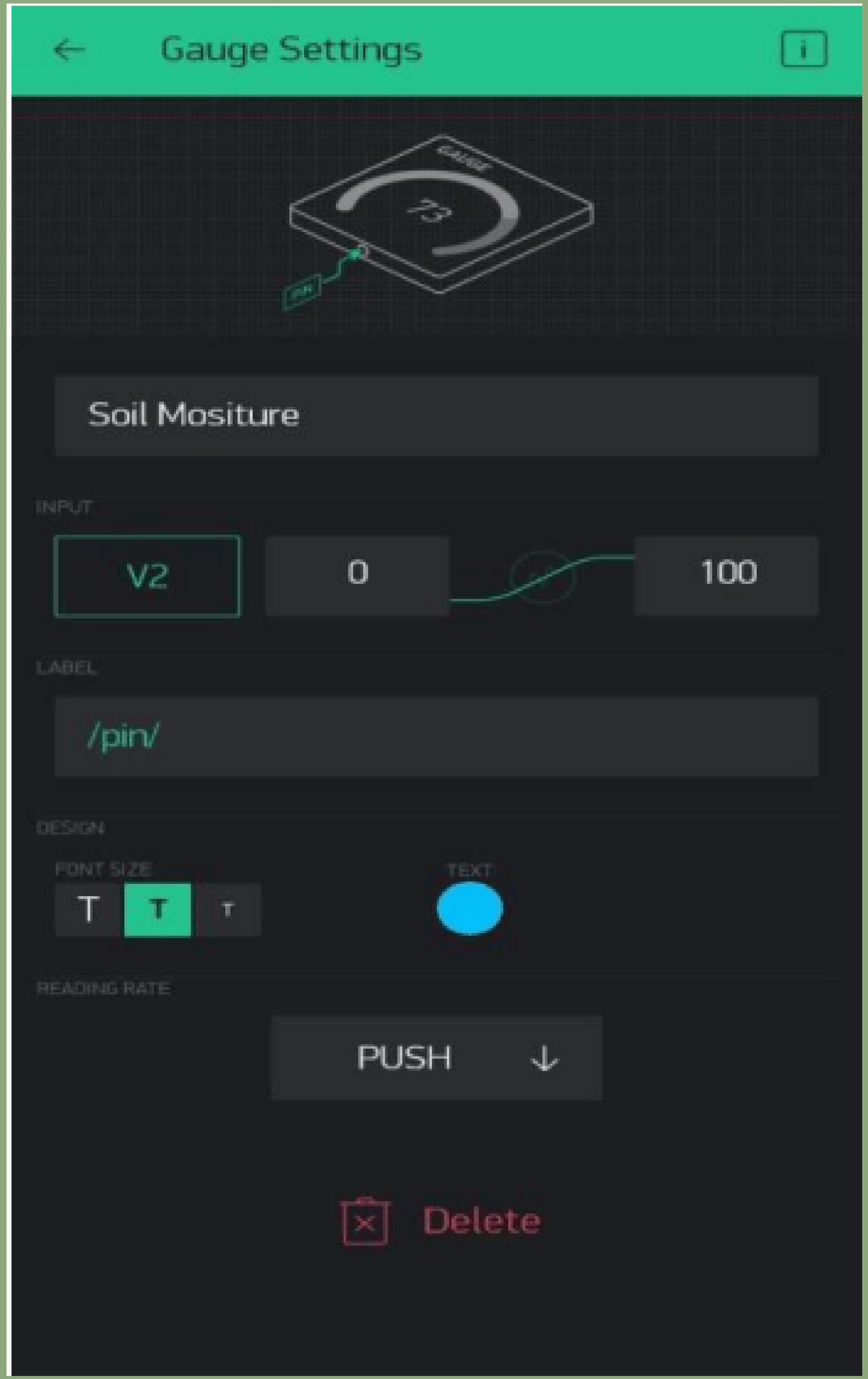
CLIENT SIDE (UI) APP

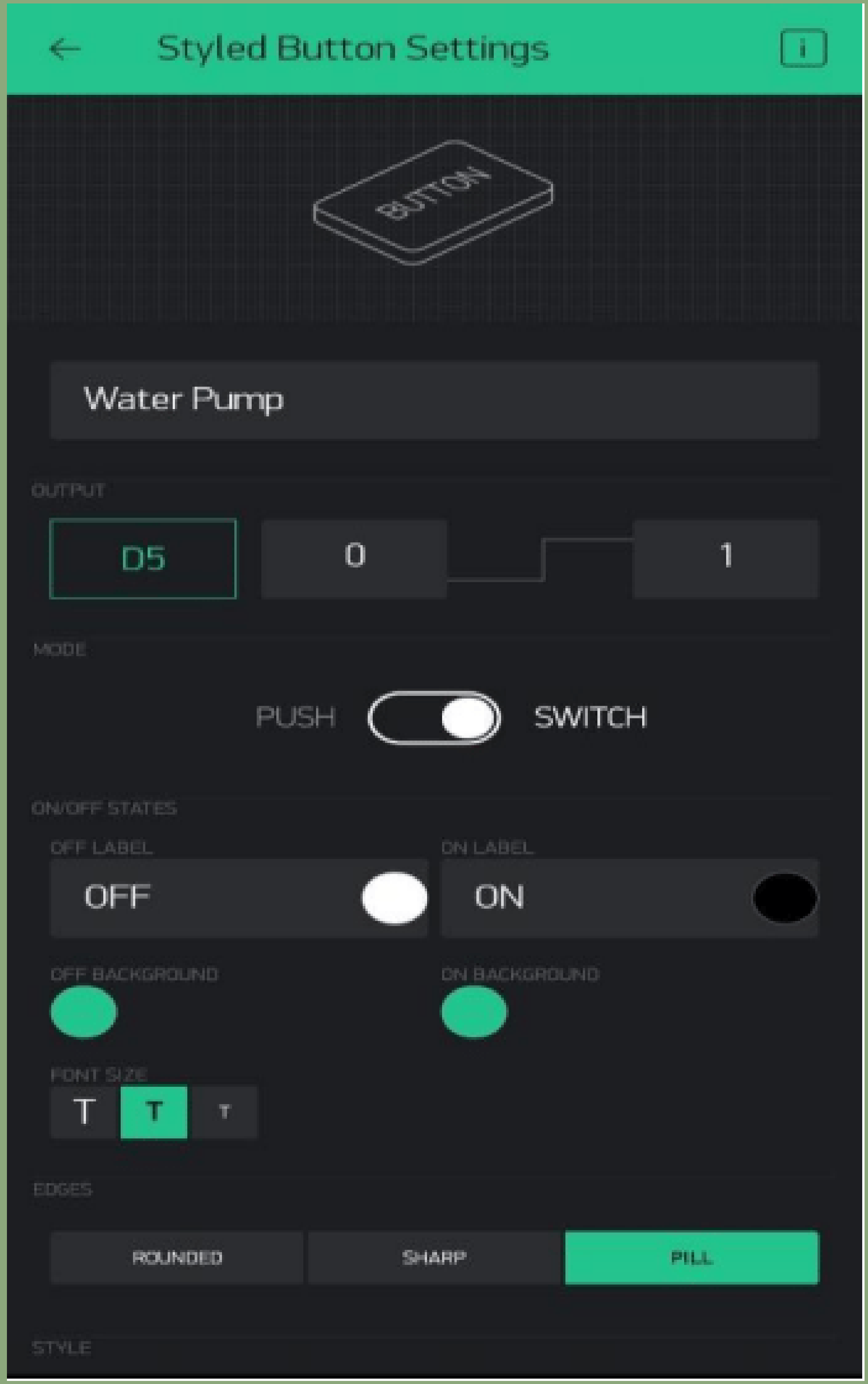



irrigation system
SOIL MOSITURE
V2
33
0
100
HUMIDITY
V5
61
0
100
TEMPERATURE
V6
22.8
0
50
WATER PUMP
D5
INDICATOR
D3


Gauge Settings
Temperature
INPUT
V6
0
50
LABEL
e.g: Temp: /pin/ ºC
DESIGN
FONT SIZE
TEXT
READING RATE
PUSH
Delete


Gauge Settings
Humidity
INPUT
V5
0
100
LABEL
e.g: Temp: /pin/ ºC
DESIGN
FONT SIZE
TEXT
READING RATE
PUSH
Delete


Gauge Settings
Soil Mositure
INPUT
V2
0
100
LABEL
/pin/
DESIGN
FONT SIZE
TEXT
READING RATE
PUSH
Delete


Styled Button Settings
Water Pump
OUTPUT
D5
0
1
MODE
PUSH
SWITCH
ON/OFF STATES
OFF LABEL
ON LABEL
OFF
ON
OFF BACKGROUND
ON BACKGROUND
FONT SIZE
EDGES
ROUNDED
SHARP
PILL
STYLE

CONCLUSION

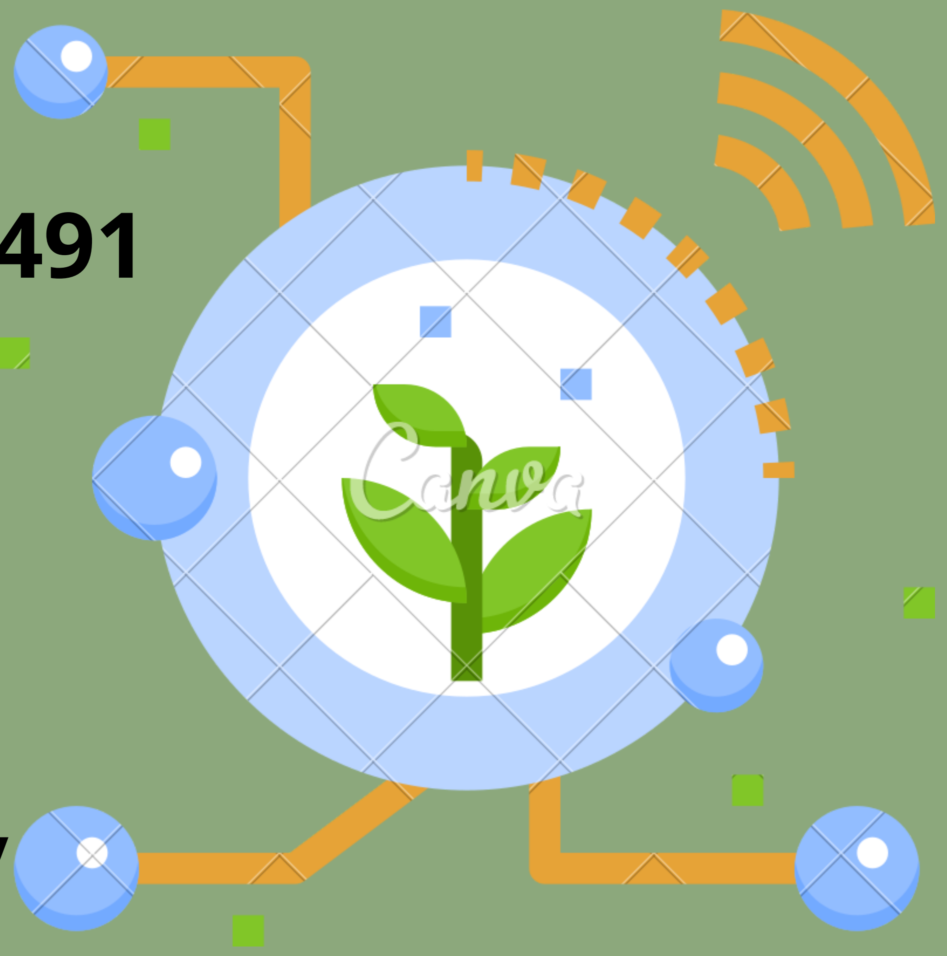
After arranging all components with the required board we were able to perform the working of our project, this project helps us to gain in depth knowledge about the environment , type of crops that we come across in daily life , the conditions that need to be completely nourished , we also gained knowledge about the working of sensors , how moisture sensor works , in respect of resistance values how we relate the condition of the soil whether it needs water , whether it is completely wet. The moisture will deliver the moisture level of the soil visible from the app. It will also give the values for humidity and temperature. Each plant has its own favorable environment in which it can grow properly.If we know the adequate moisture level value for each of the plant we can maintain its moisture to that value as we can read the value of it from the mobile app. This is implemented in this project.

FUTURE WORK

The mathematical model that has been implemented is based on the current data sets obtained from different researches as mentioned in references tend to change with adaptability of the plant in the surrounding like plants getting resistant to high temperature or high humidity. With recent studies suggesting that in the next 5-6 years plants will be adapting to the surroundings to match the global climate change which will affect their growth genetically hindering their basic growth requirements and displaying multiple growth abnormalities

REFRENCES

- https://en.wikipedia.org/wiki/Crop
- https://europepmc.org/article/med/3077863
- https://www.academia.edu/download/53284195/37_1488609 467_04-03-2017.pdf
- https://www.sciencedirect.com/science/article/pii/S02697491 10004240
- https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-3040.1990.tb01082.x
- https://www.nationalgeographic.org/encyclopedia/crops/
- https://www.britannica.com/topic/crop-agriculture
  https://en.wikipedia.org/wiki/Plant_development




Jelly's Candles
Thank you