

SMART IRRIGATION

Guide:

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INTRODUCTION

- Water irrigation system based on **Internet of Things (IoT)**.
- Irrigate the farmland in an efficient manner with automated irrigation System based on **soil moisture**.
- Operates by monitoring the value on soil moisture **sensor** and based on the reading, **motor** is kept ON or OFF.
- Node MCU transports the data to the digital platform of the server for processing of the data. Then those data are sent to the mobile application of the user.
- User-friendly experience with the help of **mobile application**.

PROBLEM STATEMENT AND MOTIVATION

“ An automated irrigation system is needed to optimize water use for agricultural crops. The technique can be used for the application of accurate amount of water. By forming sensor network, good monitoring of water regulation in agricultural field can be achieved. ”

LITERATURE REVIEW

YEAR	NAME OF THE PAPER	AUTHOR	DESCRIPTION	LIMITATIONS
2019	<i>Automatic Plant Watering System</i>	M. Mayuree P. Aishwarya A. Bagubali	User will be notified to switch ON/OFF the motor	User should be alert every time to OFF the motor.
2020	<i>Water irrigation using IoT</i>	J. Karpagam I. I. Merlin P. Bavithra J. Kousalya	Pump get ON and OFF automatically	no customized settings, expensive
2021	<i>IoT Enabled Smart Farming and Irrigation System</i>	M. Rohith R. Sainivedhana N. Sabiyath Fatima	switch on the motor to water the plants automatically	user cannot interfere with the process



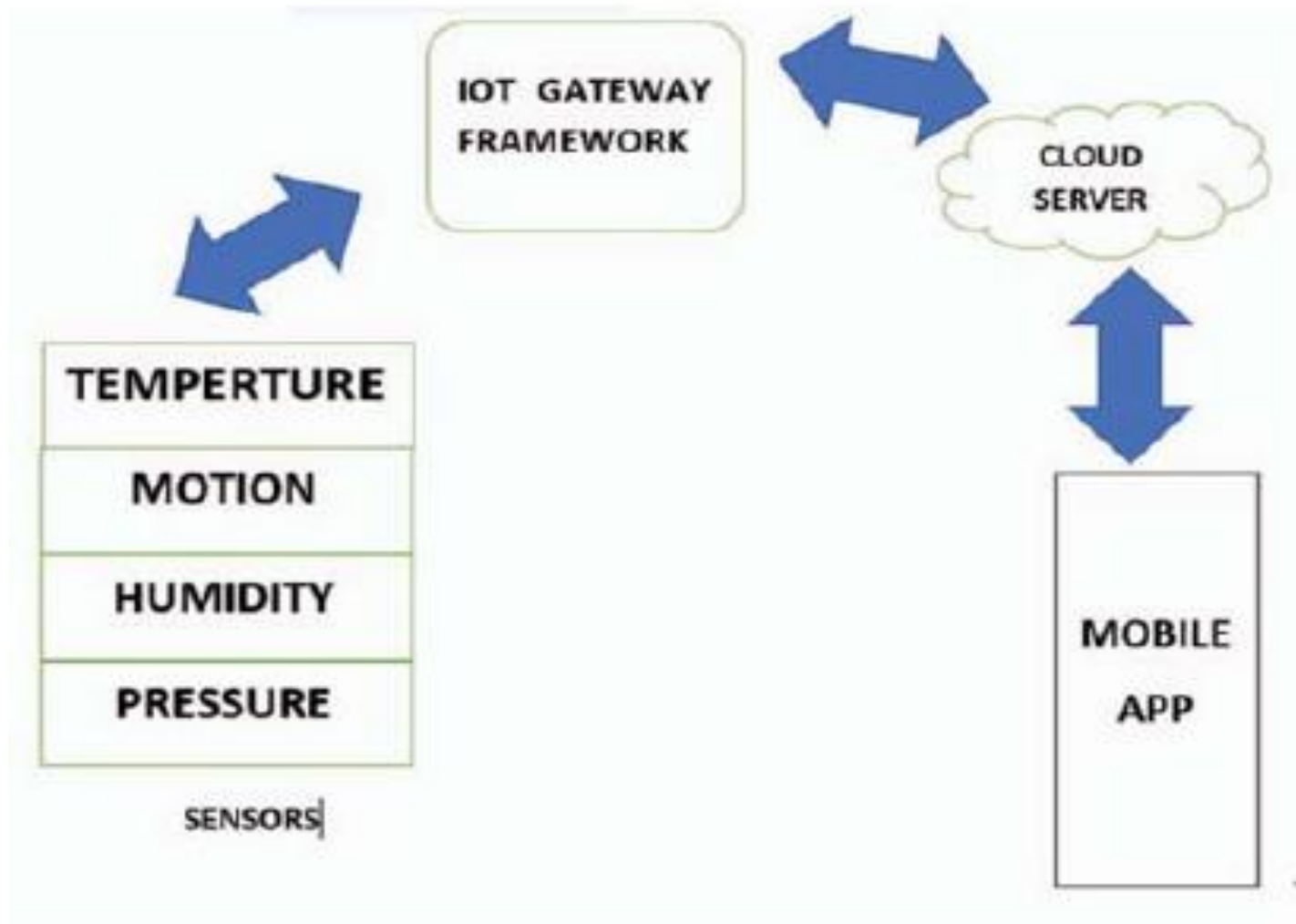
EXISTING SYSTEM

- In existing system, we require manual supervision and labour for proper irrigation.
- As per the paper *"An IoT Based Smart Irrigation System," 2021* , existing system consist of a motor that pumps water automatically based on the value of sensor.
- No user intervention
- Expensive
- No customized settings
- Use of Arduino



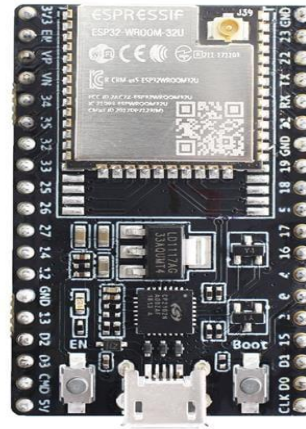
PROPOSED SYSTEM

- In the proposed system, parameter of soil such as moisture is sensed with the help of sensors and is displayed in the mobile application.
- If the value of sensor is greater than the threshold, an alert is sent to the telegram.
- Based on the alert, User can ON the motor.
- Motor gets OFF automatically and manually.



ARCHITECTURE

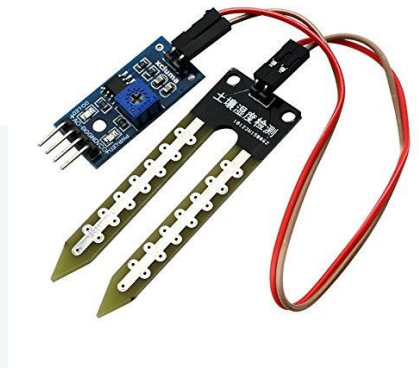
COMPONENTS



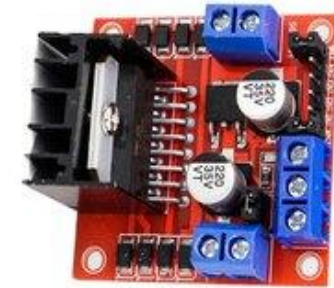
ESP32



MOTOR PUMP

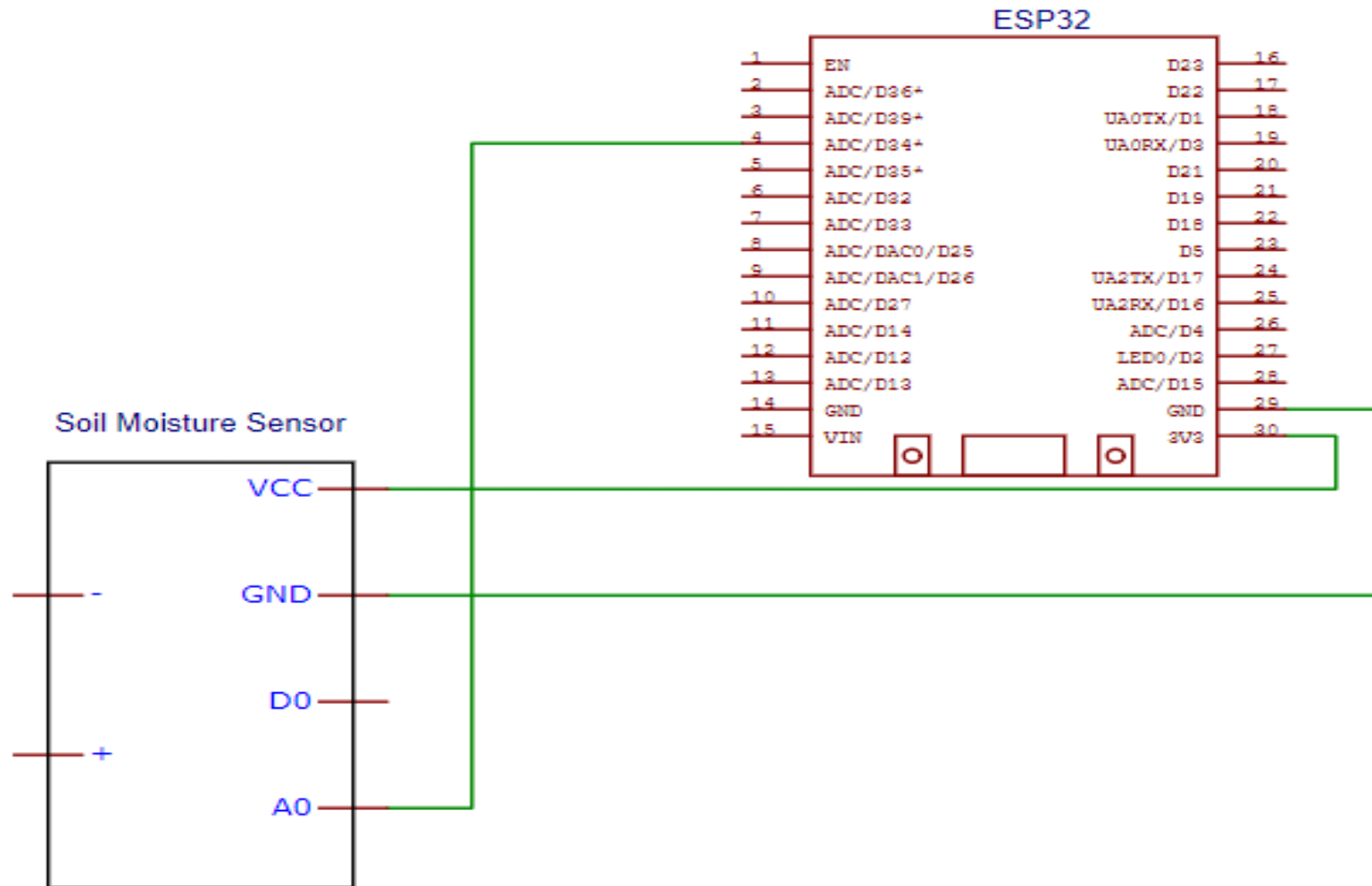


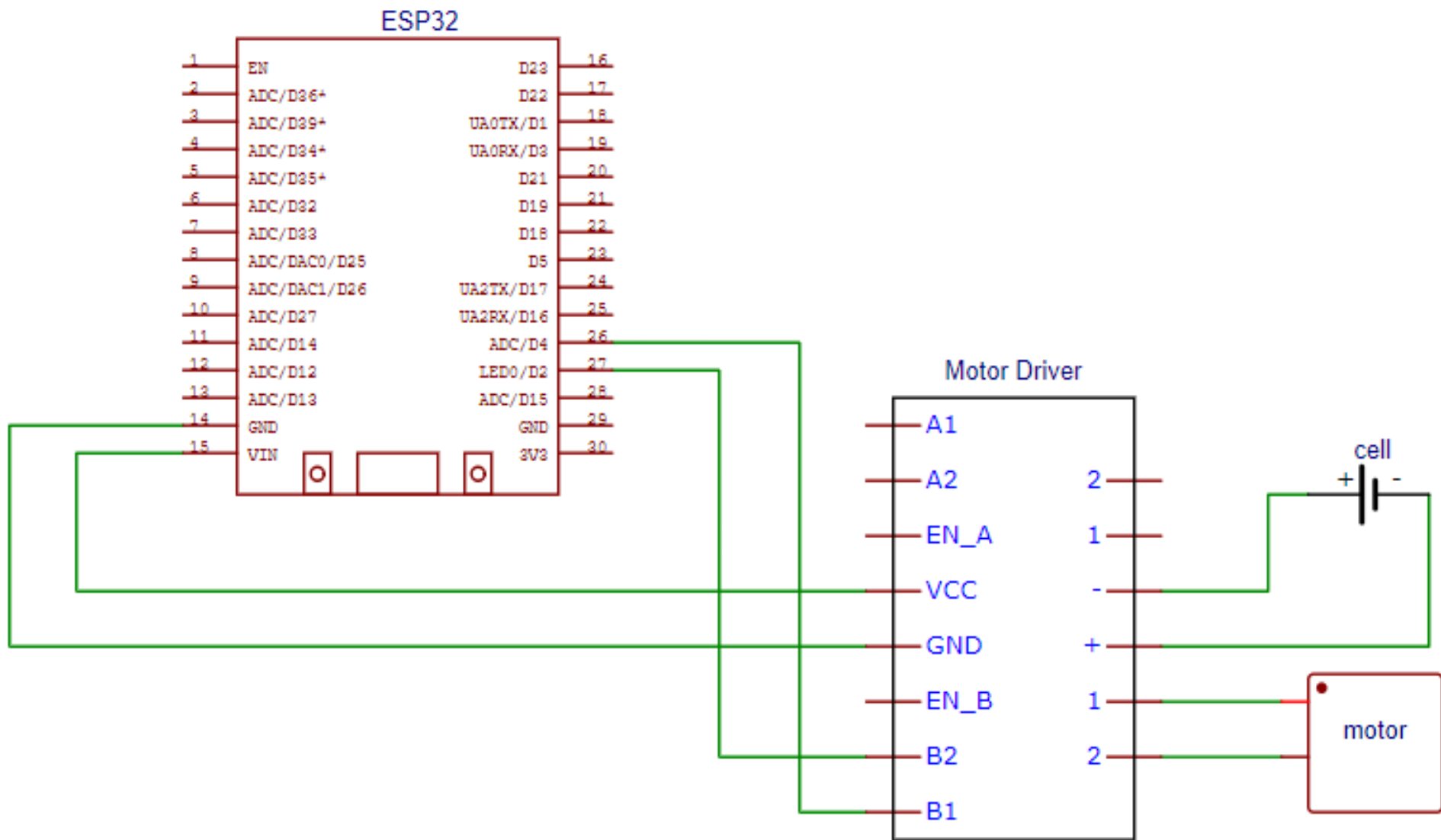
SOIL MOISTURE
SENSOR

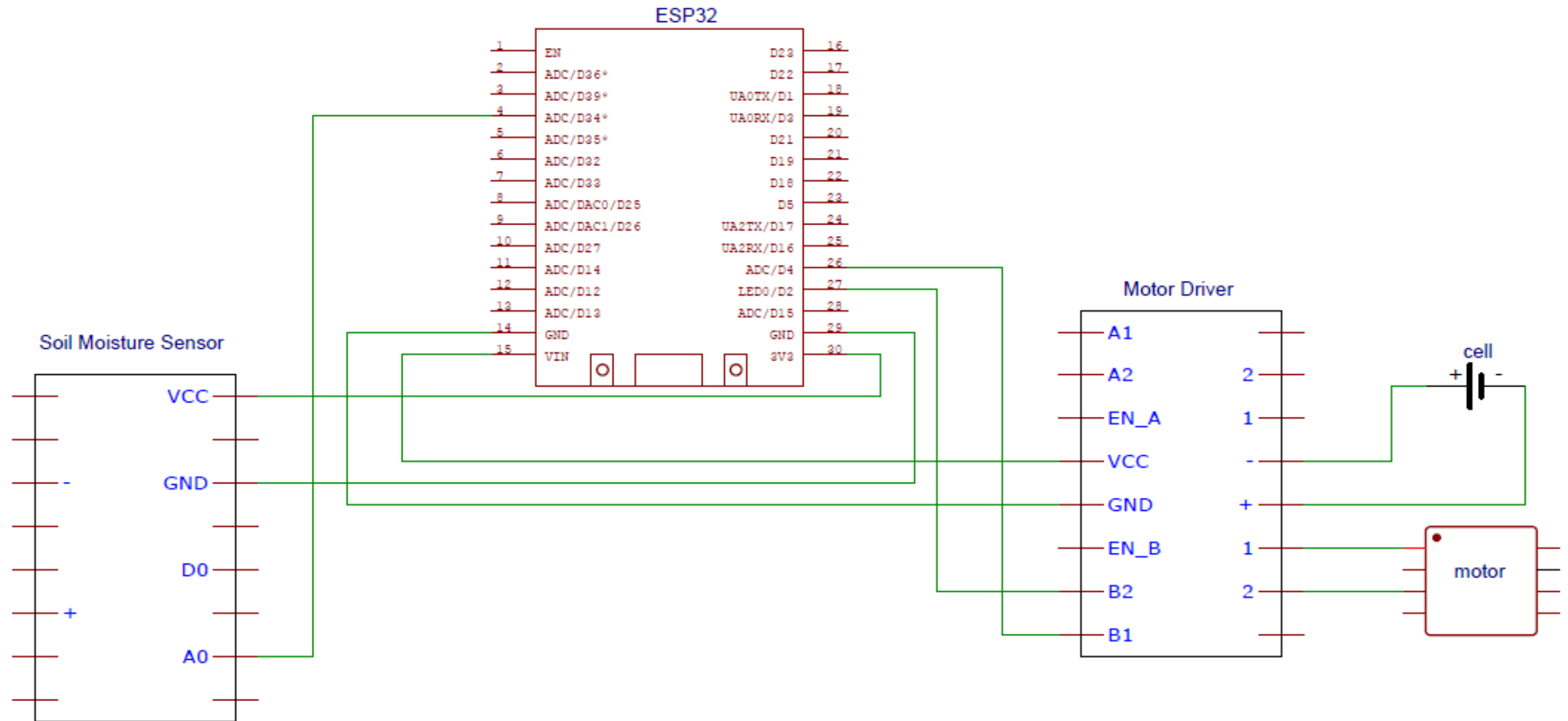


MOTOR DRIVER

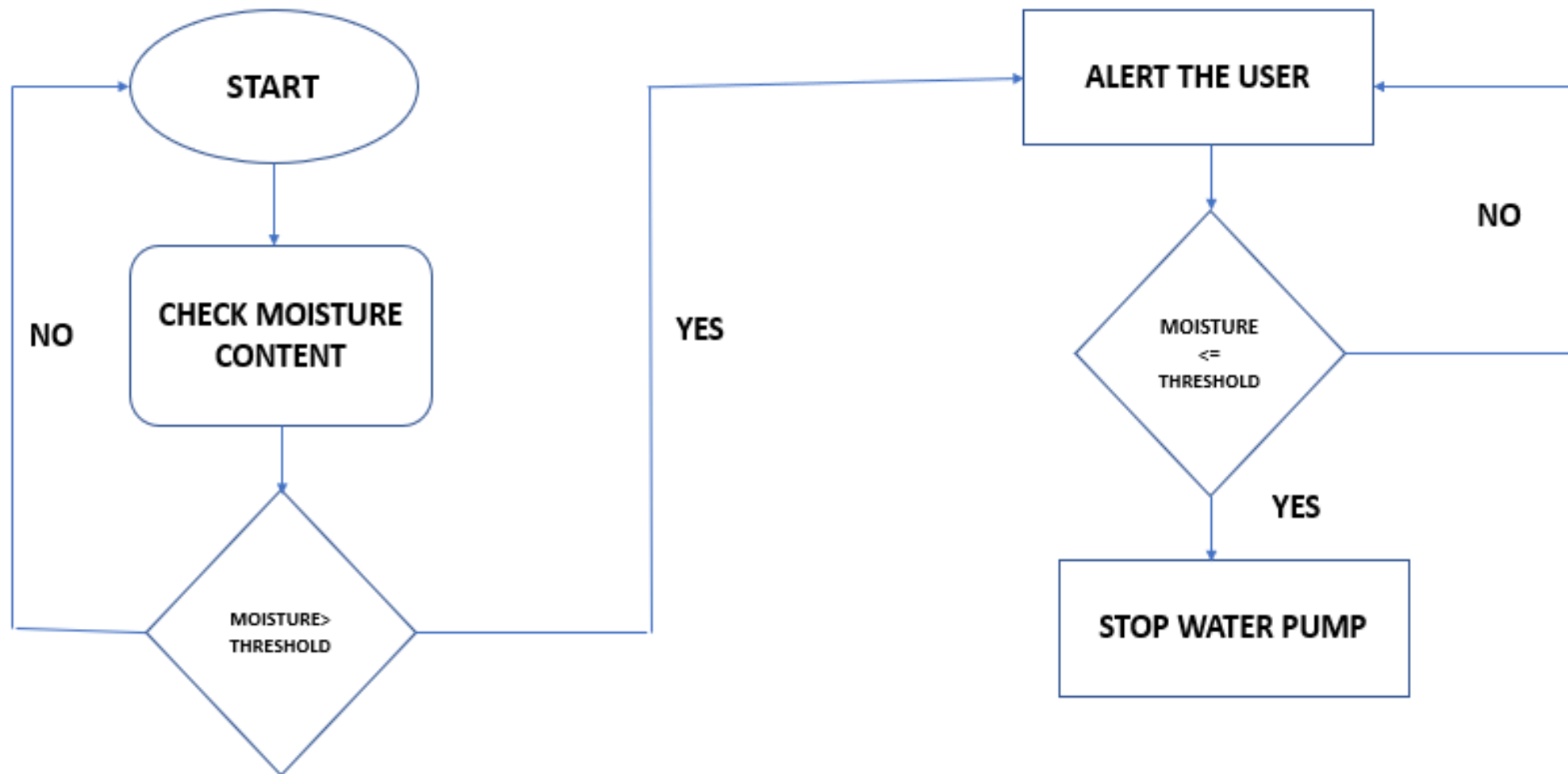
CIRCUIT DIAGRAM



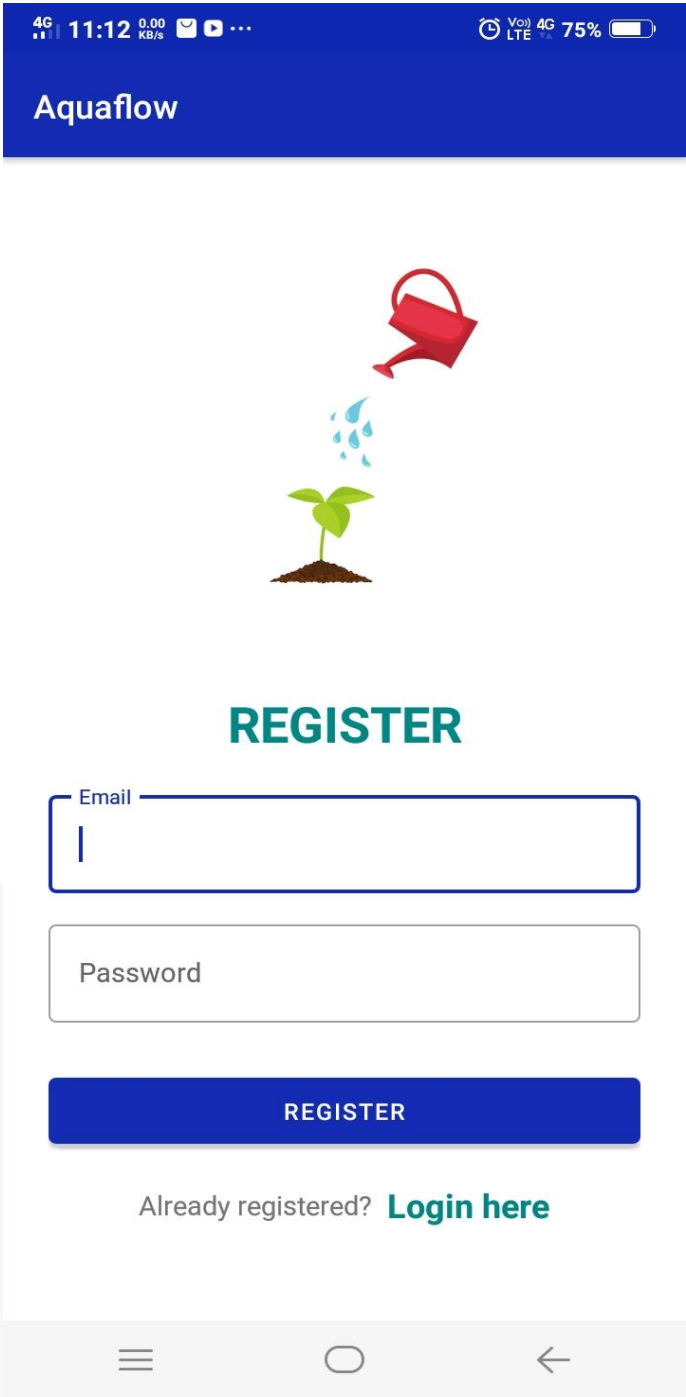
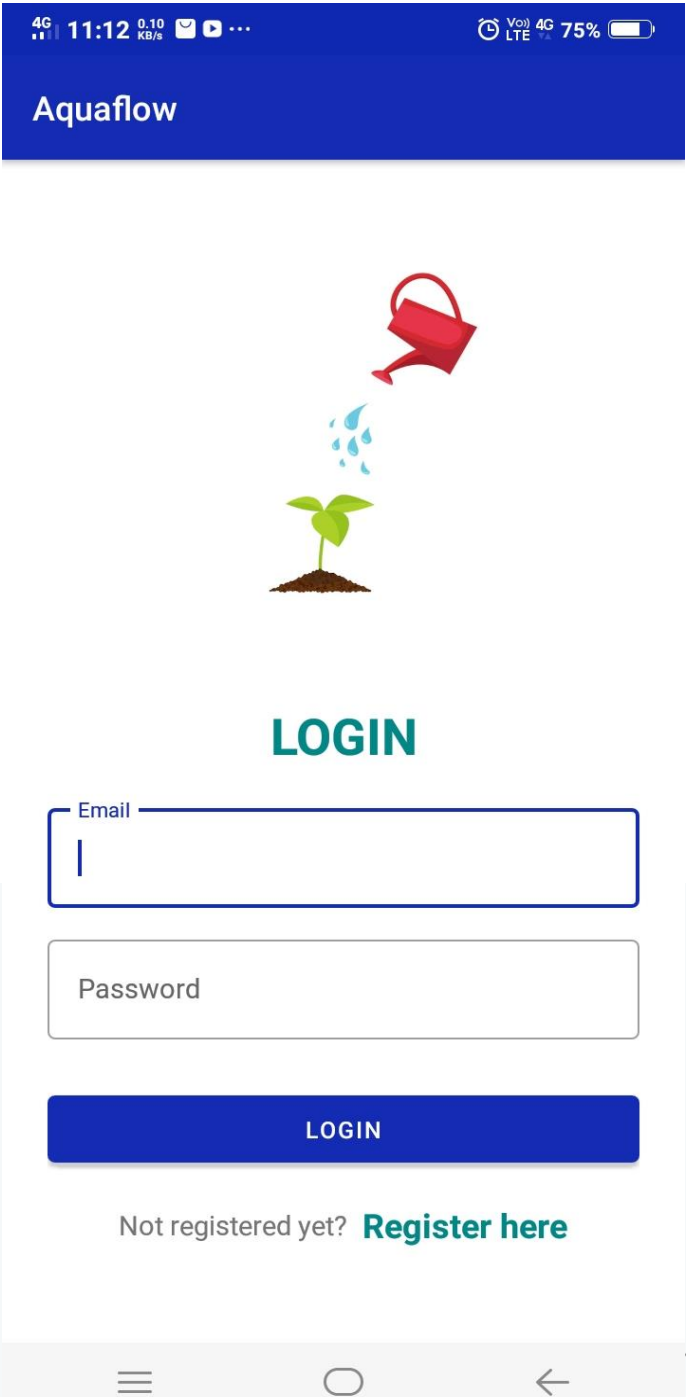




FLOW CHART



SCREENSHOTS





Add user

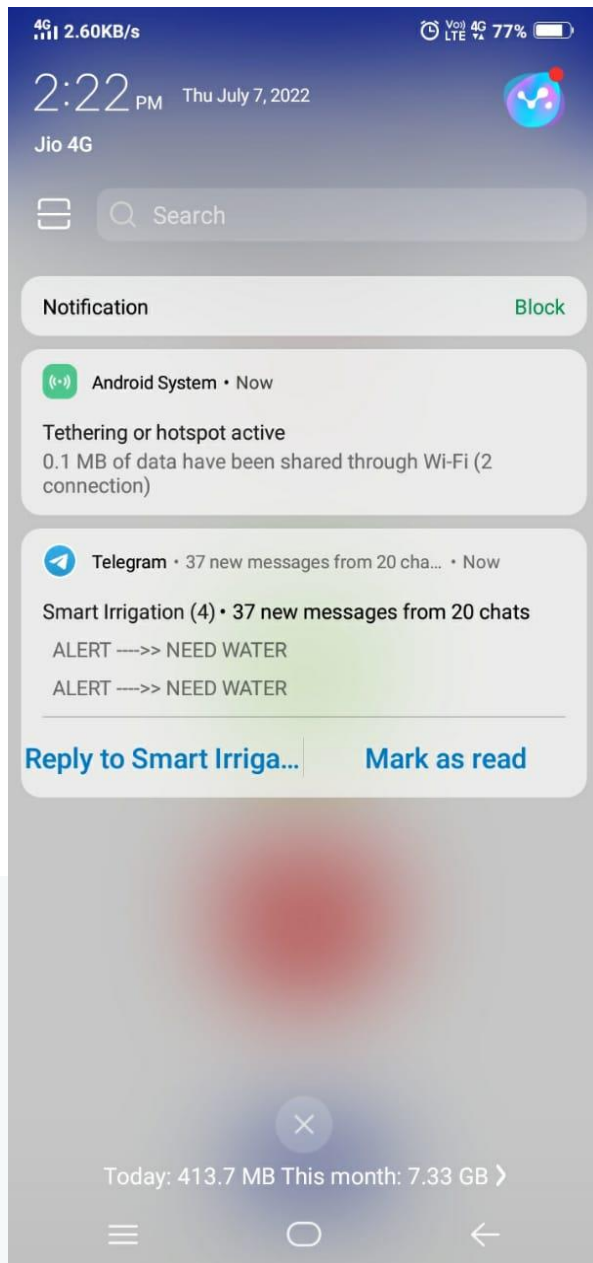


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Telegram Alert Message when
the soil is dry

Dry Percentage

97.50



LOGOUT

Dry Percentage

31.79



LOGOUT

REQUIREMENTS

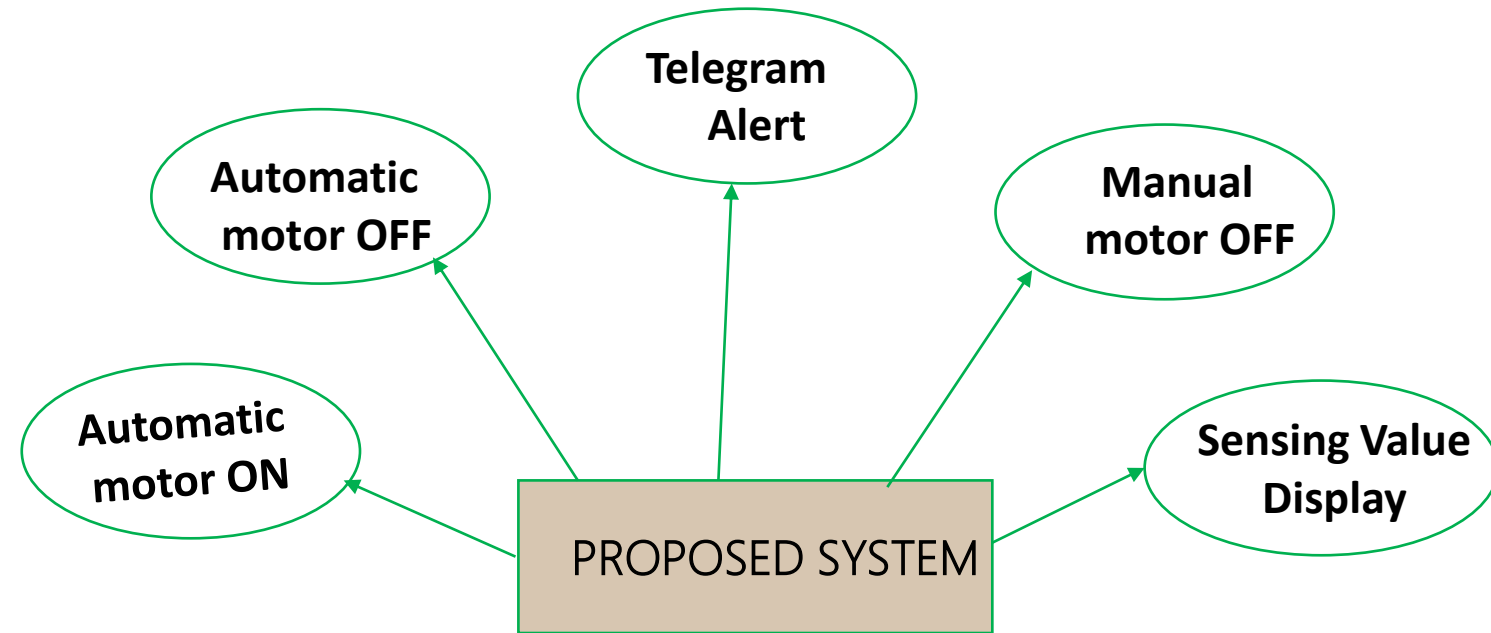
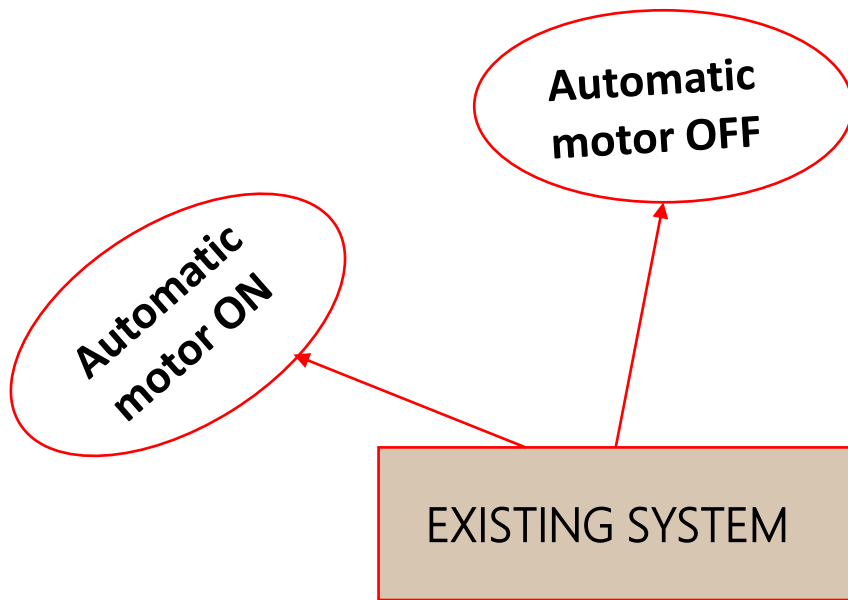
FRONT END

ANDROID

BACK END

ARDUINO

RESULT ANALYSIS



TESTING

CONDITION	MOISTURE CONTENT	WATER PUMP STATUS	TELEGRAM ALERT	TEST CASE STATUS
Dry	>3500	ON	ON	TRUE
Wet	<3500	OFF	OFF	TRUE

TEST CASE	INPUT	EXPECTED OUTCOME	ACTUAL OUTPUT	TEST CASE STATUS
Email check	Input without '@'	Invalid email	Email address is badly Formatted	TRUE
Password check	Length less than 6	Invalid email	Password should be at least 6 characters	TRUE

ADVANTAGE AND DISADVANTAGES

- User friendly
- Combines both automated and manual work
- Cost effective
- Durable
- Reduce water consumption
- Sensing only soil moisture
- Water level do not differ with various crops

FUTURE SCOPE

- In the future, the system will be able to categorize different crops and set the threshold according to it. So that water level for each crop can be different.
- Alert failure of devices.
- Now the system only senses moisture content in the soil. It can be extended as the system can sense temperature, minerals and nutrients in addition to water.
- This smart irrigation can be adjusted and modified according to the changing environment.

PUBLICATION

Smart Irrigation based on IoT

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Abstract—Smart Irrigation is a water irrigation system based on Internet of Things (IoT). The Internet of Things is a technology where in a mobile device can be used to monitor the function of a device. This system helps the farmers to irrigate the farmland in an efficient manner with automated irrigation system based on soil moisture. This project focuses primarily on reducing the wastage of water and minimizing the manual labour on field for irrigation. The main objective of this system is to provide the automatic irrigation system thereby saving time, money and power of farmer. The existing farm-land irrigation techniques require manual intervention. With the automated technology of irrigation, human intervention can be reduced. The proposed system has been designed to overcome the unnecessary water flow into the agricultural lands. Temperature, soil moisture and humidity values are always being continuously monitored using sensors. And based on high value of sensor, water is pumped to the land. Otherwise, it stops pumping the water. Some of the components used to implement this system is Arduino, soil moisture sensor, 5V relay, water pump with tubes and jumper wires.

Index Terms—

I. MOTIVATION

An automated irrigation system is needed to optimize water use for agricultural crops. The technique can be used for the application of accurate amount of water. By forming sensor network, good monitoring of water regulation in agricultural field can be achieved.

II. INTRODUCTION

Water irrigation system based on Internet of Things (IoT). Irrigate the farmland in an efficient manner with automated irrigation System based on soil moisture. Operates by monitoring the value on soil moisture sensor and based on the reading, motor is kept ON or OFF. Node MCU transports the data to the digital platform of the server for processing of the data. Then those data are sent to the mobile application of the user. User-friendly experience with the help of mobile application. This system provides a user friendly experience. Here, telegram alert is made based on the moisture sensor placed in the soil. A threshold is already set based on many testing. If the sensed value exceeds the threshold motor is kept ON. Motor can be OFFed manually if user wants or automatically when sensed value become less than the threshold.

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III. COMPONENTS

A. ESP 32



Fig. 1. ESP32

B. Soil moisture sensor



Fig. 2. Soil moisture sensor



Fig. 3. motor driver

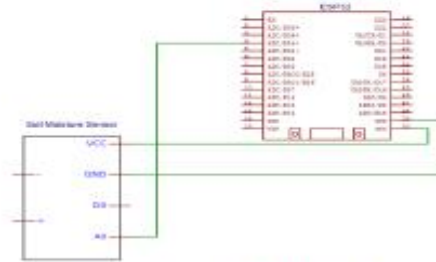


Fig. 5. ESP32 connected to soil moisture sensor



Fig. 4. water pump

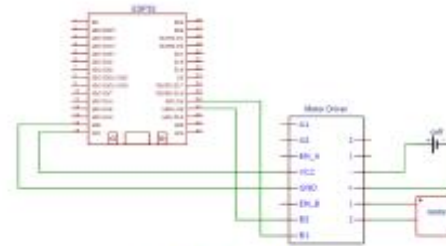


Fig. 6. ESP32 connected to motor

C. motor driver

D. water pump

IV. METHODOLOGY

In the proposed system, a soil moisture sensor is placed in the soil to find the moisture content. After sensing the value, value is passed to the android application in every second. When the sensed value become larger than the threshold value, alert is sent to the telegram. It indicates the need of water to the plants. When the alert is identified, user will switch on the ON button of android app that will ON the motor which pumps the water to the plants. Watering the plant continuously may decrease the value of sensor. Then the motor will stop automatically. In case we need to OFF the motor we can do manually by clicking the OFF button in the app.

V. CIRCUIT DIAGRAM

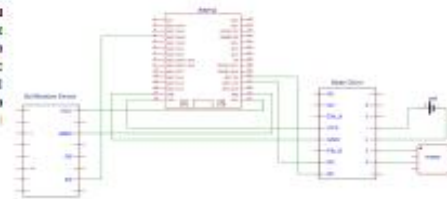


Fig. 7. overall connection

CONCLUSION

- So far , we have discussed the working of smart irrigation.
- This system provides a user friendly experience .
- Here , telegram alert is made based on the moisture sensor placed in the soil.
- A threshold is already set based on many testing.
- If the sensed value exceeds the threshold motor is kept ON.
- Motor can be OFFed manually if user wants or automatically when sensed value become less than the threshold.

REFERENCES

- M. Rohith, R. Sainivedhana and N. Sabiyath Fatima, "IoT Enabled Smart Farming and Irrigation System," *2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS)*, 2021, pp. 434-439, doi: 10.1109/ICICCS51141.2021.9432085.
- M. Mayuree, P. Aishwarya and A. Bagubali, "Automatic Plant Watering System," *2019 International Conference on Vision Towards Emerging Trends in Communication and Networking (ViTECoN)*, 2019, pp. 1-3, doi: 10.1109/ViTECoN.2019.8899452.
- J. Karpagam, I. I. Merlin, P. Bavithra and J. Kousalya, "Smart Irrigation System Using IoT," *2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS)*, 2020, pp. 1292-1295, doi: 10.1109/ICACCS48705.2020.9074201.