

IOT using Smart Irrigation system

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in
Electrical and Electronics Engineering
by

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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING**

SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade “A” by NAAC

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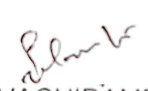
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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of **Abhay kaushal (40140701)** and **B .Reddy Chandra sekhar (40140703)** who carried out the project entitled **"IOT using Smart Irrigation system"** under our supervision from January 2023 to April 2023.



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DECLARATION

WE **Abhay kaushal** (Reg. No. 40140701) and **B. Reddy Chandra sekhar** (Reg. No.40140703) hereby declare that the Project Report entitled “**IOT using Smart Irrigation system**” done by us under the guidance of **Dr. D. GODWIN IMMANUEL** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electrical and Electronic Engineering.

DATE:20/04/2023

B. Reddy Chandra Sekhar
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SIGNATURE OF THE CANDIDATE

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Abstract

- ✓ Irrigation is one of the traditional practices and involves higher percentage of labour in daily agriculture sector.
- ✓ To water the plants automatically, sensors and Microcontrollers are available to determine when the plants need water.
- ✓ Automation involves improving the speed of production, reduction of cost, effective use of resources.
- ✓ The main role of this project is to develop a Microcontroller system to irrigate the plant automatically and the information is been sent to the farmers.

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CHAPTER 1

INTRODUCTION

1.1 GENERAL INTRODUCTION

- Water is a basic component of all known life on earth. Water can both sustain life in correct quantities and threaten life when it is not available.
- Water as a result is a very precious natural resource that must not be wasted.
- For crop irrigation, optimal water efficiency means minimizing losses due to evaporation, run off or subsurface drainage while maximizing production.
- Soil moisture sensors can be used to determine how much water contents are available in soil and how much water is needed to satisfy plant requirement.
- This project is proposed to save the water and energy. In this project we are trying to optimize the use of water for irrigation using microcontroller and various sensors.
- For measuring physical parameters values such as temperature and soil moisture contents, various sensors are used and the outputs of these sensors are converted to control the parameters.
- The control circuit is designed using micro-controller. The outputs of these sensors are fed to micro-controller.
- The micro-controller outputs are also used to driver a relay independently.
- This relay energizes and de-energizes automatically according to the real time value of the moisture contents in soil and temperature.

1.2 BLYNK

Blynk may be a Platform with IOS and automaton apps to manage Arduino, Raspberry Pi and therefore the likes over the net. It's a Digital dashboard wherever you'll build a graphic interface for your project by merely dragging and dropping widgets. Blynk Server is associate ASCII text file Netty based mostly Java server, chargeable for forwarding messages between Blynk mobile Application and varied microcontroller boards and SBCs (i.e. Arduino, Raspberry Pi.) Blynk is that the hottest IoT platform to attach your devices to the cloud. It's well-known for permitting users to style apps to manage their IoT devices, analyze mensuration information, and manage your deployed merchandise at scale.

1.3 ADVANTAGES

1. Intelligence Data Collection IoT devices enable sensors that help in collecting a bunch of useful data for farmers.
2. Waste Reduction IoT technology in agriculture also helps in managing cost-efficient production.
3. Process Automation.
4. Animal Monitoring.
5. Competitive Advantage.

1.4 APPLICATIONS

- 1 IOT Agriculture sensor
- 2 Demand for irrigation
- 3 Soil correction
- 4 Crop diagnosis
- 5 Smart Green houses

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING METHOD

In the previous existing method agriculture process is automated using IoT. In that work low cost soil moisture sensors, temperature sensors, Wi-Fi module is used. They continuously monitor the field and send it to the web server using transmitter. The sensor data are stored in database. The web application is designed in such a way to analyze the data received and to check with the threshold values of moisture and temperature. The decision making is done at server to automate irrigation. If soil moisture is less than the threshold value the motor is switched ON and if the soil moisture exceeds the threshold value the motor is switched Off. This method can also be used in green houses where in addition light intensity control can also be controlled and automated. The highlighting features are web interface-based processor, and increased durable soil humidity sensor. It proposes low cost and wireless sensors to acquire the soil moisture and temperature from farm locations. Though there are sensors collecting field information's the water level should also be monitored and should be notified when there is a fall in water level of the water source.

2.2 PROPOSED SYSTEM

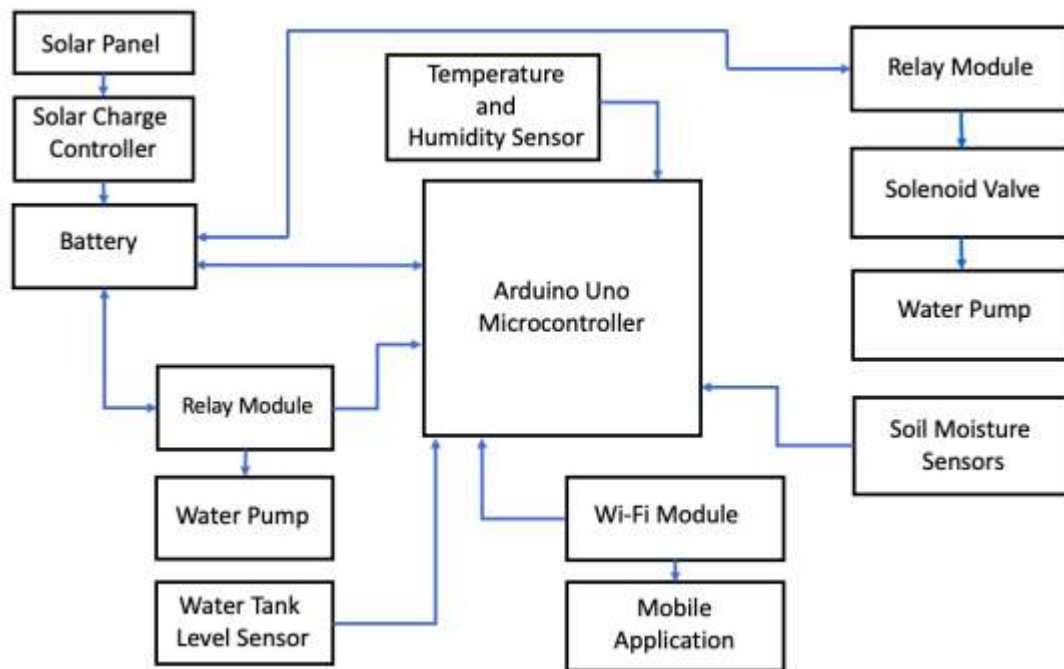
In the proposed system instead of normal irrigation type we use drip irrigation method where the water can be directed to the root in sufficient amount so that water as well crop management can be improved. Using IoT the drip irrigation method is automated with the help of sensors and pipe tubes. Various sensors such as temperature, soil moisture sensors are used in field monitoring and the ground water level can be monitored lively using the float switch where the fall in water level can be notified to the farmer through SMS. If the field is dry it can also be notified to the farmer to his mobile and the motor will be switched ON and if the moisture level attains a certain level the motor is switched OFF automatically without manual instruction. The farmer can monitor the field and water level either through the web page which updates field information lively or through SMS in mobile phone. Thus, through the Web interfaced processor and relay switches the water management is controlled and information is delivered to the user.

CHAPTER 3

3.1 Block Diagram

- On-site connection of system components
- Sensing and data acquisition
- Data relay to controller
- System actuation and DC pump activation
- Monitoring The above may be alternatively referred to as the process model.

The project presents the use of correct soil moisture sensors which helps to ease out the pain to monitor and keep records about the changes in soil moisture. Using the Arduino Mega microcontroller with Light-Depended Resistor sensor, moisture sensor, and temperature sensor, the temperature is measured and analyzed. The soil for a certain duration provides information related to the moisture status of the soil. The Arduino Mega will collect and process the data received from the Sensors. When a threshold moisture level of the soil is reached, the water will supply accordingly. This is essential because water must be provided to the plant at a particular time for a good yield. This project is highly used for farmers, Nursery professionals by eradicating traditional or manual methods of irrigation systems.



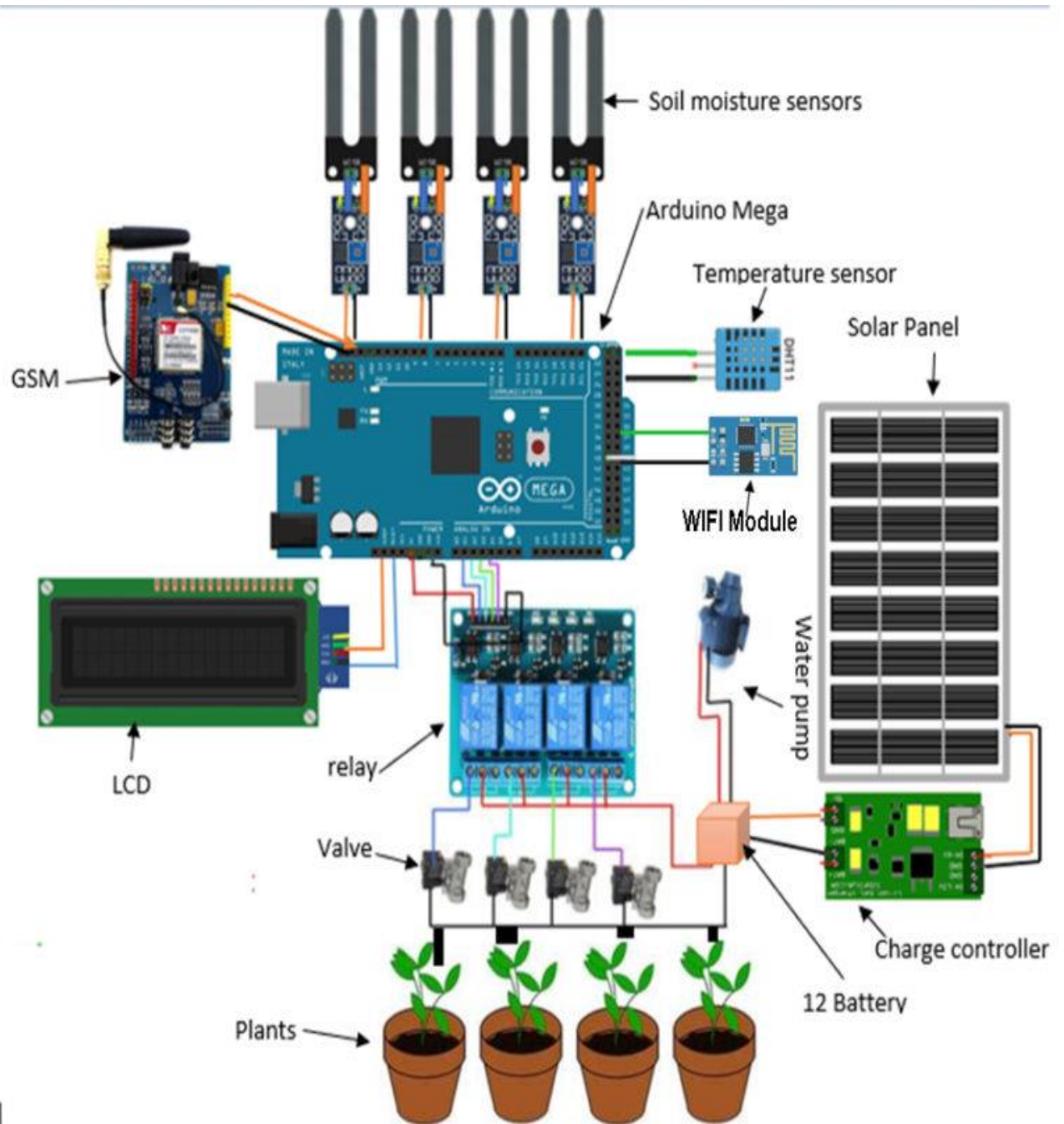
3.2 Project concept explanation

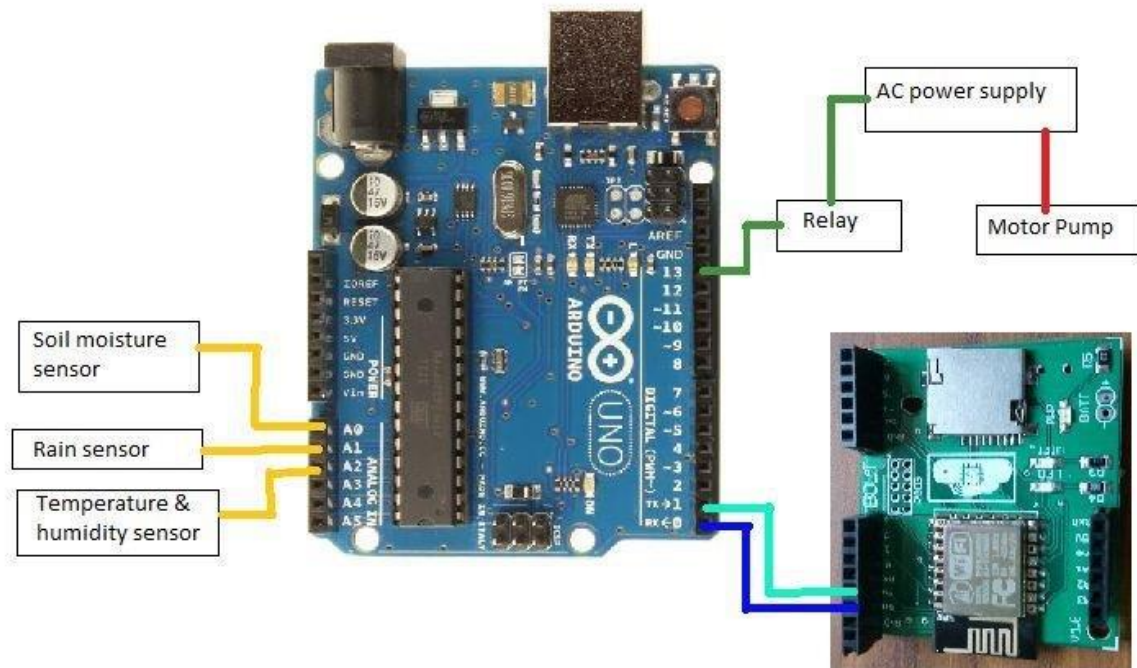
Agriculture is the most important and worshipped occupation in India. Agriculture is livelihood for the most of the Indian who has rural background. Smart Irrigation helps to the development of agricultural country. In India, agriculture contributes about 16% of total GDP and 10% of total exports. Water plays an important role in Agriculture. Water is main resource for Agriculture. Irrigation is one method to supply water. In this irrigation process people are wasting water more by missing the timings. So too save water and time we have an excellent method called Smart irrigation system using IoT. By the smart irrigation system, we are using various equipments like temperature sensor, humidity sensor, and soil moisture sensor. These sensors will find the various situations of the soil and based on soil moisture percent; land gets automatically irrigated. It means when field needs water then automatically motor will get ON and it will get OFF when it's got enough. These sensed parameters and motor status will be displayed on user devices.

CHAPTER 4

PROPOSED SYSTEM

4.1 Project design

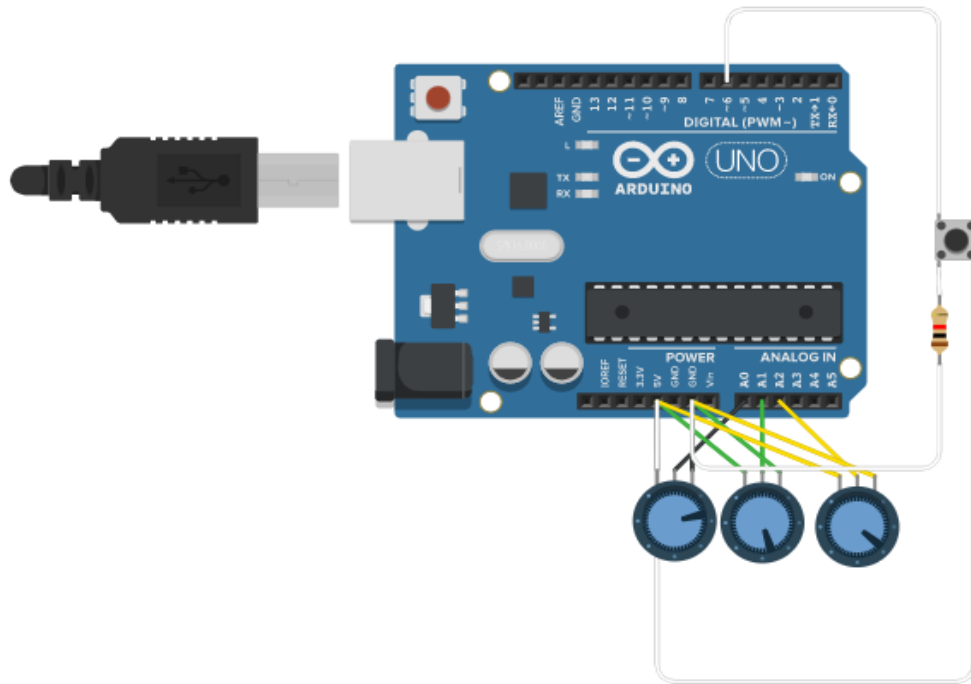




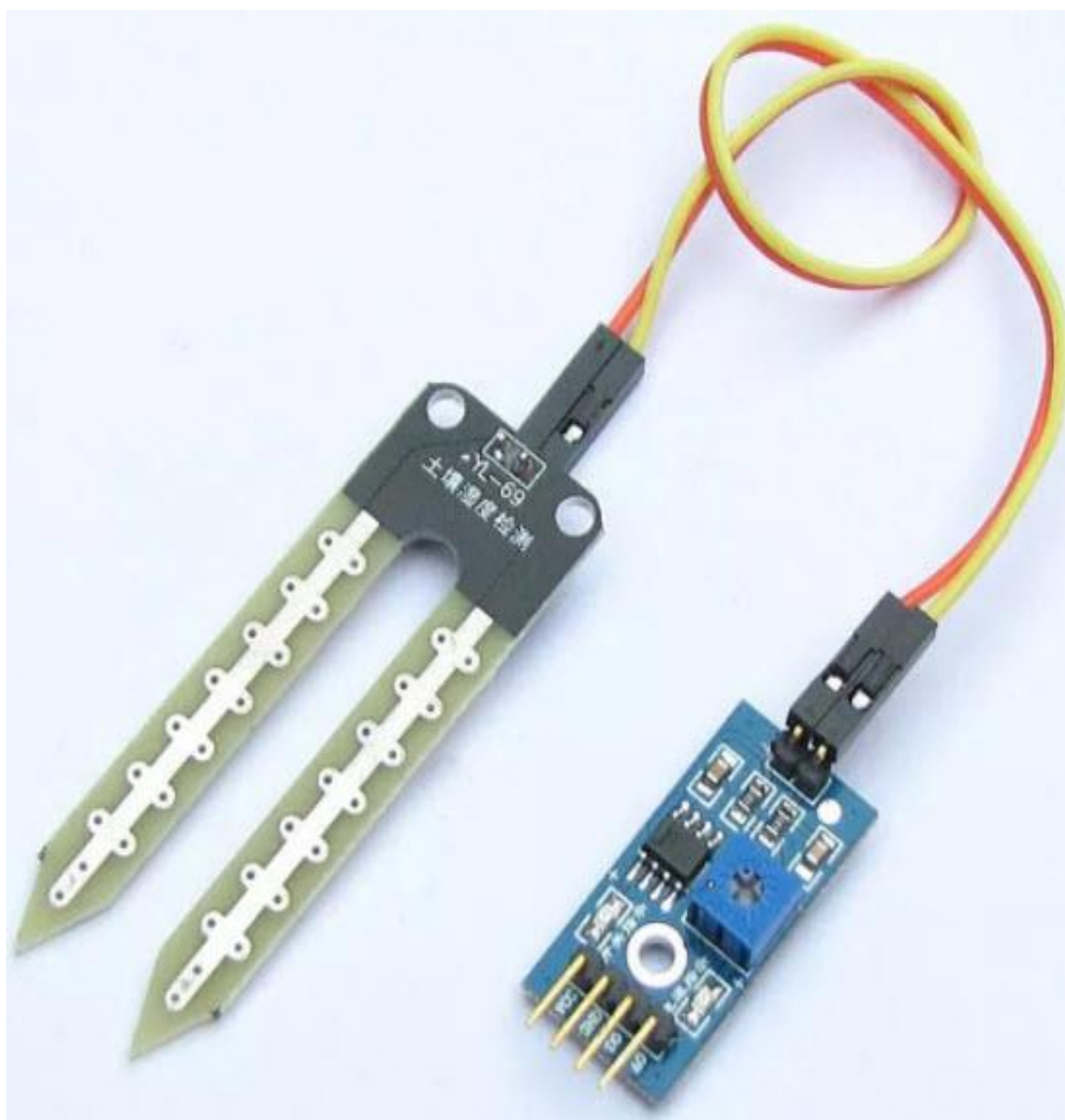
Design of this SMART IRRIGATION SYSTEM explains temperature, humidity and soil moisture values using flow chart. With the help of the sensors information the system came to know values of soil moisture, temperature and humidity. In these smart irrigation system low-cost soil moisture sensors, temperature sensors, Wi-Fi module is used. They continuously monitor the sector and send it to the online server using transmitter. The sensor data are stored in database. The web application is meant in such hoe to research the info received and to see with the edge values of moisture and temperature. The decision making is completed at server to automate irrigation. If soil moisture is a smaller amount than the edge value the motor is switched ON and if the soil moisture exceeds the edge value the motor gets turned ON. It proposes low cost and wireless sensors to accumulate the soil moisture and temperature from farm locations. information's the water level should also be monitored and should be notified when there is a fall in water level of the water source.

4.2 Components

- Moisture sensor
- 5v relay module
- 1.6Mini water
- Pump with small pipe
- Connecting wires

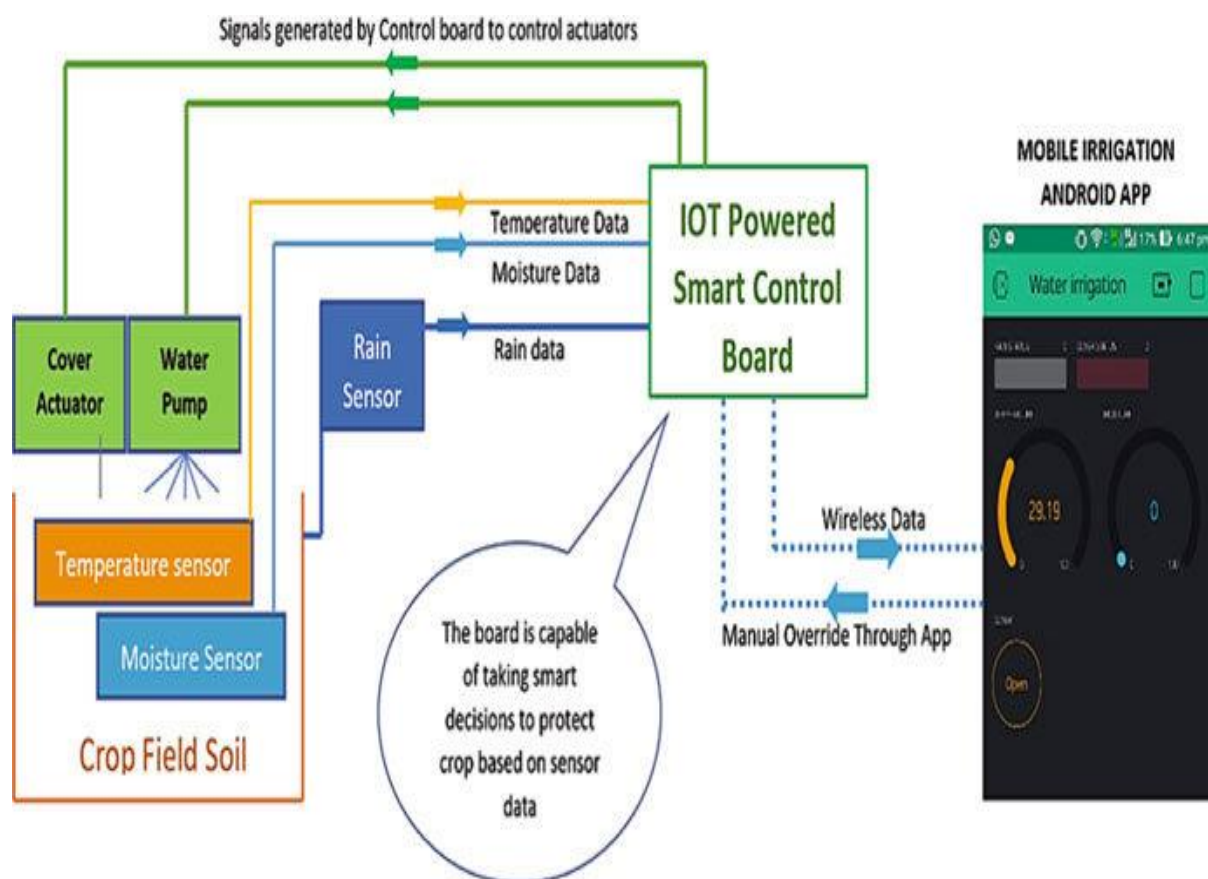


Soil moisture sensor is one kind of sensor used to detect the soil moisture content. This sensor has two outputs like the analog output as well as the digital output. The digital o/p is permanent and the analog o/p threshold can be changed. The working principle of soil moisture sensor is open & short circuit concept. Here the LED gives an indication when the output is high or low.



The Arduino UNO is one of the most used microcontrollers in the industry. It is very easy to handle, convenient, and use. The coding of this microcontroller is very simple. The program of this microcontroller is considered as unstable due to the flash memory technology. The applications of this microcontroller involve a wide range of applications like security, home appliances, remote sensors, and industrial automation. This microcontroller has the ability to be joined on the internet and perform as a server too.

The application of agriculture networking technology is need of the fashionable agricultural development, but also an important symbol of the future level of agricultural development; it will be the future direction of agricultural development. After building the agricultural water irrigation system hardware and analyzing and researching the network hierarchy features, functionality and therefore the corresponding software architecture of precision agriculture water irrigation systems, actually applying the web of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources also as ensuring the efficiency and stability of the agricultural production.



CHAPTER 5

SUMMARY

1.1 Conclusion

- ✓ Agriculture plays a vital role in world-wide economy. It is the main source of sustenance for people.
- ✓ It is necessary to make economical utilization of resources as per the environmental conditions, to fulfill the fundamental needs of the crops.
- ✓ This work includes improvement in the previous work, here drip irrigation is used instead of normal irrigation method.
- ✓ It's been long since sensors were introduced in the agriculture operations. But the problem with the traditional approach of utilizing sensor technology was that we were not able to get the live data from the sensors.
- ✓ The sensors used to log the data into their attached memory and later on we were able to use it.
- ✓ To improve traditional methods, there has been many systems developed using advanced technologies that help to reduce crop wastes, prevent excessive and scarce watering to crops and thereby increase the crop yield. With the introduction of Industrial IoT in Agriculture, far more advanced sensors are being utilized.
- ✓ The sensors are now connected to the cloud via cellular/satellite network. Which lets us to know the realtime data from the sensors, making decision making effective.
- ✓ Drip Irrigation using IoT Automation in irrigation helps to improve efficient Drip in lowpressure, low-volume irrigation.
- ✓ The water is usually carried through polyethylene tubing, and is applied directly to the root zone of the plants. Efficient irrigation systems require the selection of an appropriate method for the crop being grown, adequate monitoring of the irrigation system and of water delivery, and appropriate application rates depending on the growth stage of the crop.
- ✓ The important parameters to be measured for automation of irrigation system are soil moisture and temperature.
- ✓ The entire field is first divided in to small sections such that each section should contain moisture sensor and a temperature sensor.
- ✓ Advantages of drip irrigation systems as compared to overhead sprinkler systems include reduced water use, reduced erosion and runoff potentials, and decreased weed growth.

1.2 Future scope

Future work could be focused more on increasing sensors on this system to fetch more data especially with regard to Pest Control and by also integrating GPS module in this system to enhance this Agriculture IoT Technology to full-fledged Agriculture Precision ready product. Even though the proposed work can be applied in real time it can be enhanced by developing this system for large acres of land. Also the system can be integrated to check the quality of the soil and the growth of crop in each soil.

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