Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 09, September-2021

Plant Monitoring System

Gaurav Patil
B-Tech. Computer Engineering
Vishwakarma Institute of Technology Pune, India

Akash Patil
B-Tech. Computer Engineering
Vishwakarma Institute of Technology Pune, India

Shashank Pathmudi
B-Tech. Computer Engineering
Vishwakarma Institute of Technology Pune, India

Abstract **- As we can see in today's world only some devices like PC's and mobiles are connected to internet. Now-a-days world is fully overtaken by the internet and internet of things. Internet is use for basic need of all human beings. The Internet of Things (IOT) is the network of physical objects. It simply means to monitor a physical device or machine, or it is inter-networking of physical devices which is embedded with electronics, sensors, software and network connectivity to enable it to achieve greater value and services by exchanging data with the manufacturer. This project is designed as a plant monitoring system based on IOT. In this project we used different modules such as IOT, NodeMCU, Temperature sensor, Moisture sensor, Humidity sensor**

Keywords — IOT, Humidity, Moisture, Monitoring, Temperature

1. INTRODUCTION

We live in a world where everything can be controlled and operated automatically, but there are still a few important sectors in our country where automation has not been adopted or not been put to a full-fledged use, perhaps because of several reasons one such reason is cost. One such field is that of agriculture. Agriculture has been one of the primary occupations of man since early civilizations and even today manual interventions in farming are inevitable. Plant monitoring form an important part of the agriculture and horticulture sectors in our country as they can be used to grow plants under controlled climatic conditions for optimum produce. Automating a plant monitoring and controlling of the climatic parameters which directly or indirectly govern the plant growth and hence their produce. Automation is process control of industrial machinery and processes, thereby replacing human operators.

In this paper the presented plant monitoring system technology to provide feedback to the user through smart phone. The automated system will reduce the need of manpower, hence reducing the error. for a largescale area, it is quite impossible for a farmer to monitor the efficiency of the system by implementing this technology, the farmers can easily monitor the system using their smart phone. Also due to busy life these days we are not able to keep proper care of plants such as watering plant, to check whether plant is getting sufficient sunlight etc.

To easy this we are making an IOT based automation system in which user can monitor plant parameters such as temperature, humidity, moisture and can also water them.

2. LITERATURE REVIEW

We have studied many previous works done in this field by different researchers. Use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the manpower efforts.

A Review paper IoT Based Plant Monitoring System[2] shows, In India about 35% of land was under reliably irrigated. And the 2/3rd part of land is depending on monsoon for the water. Irrigation reduces dependency on monsoon, improves food security and improves productivity of agriculture and it offers more opportunities for jobs in rural areas. Farmers are facing problems related to watering system that how much water has to supply and at what time? Sometimes overwatering causes the damage to crops and as well as waste of water. Hence for avoid such damage we need to maintain approximate water level in soil.

A Review paper Internet of Things and Node MCU[3] explains that prototype is the first, step in building an Internet of Things(IoT) product. An IoT prototype consists of user interface, hardware devices including sensors, actuators and processors, backend software and connectivity. IoT microcontroller unit (MCU) or development board is used for prototyping. IoT microcontroller unit (MCU) or development board contain low-power processors which support various programming environments and may collect data from the sensor by using the firmware and transfer raw or processed data to an local or cloud-based server. NodeMCU is an open source and LUA programming language based firmware developed for ESP8266 wifi chip.

3. PROPOSED SYSTEM

The system is combination of hardware and software components.

I) Hardware components:

1. Sensors (Moisture, DHT11)
2. NodeMCU
3. Relay
4. Motor

II) Language Used:

1. JAVA
2. PHP
3. C

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 09, September-2021

4. JavaScript
5. HTML
6. CSS

III) Database:
MySQL

IV) Host:
000webhost.com

V) Software components: 1) PhpMyAdmin
2) Android Studio
3) Visual Studio Code
4) Arduino IDE
5) Postman Tool

3.1 Sensors:
3.1.1 Moisture sensor: Soil moisture sensor is used to detect the moisture of the soil. This sensor is made up of two pieces: the electronic board at the right, and the probe with two pads, that detects the moisture content of soil.
How does it work? The voltage of the sensor outputs changes accordingly to the moisture level in the soil.
When the soil is: Wet: The output voltage decrease
Dry: The output voltage increase

Fig 1. Moisture Sensor

3.1.2 DHT 11 (Temperature and Humidity): DHT11 consist of both humidity and temperature sensor. For measuring humidity there are two electrodes with moisture holding substrate between them. So when the humidity changes, the resistance between these electrodes changes and conductivity of the substrate changes. This change in resistance are measured and processed by the IC which makes it ready to be read by a microcontroller.
On the other side for measuring temperature DHT11 sensor use a NTC temperature sensor or a thermistor. A thermistor changes its resistance with change of the temperature because it is variable resistor. These sensors are made by sintering of semi-conductive materials (ceramic and polymers), which provide large changes in the resistance with just small changes in temperature. The term “NTC” means “Negative Temperature Coefficient”, which means that the resistance decreases with increase of the temperature.

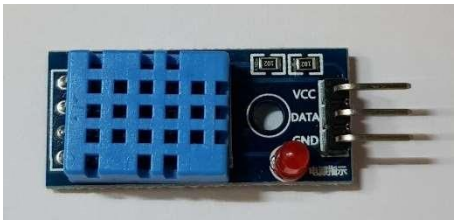

Fig 2. DHT 11

3.2 Control:
3.2.1 Node MCU: Node MCU is an open source IOT platform. While writing GPIO code on NodeMCU, you can’t address them with actual GPIO Pin Numbers. There are different I/O Index numbers assigned to each GPIO Pin which is used for GPIO Pin addressing. ESP8266EX offers a complete and self-contained WIFI networking solution; it can be used to host the application or float WIFI networking functions from another application processor. When ESP8266EX hosts the application, it boots up directly from an external flash. In has integrated cache to improve the performance of the system in such applications.

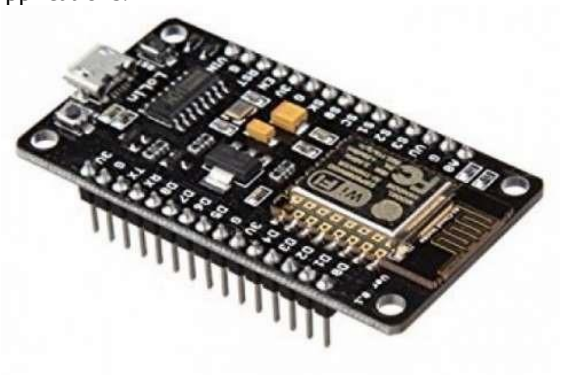
Fig 3. Node MCU

3.3 Relay:
The relay is used to switch ON/OFF the water pump. It’s connected between the “NO” (normally open) terminal and the circuit ground.

Fig 4. Relay

3.4 Water Pump:
The relay and water pump both operate at 12 V, which is provided by the battery.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 09, September-2021

Fig 5. Water Pump

2. CIRCUIT DIAGRAM

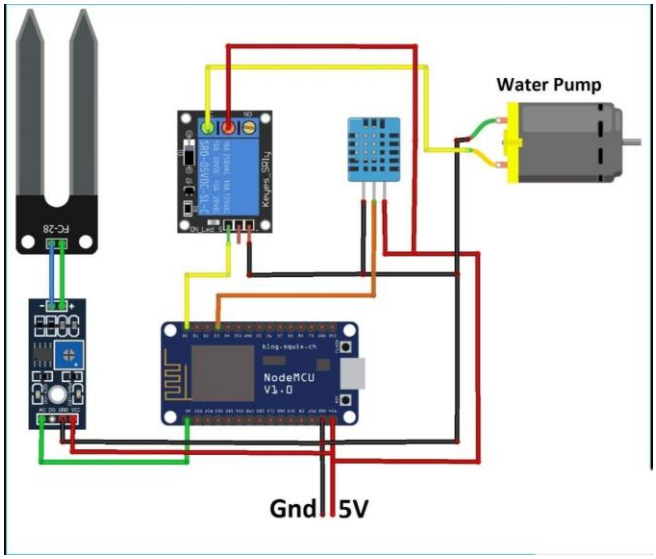

Fig 6. Circuit Diagram

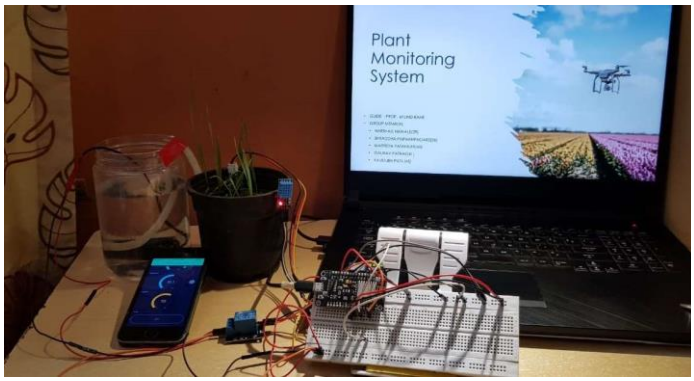

Fig 7. System Setup

3. WORKING

Fig 8. Shows the block diagram of Plant Watering System with I0T. User monitors and control system in order to improve the efficiency with help of sensor parameters like temperature, humidity, soil moisture.

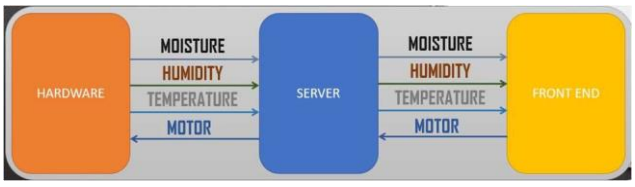

Fig 8. Working Project

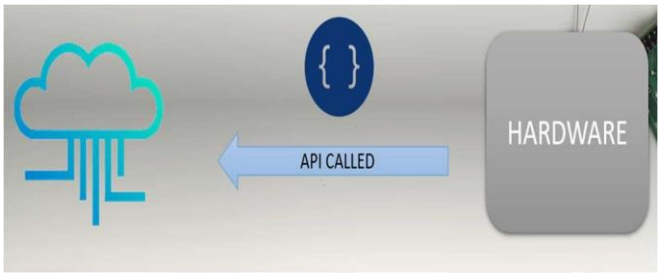

Fig 9. Working Hardware

Fig 10. Working Display

1. When power supply is ON, the input module of three sensors (DHT11, moisture) start to activate.
2. When sensors get ON it will read the data from soil and from surrounding.
3. Values are sent through API's to database.
4. Once the API are called it shores the data In Online webhost cloud
5. Front end data is received by the API in order of read only data and there is only update data allowed by front end to update Motor State.
6. According to the values that are detected by sensors motor will turn ON/OFF.
7. If Moisture and Humidity is below threshold value, then the motor is turn ON.
8. If moisture and humidity level is high, then it will stop the motor and water supply will also stop.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 09, September-2021

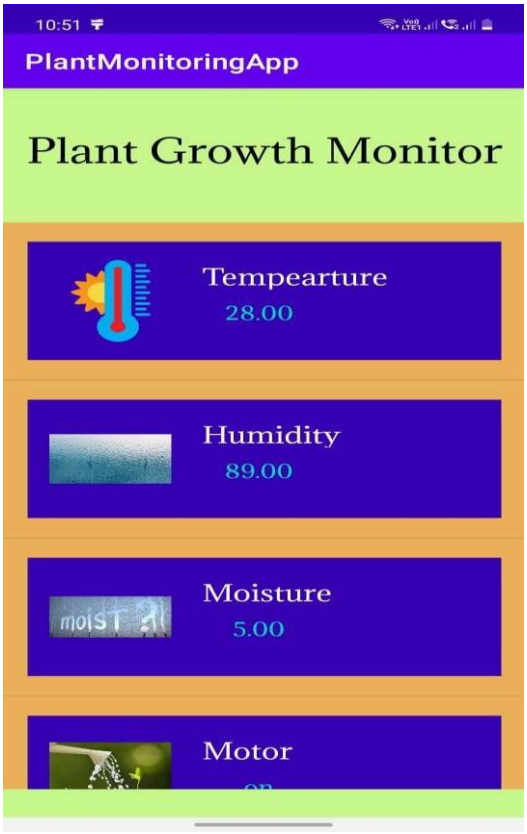

Fig 11. Android App Interface

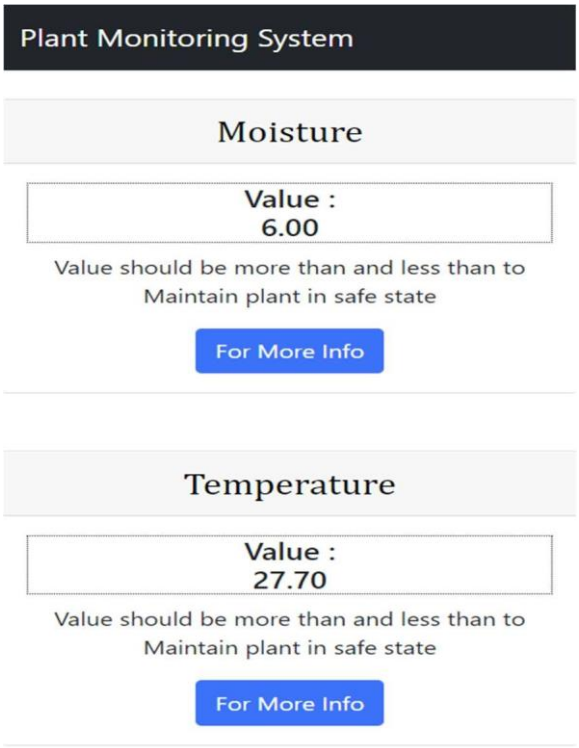

Fig 12. Web Interface

9. CONCLUSION

A system to monitor temperature, humidity, moisture levels in the soil was designed and the project provides an opportunity to study the existing systems, along with their features and drawbacks. Agriculture is one of the most waterconsuming activities. The proposed system can be used to switch the motor (on/off) depending on favorable condition of plants i.e., sensor values, thereby automating the process of irrigation. which is one of the most time efficient activities in farming, which helps to prevent over irrigation or under irrigation of soil thereby avoiding crop damage. The farm owner can monitor the process online through Front End Structure. By this work, the wastage of water and the consumption of power by motor can be reduced so that they are conserved for the future use. Through this project it can be concluded that there can be considerable development in farming with the use of IOT and automation.

10. FUTURE SCOPE

1. To Add Security to Device and Owner's Account.
2. Detect amount of Sunlight available for plant.
3. To Implement AI and Check whether plant is in good condition or not.
4. Making Product compact so that can be fitted anywhere.
5. Can use solar cell to charge battery so need of Plug.

11. REFERENCES

[1] Prof. Kawale Jayashri , Sanjay More, Akshay Bankar, Ganesh Dongre, Pooja Patil, "I0T BASED
[2] SMART PLANT MONITORING SYSTEM", International Journal of Advance Research in Science and Engineering, Vol. No. 7. [2] Prof. Prachi Kamble, "IOT Based Plant Monitoring System", ITIIRD, Vol. No. 2. [3] Yogendra Parihar, "Internet of Things and Node MCU", JETIR, Vol. No. 6.
[3] Gabriel, "Monitoring Moisture and Humidity using Arduino Nano", IJERT, Vol. No. 9