

IoT Based Plant Monitoring System Using NODEMCU

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ABSTRACT- Internet of Things(IoT) is one of the most understandable form of connectivity. It is used in plenty of applications. Improper Supply of Water can effect both Soil and Plants. This problem can be overcome by using this project .In this Project, IoT is employed to create a Smart Monitoring System for Plants. In this Project we mainly used the components are NODEMCU, DTH11 Sensor, and Soil Moisture Sensor. In this project we Measure the parameters like Temperature Humidity, soil Moisture.

KEYWORDS: IoT, NODEMCU, DTH11 Sensor, Soil Moisture Sensor

Received 12 June, 2022; Revised 24 June, 2022; Accepted 26 June, 2022 © The author(s) 2022.

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I. INTRODUCTION

This Project deals about the Plant Monitoring System Mechanism. It gives the Information about the Temperature, Humidity and soil moisture. This can be done by using various sensors like DTH11 sensor, soil moisture sensor. It is suitable for plant which may help to start a better growth of plant and also it may support to control the usage of water. When the soil moisture is very less then motor ON and pump the water to the plant after that soil moisture increases and then motor OFF Automatically. The parameters Temperature, Humidity, Soil Moisture can Display on Blynk IoT App.

II. COMPONENTS

NODEMCU: NodeMCU is Open Source IoT Platform. It is the key Component of our project.MCU means micro control unit.it is 32 bit MCU and it has ESP8266 Wi-Fi protocol. It is 17 pin GPIO(General purpose input output).It has a inbuilt Wi-Fi through this Wi-Fi the data can be transmitted. In NODEMCU the user program can be external flash memory. It uses low power.



Fig 1: NODEMCU

Soil Moisture Sensor: Soil Moisture Sensor is used to Measure the Volumetric Content of soil. It is sensitivity adjustable it is capacitance to measure dielectric permittivity of the surrounding medium. In soil Dielectric Permittivity is function of water content.It has operating voltage of +5v dc. It is used in many applications like agriculture and landscape irrigation.



Fig 2 : Soil Moisture Sensor

DTH11 Sensor : Digital Temperature and Humidity Sensor It has capability to measure Temperature and Humidity.

It gives Calibrated Digital Output. It uses 3-5 V. It is good For 0 to 50 C Temperature readings with +-2 accuracy.

It is also good for 20 to 90 % of Humidity readings with 5% Of accuracy. It consists of 3 pins with 0.1 spacing.



Fig 3: DTH11 Sensor

Relay: It is an Electrical switch it opens and closes Under control of another electric circuit. Relay Uses the power supply for opening and closing Switch contacts. The supply voltage range from 3.75 to 6V. Operating time is 10ms.



Fig 4: Relay

III. METHODOLOGY

The Procedure is introduced by using NodeMCU that is connected by different Sensors and the data is transferred through a Wi-Fi module that is Available in ESP8266 Wi-Fi module. The data is transferred directly to the application by using power supply and Wi-Fi. The network part is the main point for Operating the device. DTH11 Sensor are used to detect the Exact status of heat and Humidity. Soil moisture detect the moisurity of soil.

These two Sensors are used to Analyse the real time data of plants and this help us to get the overview of plant Environment. By using this information user can Detect which part of the plant is affected in the garden and recover the plant by these effects and improve the plant growth. Power supply is given to the circuit board through Battery then the circuit board that uses it transfer the dc power to sensors for working properly. The display unit can generate the output. Here we use Blynk IoT app for this project to the display outputs.

• **The Steps for Flow Of Method**

1. When we give the power supply the NodeMCU activate. Then also sensors get ON.
2. When sensors are ON It reads the data from soil and also from Surroundings.
3. Based on the values which are detected by Sensors motor will be turn to ON/OFF State.
4. The value of Threshold is less than the Moisture then the Motor turned ON.
5. If it Detects high moisture level the motor is in OFF position.
6. The Sensor only collects all the values and sends it to ESP8266 Wi-Fi protocol.
7. The Information Display on the Blynk App.
8. Then the user can easily control the motor by using Blynk App.

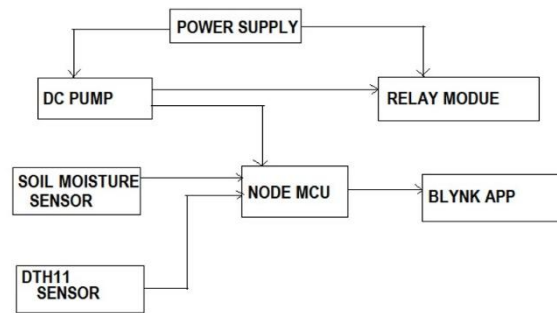


Fig 5: Block Diagram

The Physical Description of project can be represented by the above Fig 5. All Sensors are connected to the NodeMCU and DC Pump and Relay module is connected to Power Supply. Here we use the power supply as Battery. The Output can be shown in Blynk App. This app is used to Monitor and Control our Hardware project and Display the parameters in Web Dashboard of Blynk App.

The circuit Diagram can be shown in below Figure:6

The connections of circuit are explain below.

In NodeMCU we use D3, D2,D5 and A0 along with VCC and GND Pins.DTH11 Sensor consist of Three pins the data pin is connected to D3 of MCU and Supply and Ground pin is connected to VCC and GND respectively. Soil moisture sensor signal pin is connected to A0 and remaining two pins one is connected to supply and another is ground. LED positive is connected to D2 whereas negative is grounded. Relay Module data pin is connected to the D5 and Supply and Ground is connected to VCC and GND Respectively. DC Pump Relay Module is connected to the Battery .DC pump Operates based on the Relay and Battery. When we give Power Supply to NodeMCU 5V or 9V then the user program in flash memory is enables and display the outputs. According to the displayed information we overcome the Soil Moisture related problems then we improve the Soil Moisture by giving the proper water supply to plant through motor. Then Automatically the we improve plant growth and also reduce the wastage of water. When moisture level is high then the motor is in OFF position .

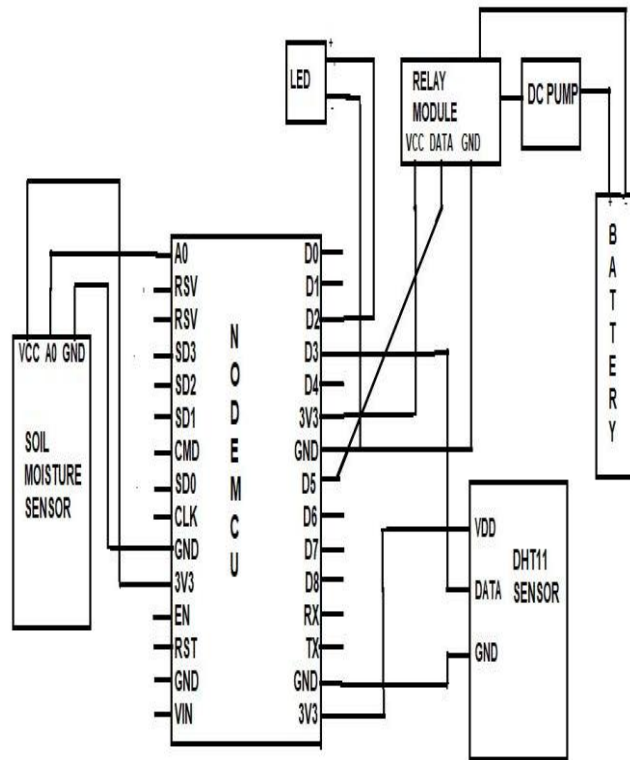


Fig 6: Circuit Diagram

SOFTWARE TOOLS

Blynk IoT is main Software Tool of Our Project. It can be Installed by using Following Steps:

First we have to install the Blynk IoT App from play store. After Create Account on Blynk App by using Mail Id. Then go to Developer mode and Create New Template According to our project. After creation of Template we have to go to DataStream's and create Separate Data stream for each parameter. In our project we take Four Data Streams like Temperature, Humidity and Soil Moisture along LED. After Create Web Dash Board for Displaying parameters purpose. In Web Dash Board we take three Gauges for measuring Temperature Humidity and Soil Moisture and take Switch as LED for ON/OFF.



Fig 7: Blynk IoT Logo

After creation of web dashboard we go to device information in that we get BLYNK TEMPLATE ID and BLYNK DEVICE NAME. Through this ID and name only the Node MCU connected to the BLYNK App.

IV. RESULTS

The below Fig:8 shows the real time results on Blynk App web dashboard Screen. It displays the Exact Temperature, Humidity and Soil Moisture Readings. The Blynk application is connected to Wi-Fi. Through this Wi-Fi the App can show the Readings in any Android Device.

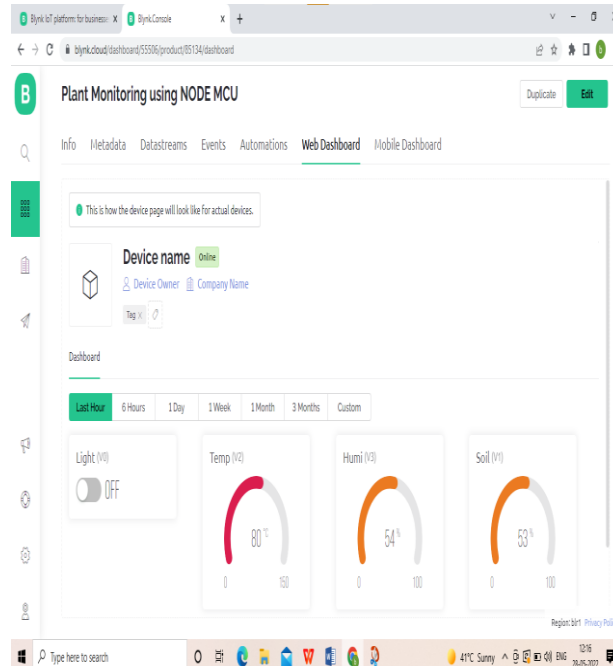


Fig 8: Results on Blynk App



Fig 9 : Plant Monitoring System

V. CONCLUSION

By this project we Conclude that we reduce the Effect of daily Watering of plants and we can Improve the growth of the plant and health also Improved.

FUTURESCOPE

The Future Scope of this Project never be ended Because in today fast World every person will Require a helping hand to take care of plant and Plant health status. This is Further used for large Scale of Agriculture Purpose to increase the Crop Rate and help farmers to reduce man power.

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