WIFI Controlled Smart Irrigation Switch

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Abstract- **The main purpose of this project is to take care of the agricultural practices becoming more used to technology farming becoming smart. The main aspect in this project is how we can implement a smart technique to enhance the growth of crop water management. Moisture Status is monitored through some sensors connected to NODEMCU, moisture sensor is used to measure the moisture of the soil that is required for the plant. Temperature and Humidity sensor is used to measure the ambient weather parameter that suits the farm moisture condition. Whenever the soil moisture is under the reference moisture condition it displays moisture percentage On LCD display as well as sends a notification to mqtt platform. If there are any abnormalities in the measured parameters it works as programmed. Important aspect of the project is to bring updated farming facilities using iot and introducing mqtt sector in faming making the control of advanced farming facilities from distance. The project also projects the safety of farmer and has a facility to provide and intimate the farmer if there is any trespassing which will be monitored by distance sensor on the entry. Index terms- iot, MCU (ESP8266-12E), LCD display, Radio-Frequency Identification (RFID)**

I.INTRODUCTION

The idea includes sophisticated controllers that read real-time site conditions and deliver just enough water to keep plants healthy. Sensors that deliver water based on the amount of moisture in the soil. The most sophisticated of the "smart" systems are the so-called iot platform, these take in real-time weather data, captured on-site through weather stations. WIFI Technology is being used everywhere in our daily life to fulfill our requirements. We are employing different sensors for different applications sometimes we may even use same sensors differently for different applications. Whatever it may be the final output is life has increased its speed with the technology boosters. One of the ideal ways of using technology is to employ it to sense the condition of soil and weather parameters so that efficient water delivery systems can be developed. The modules in the project are: Moisture sensor which continuously gives the information about the condition of soil (WET or DRY), humidity sensor is used to monitor temperature and humidity. submersible motor is used as a sprinkler which has a long pipe attached to it and based on the sensor values motor pours water. LCD display where the values of temperature and humidity are displayed which are retrieved from the iot platform. The controlling device of the whole system is a Node MCU (ESP8266-12E). The data from the sensors is posted in weather station (mqtt platform) that we have created. In achieving the task the Node MCU is loaded with a program written using Embedded 'C' language. The Internet of Things (IoT) is an important topic in technology industry, policy, and engineering circles and has become headline news in both the specialty press and the popular media. This technology is embodied in a wide spectrum of networked products, systems, and sensors, which take advantage of advancements in computing power, electronics miniaturization, and network interconnections to offer new capabilities not previously possible. While the term "Internet of Things" is relatively new, the concept of combining computers and networks to monitor and control devices has been around for decades. By the late 1970s, for example, systems for remotely monitoring meters on the electrical grid via telephone lines were already in commercial use. In the 1990s, advances in wireless technology allowed "machine–to–machine" (M2M) enterprise and industrial solutions for equipment monitoring and operation to become widespread. Many of these early M2M solutions,

however, were based on closed purpose–built networks.

II. LITERATURE SURVEY

[1]According to Srishti Rawal "IOT based smart irrigation system" International Journal of computer application: A system to monitor moisture levels in the soil was designed and the project provided an opportunity to study the existing systems, along with their features and drawbacks. The system uses information from the soil moisture sensors to irrigate soil which helps to prevent over irrigation or under irrigation of the soil thereby avoiding crop damage. The farm owner can monitor the process online through a website. Through this project it can be concluded that there can be considerable development in farming with the use of IOT and automation. Thus the system is a potential solution to the problems faced in the existing and cumbersome process of irrigation by enabling efficient utilization of water resources.

[2]2017 2nd IEEE International conference on recent trends in electronics, information and communication tech(RTEICT): interconnection of number of devices through internet describes the IOT. Every object is connected with each other through unique identifier so the data can be transferred without human to human interaction. It allows establishing solutions for better management of natural resources. In this paper proposed system is based on IoT that uses real time input data. Smart farm irrigation system uses android phone for remote monitoring and controlling of drips through wireless sensor network. Zigbee is used for communication between sensor nodes and base station. Real time sensed data handling and demonstration on the server is accomplished using web based java graphic interface. Cloud computing is an attractive solution to the large amount of data generated by the wireless sensor network. This paper proposes and evaluates a cloud based wireless communication system to monitor and control a set of sensors and actuators to assess the plants water need.

[3]2007 certified vol.6, issue 9,sept 2017"Smart irrigation system using IOT": the smart irrigation system implemented is cost effective for optimizing water resources for agricultural production. The proposed system can be used to switch on/off the sprinkler depending on the soil moisture levels thereby making the process simpler to use. Through this project it can be concluded that there can be considerable development in irrigation with those of IOT and automation. Thus this system is a solution to the problems faced in the existing process of irrigation.

III. OBJECTIVES

- To develop an IOT based irrigation system according to soil moisture content, type of crop and the stage of development of the crop.
- To design and develop a server/android application that the farmer can use to monitor the farm.
- To test the functionality of the proposed irrigation system.
- Displaying the status of moisture and indicating the status of trespassing on LCD and also knowing the status through application.
- Controlling the water flow through the server from the mobile.

IV. HARDWARE DESCRIPTION:

1. Distance sensor

A HC-SR04 distance sensor is commonly used with both microcontroller and microprocessor platforms like Arduino, ARM, PIC, Raspberry Pie etc.

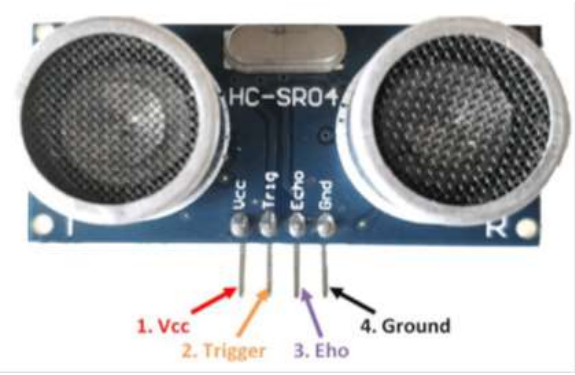


Figure 1: Ultrasonic sensor

2. ESP8266-12E:

ESP8266 is an impressive, low cost WiFi module suitable for adding WiFi functionality to anexisting microcontroller project via a UART serial connection.

Figure 2:ESP8266-12E

3. Board:

ESP8266EX has been designed for mobile, wearable electronics and Internet of Things applications with the aim of achieving the lowest power consumption with a combination of several proprietary techniques. The power saving architecture operates mainly in 3 modes: active mode, sleep mode and deep sleep mode.

Figure: ESP8266-12E board Description

4. DHT11(Temperature and Humidity Sensor):

DHT11 digital temperature and humidity sensor is a composite Sensor contains a calibrated digital signal output of the temperature and humidity.

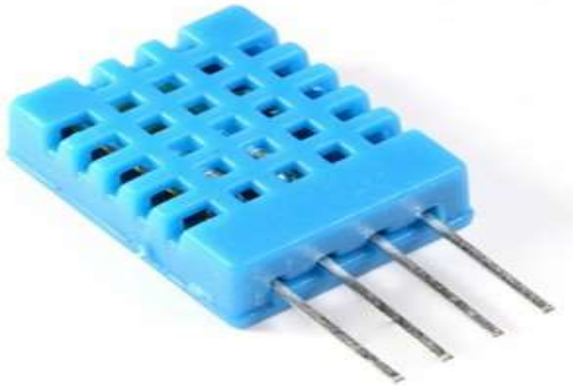


Figure 4: DHT11 sensor

5. Soil Moisture Sensor**:**

This sensor can be used to test the moisture of soil, when the soil is having water shortage, the module output is at high level, and else the output is at low level.

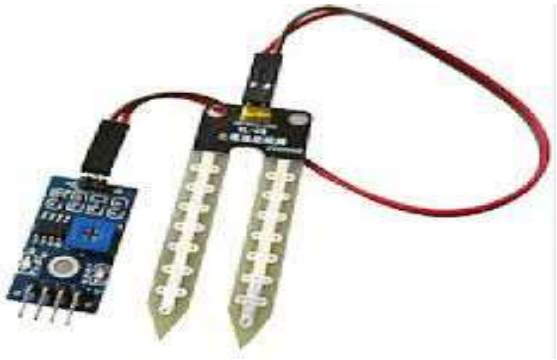


Figure5: soil moisture sensor module

6. Submersible water pump:

A submersible pump (or sub pump, electric submersible pump (ESP)) is a device which has a hermetically sealed motor close-coupled to the pump body.

Figure6: submersible pump

7. LCD Display

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome.

Figure7: LCD Display

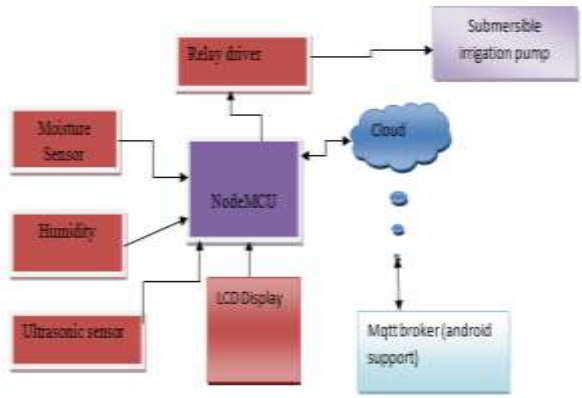
8. Relay:

An electromagnetic relay is basically a switch operated by magnetic force. This magnetic force is generated by flow of current through a coil in the

relay. The relay opens or closes a circuit when current is passed through it or stopped through it. A relay has two circuits to make and break first is normally open and the other is normally closed.

Figure8: relay with driving unit (module)

Block diagram:



V. SOFTWARE DESCRIPTION OF THE PROJECT

Arduino IDE:

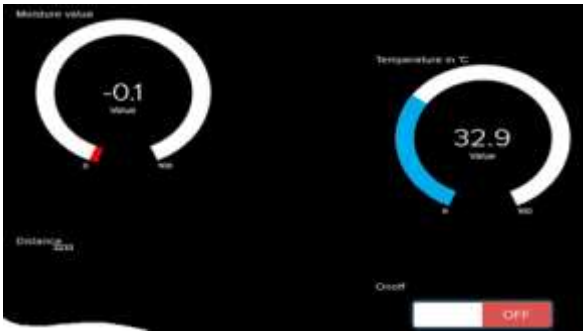
The Arduino Integrated Development Environment – or Arduino Software (IDE) – contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them

VI. METHODOLOGY

The moisture sensor reads the value of the moisture and for a dry condition or for a low moisture level the reference value is set and is between a certain scale, the moisture sensor is place in the farm land for mapping data which is recorded on the server, the server display all data's in a graphical form, the same goes for temp and moisture sensor data where the moisture data is recorded and in displayed on the mqtt platform. The programme is done in such a way if the moisture level is below the reference point the pump connected to the relay deriver is tripped and the water starts flowing in to the fields . Distance sensor is connected to the farm entrance whenever there is an intruder the buzzer connected to it is triggered and the notification is sent to the server and a mail is sent to the user. This data can be seen on the server anytime.

VII. TESTING AND RESULT:

Power the system down and check continuity between VCC and GND. If there is continuity (if you hear a beep), then you've got a short somewhere. Power the system down. With continuity, check that VCC and GND are correctly wired to the pins on the microcontroller and other devices. The system may be powering up, but the individual ICs may be wired wrong. Assuming you can get the microcontroller running, set the multimeter aside, and move on to serial debugging or use a logic analyser to inspect the digital signals. Continuity and large capacitors: During normal troubleshooting. You will be probing for continuity between ground and the VCC rail. This is a good sanity check before powering up a prototype to make sure there is not a short on the power system. But don't be surprised if you hear a short 'beep!' when probing. This is because there is often significant Amounts of capacitance on the power system. The multimeter is looking for very low resistance to see if two points are connected. Capacitors will act like a short for a split second until they fill up with energy, and then act like an open connection. Therefore, you will hear a short beep and then nothing. That's ok, it's just the caps charging up.



- The fig shows how the moisture and temperature is shown in the platform.
- Distance sensor recognizes the trespassers and initiates the buzzer.
- The on off switch turn on and off the pump.
- The lcd displays the activity going around.

ADVANTAGES:

- Increase in productivity.
- Reduced water consumption.
- Safe.
- No manpower required.
- Reduce soil erosion and nutrient leaching.
- Require smaller water source.

VIII. CONCLUSION AND FUTURE SSCOPE

Iot is the future of how the entire system of human process is going to be ease it makes life better the project shows that the agricultural system need not be old school it could be made smart and the amount of water usage can be controlled crops are not flooded with water it could be controlled through cloud or could be made automatic when the sensors sense the respective reference value the model is supported by features like trespassing detection so that owner could be notified whenever there is a trespassing.

IX. FUTURE SCOPE:

This project can be future improved by making it little more advance by collecting data from the cloud using sql and predicting crop growth other safety features and the future improvement could also include machine level control or artificial intelligence control of scheme to monitor the whole process.

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