# SMART IRRIGATION SYSTEM USING CLOUD

Group number-1


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***ABSTRACT :-***

Agriculture has a significant water need. Water needs cannot be met because of insufficient rainfall. Irrigated land is either under- or over-irrigated under conventional irrigation systems, which has a negative impact on crop development and results in water waste. An automated system is required. By keeping track of various environmental variables and the soil moisture, the proposed irrigation system in this research tries to satisfy the crops' water needs. The Internet of Things-based system stores the sensor data in the cloud, allowing the farmer to monitor and manage all of the water pumps remotely over the internet using an Android application. It is made up of a wireless sensor node with an Arduino that transmits sensor data to a cloud using a Wi-Fi module and controls.



***KEYWORDS:-***

Android Application, Arduino, Internet of Things, Wi-Fi module, Relay.


## I. INTRODUCTION:-

The largest issue the world is currently dealing with is water scarcity. Agriculture is a profession that requires a lot of water. Irrigation is the process of adding water to agricultural land to complement rainfall. There are numerous irrigation system types that have been used. The irrigation system is not very effective at preserving water. Additionally, factors including soil type, crop, and environmental factors like temperature and humidity affect how much water a crop needs. Overirrigated or underirrigated land are the two outcomes of conventional irrigation systems. Similar to how a lack of water prevents plant growth and development, an abundance of water is detrimental to plant growth. Due to variations in the water holding capacity of the land, water infiltration, and water runoff, many areas of irrigated fields are over or underirrigated under conventional irrigation systems. Plant health is poor in over-irrigated areas due to an increase in salinity. Air is replaced by too much water in the soil's pores. As a result, the plants' roots do not receive enough air. It might cause leaching. The area that is being irrigated has water stress. Therefore, effective water management is crucial to agriculture. . Traditional irrigation systems include labor-intensive, time-consuming human labour. The Internet of Things can now offer an intelligent solution for irrigation systems. The ever-expanding network of physical items with an IP address for internet connectivity and the communication that takes place between these objects and other Internet-enabled systems and devices are collectively referred to as the "Internet of Things" (IoT). To prototype, roll out, and remotely manage linked electronic devices at any scale, use the Blynk app. With the help of the ESP8266-01 WiFi module and Blynk App, you can use this project to control the water pump. The Blynk App is incredibly user-friendly and a wonderful place to start learning about IoT.

## II. PROPOSED SYSTEM:-

The transmitter and coordinator modules make up the proposed system. The soil moisture sensor and the temperature-humidity sensor in the transmitter module are connected to the microcontroller. A microcontroller is linked to the internet through a Wi-Fi module, Esp8266. In ThingSpeak, an open source Internet of Things (IoT) application, a channel is built. The API (Application Programming Interface) key that ThingSpeak offers is used to upload sensor data to the cloud and save it in the channel and designated fields that were generated. The microcontroller gathers sensor readings and sends them via the internet via the HTTP protocol to the ThingSpeak cloud. Every 30 seconds, these values are transmitted to the cloud through the internet. Graphs are used to visualise the logged data in the ThingSpeak cloud. An alarm message is provided to the farmer when the sensor values exceed the threshold. A farmer can activate the water motor by using an Android application to control the relay attached to the coordination module online. A second signal telling the farmer to stop the motor is issued when the appropriate environmental criteria are fulfilled.

## III. COMPONENTS USED:-

### 1) ESP8266:

Figure no.1

A self-contained SOC with an integrated TCP/IP protocol stack, the ESP8266 WiFi Module allows any microcontroller to access your WiFi network. The ESP8266 is capable of offloading all Wi-Fi networking tasks from another application processor or hosting an application.

### 2) DHT11:

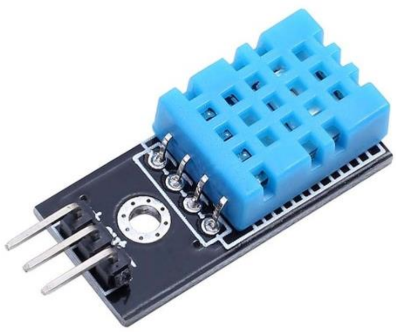

Figure no.2

A temperature and humidity sensor called the DHT11 produces calibrated digital output. A low-cost humidity and temperature sensor with great long-term stability and dependability is the DHT11. It measures the ambient air using a thermistor and a capacitive humidity sensor, and it generates a digital signal on the data pin (no analogue input pins needed). It is quite easy to use.

### 3) Jump wire:

Figure no.3

Jumper wires have pins and connectors that are used to connect different components on a breadboard.

### 4) Breadboard:

Figure no.4

A breadboard is a plastic board that is rectangular and has numerous tiny holes in it. With the aid of these holes, you may quickly assemble and test a working model of an electronic circuit, such as this one with a battery, switch, resistor, and LED (light-emitting diode).

### 5)Soil Moisture Sensor:

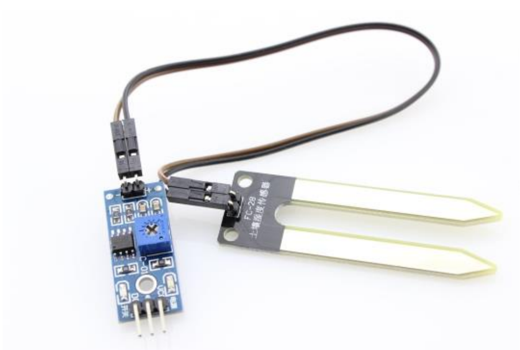

Figure no.5

One type of sensor used to determine the volumetric content of water in the soil is the soil moisture sensor. As the soil moisture straight gravimetric dimension needs to be removed, dried, as well as sample weighting. These sensors measure the volumetric water content indirectly using the electrical resistance, neutron interaction, dielectric constant, and other soil laws as well as replacement of the moisture content.

### 6)Relay Module :

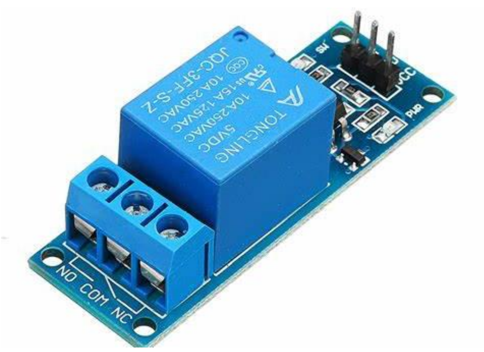

Figure no.6

The relay is the mechanism that activates or deactivates the contacts to activate the other electric control. It recognises an unfavourable condition in a designated area and instructs the circuit breaker to disconnect the problematic region by turning it ON or OFF.

### 7)Pump:

Figure no.7

Micro Submersible Pump DC 3-6V a little water pump This compact, inexpensive submersible pump motor can be powered by a 3 to 6V power source. It has a maximum flow rate of 120 litres per hour and uses relatively little electricity (220mA).

### 8)Blynk application(software):


Figure no.8

The most widely used IoT platform for managing thousands of deployed items, building apps to remotely control and monitor them, and connecting devices to the cloud is called Blynk. Use the Blynk app to remotely prototype, deploy, and manage any number of linked electronic devices.

## IV. CONCEPTUAL DIAGRAM OF SENSOR NODE

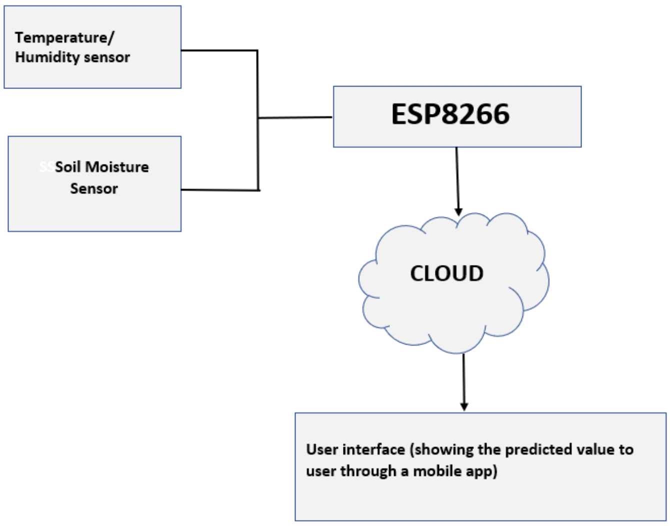


Figure no.9

## V. SENSOR NODE

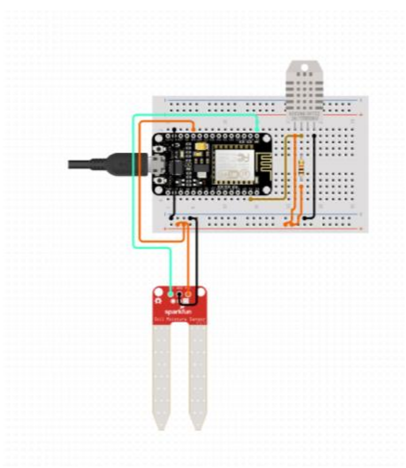

Figure no.10

## VI. WORKING

The microprocessor of the transmitter module reads the moisture content of the soil and ambient variables like temperature and humidity. Every 30 seconds, these values are transmitted to the cloud through the internet. Graphs are used to visualise the logged data in the ThingSpeak cloud. An alarm message is provided to the farmer when the sensor values exceed the threshold. A farmer can activate the water motor by using an Android application to control the relay attached to the coordination module online. A second signal telling the farmer to stop the motor is issued when the appropriate environmental criteria are fulfilled. Additionally, we created a programme that displays the current temperature, humidity, or soil moisture that was remotely detected.

## VII. ACKNOWLEDGEMENT

This paper and the research behind it would not have been possible without the exceptional support of my supervisor Dr. Rajesh B. Ingle His enthusiasm, knowledge and exacting attention to detail have been an inspiration and kept my work on track.

## VIII. CONCLUSION

The suggested irrigation system offers an effective and dependable solution. It is simple to analyse the data and learn how much water is needed at what intervals throughout the day thanks to constant updates on soil conditions and environmental factors. Additionally, the technology can effectively manage water and assure a higher crop output in arid areas with insufficient rainfall by accurately watering the crops. The system minimises human involvement. It enables the farmer to access the data from anywhere and learn about the crops and environment around them, operate the water pump, and keep an eye on the field.

## IX. FUTURE SCOPE

From coming week we will work on data computing. Using machine learning and algorithms we will predict how much water is needed and will send the message or notification to the farmer.

## X. REFERENCE


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V. Link:- (Circuit_Diagram)https://www.circuito.io/app?components=513,10167,13322,360216