

## SMART IRRIGATION SYSTEM USING IOT

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### ABSTRACT

The smart irrigation system is a fusion of the newest technology of sprayers with outlets that improve coverage of irrigation controllers that are diluting and keep a check on moisture-related conditions on your property and spontaneously adjust watering to optimal levels. As water supply is becoming scarce. In today's world, there is a high priority to acquiring smart ways of irrigation. The project depicts how irrigation can be handled smartly using IoT. This project aims less the consumption of time and avoiding problems like sustained vigilance.

**Keywords:** Irrigation, IOT, Thinkspeak, Moisture Sensor.

### I. INTRODUCTION

A challenge for farmers is to sustain land health. Most of the farmers use vast portions of land for farming and it becomes challenging to reach and track each corner of large lands. Sometimes there is a possibility of uneven water sprays. This concludes in the poor quality crops which further leads to financial losses. In this scenario, the Smart Irrigation System operating on the newest IOT technology is supportive and accompanies ease of farming.

### II. LITERATURE REVIEW

#### Review: 1

**Ashwini B.V.** has been studied on "Smart irrigation system using IoT for surveillance of crop-field"(2018)

In this study, Android app was used for the tracking of the field. This system was found feasible cost effective for the optimization of the water resources. Hence the irrigation system helps farmers by makinh their work smart with any human intervation.

#### Review: 2

**J. Jegathesh Amalraj, S. Banumathi, J. Jereena John** conducted an experiment on "Smart irrigation system for agriculture using IoT"(2019)

In this study, three classic irrigation methods channel irrigation, sprinkler irrigation and drip irrigation were used. Researchers conclude that the water usage is minimized when we use an automated irrigation system that relies on the soil moisture as a parameter implemented.

#### Review: 3

**M. Safdar Munir, Imran Sarwar Bajwa, Amna Ashra, Waheed Anwar, Rubina Rashid** conducted an experiment on "Intelligent and smart irrigation system using Edge computing and IoT"(2021).

In this study, edge computing technology was used with soil moisture, Humidity and temperature sensor for tunnel farming. The sensor data is processed using the trained models of machine learning.

### III. REQUIREMENT ANALYSIS

Material which are used for designing Smart Irrigation System is presented in this section.

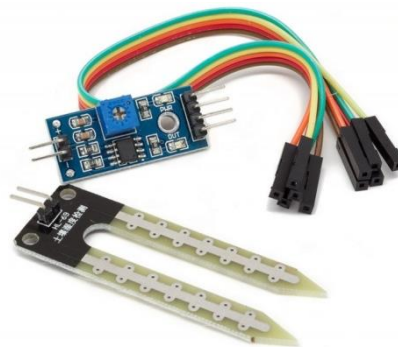
#### a) ESP8266 NodeMCU Module (cp2102)

The NodeMCU cp2102 Wifi module is an seamless microcontroller that is uncomplicated to use to create projects with WiFi and IoT (Internet of Things) applications. The board is built on the newest ESP8266 WiFi Module chip with the ESP-12E. This WiFi development board is embeded with all the necessary components for the ESP8266 (ESP-12E) to program and upload code. It has a built-in USB to serial chip upload codes, 3.3V regulator and logic level converter circuit so you can abruptly upload codes and connect your circuits. This board holds the ESP-12E chip with a 4MB flash memory limit that can accomodate your long project codes.



**Figure1:** ESP8266 NodeMCU.

### **b) Soil Moisture Sensor**

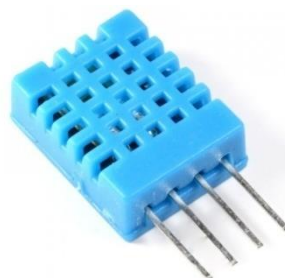


**Figure2:** Soil Moisture Sensor.

The soil moisture sensor is one kind of sensor used to detect the content of water within the soil. As the linear dimension of soil moisture needs eliminating, drying, as well as sample weighting. These sensors measure the volumetric water content indirectly with the help of different rules of soil like dielectric constant, electrical resistance, otherwise interaction with neutrons, and replacement of the moisture content.

### **c) DHT11 (Temperature and humidity sensor)**

The DHT11 is a basic, extreme inexpensive digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to quantify the surrounding air, and gives out a digital signal on the data pin (no analog input pins needed). Its pretty simple to use, but requires careful timing to grasp data. You can receive new data from it once every 2 seconds, so when using the library from Adafruit, sensor readings can be up to 2 seconds old comes with a 4.7K or 10K resistor, which you will want to use as a catch from the data pin to VCC.



**Figure3:** DHT11 Sensor

## **IV. WORKING**

The IoT-based Smart Irrigation System works on the ESP8266 NodeMCU module which handles the communication of the data and sending it to the server. The Soil Moisture Sensor detects the moisture in the soil and sends the data. The DHT11 sensor detects the humidity and the temperature and sends this data to the thinkspeak server using the NodeMCU and the thinkspeak API. This data will not only automatically irrigate the land based on the moisture level in the soil, but also send the Data to the server to keep track of the land

condition. The System will consist of a water pump which will be used to sprinkle water on the land depending upon the land environmental condition such as Moisture, Temperature, and Humidity.

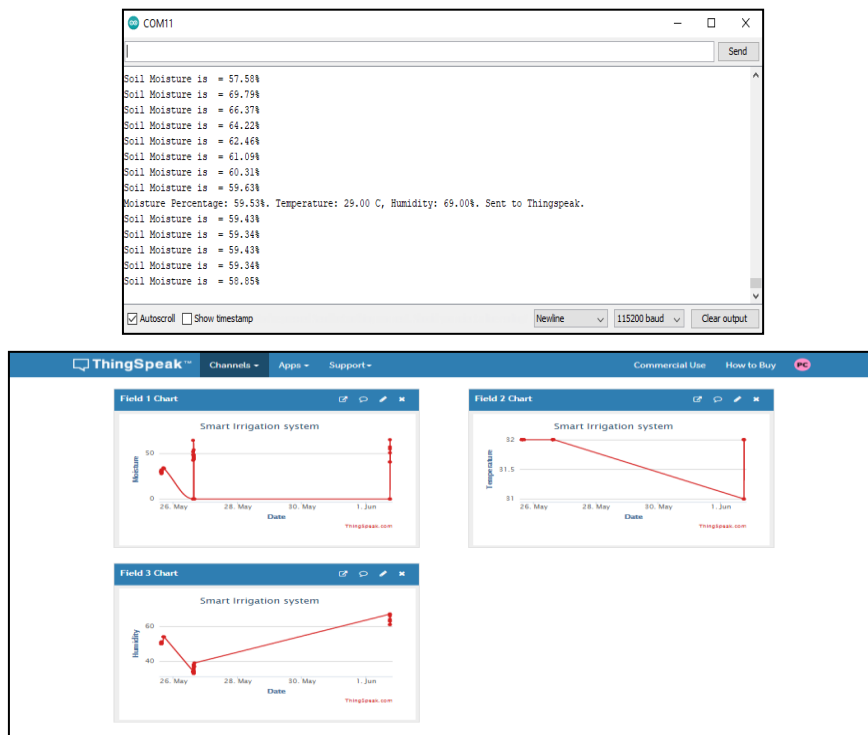


Figure4: Output Data

## V. CONCLUSION

The Project ‘Smart Irrigation System’ is used for the optimization of water in the agricultural field without the intervention of farmer by using a soil moisture sensor that senses the moisture content of the Soil using a Microcontroller that turns ON/OFF the pump automatically according to the need of water for irrigation and hence helpful in saving water.

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