

# Smart Irrigation System using IoT

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## Abstract

Agriculture is considered as the backbone of India. Agriculture is the main source of food production in our country. Most of the farmers in India depend on monsoons to cultivate their lands for food production. In India Agriculture is the primary source of income nearly 70% of people depends on it. Agriculture and their allied sectors share 16% of GDP. The main source of agriculture is water. By the traditional method of watering, the waste of water is more. Due to climatic changes in the environment, the content of water at ground level is decreasing day by day around the globe. It is right for all human beings to preserve the water for future generations by reducing its wastage. As the technology changes IoT is also evolving which is a milestone for agriculture to use. Internet of Things (IoT) is playing a major role in many fields; agriculture is one of the parts. The main objective of this paper is to overcome this problem by using IoT technologies. The proposed methodology mainly depends on the Microcontroller and sensors. This work is fully automated which helps the framers to get the information regarding their field conditions. It gives the data regarding water content in soil and humidity, which helps framers to reduce the wastage of water.

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## 1. Introduction

In India, most of the population relies upon agriculture as their primary source of income. Due to the rapid increase in population, agriculture plays an important role to address the issues of individuals. In any case, it requires water system and water to cultivate, but we have less measure of rainfall and more consumptions of water. As per the reports, around 70% of freshwater resources are using in agriculture. Sudden changes in climate around the globe, the accessibility of water at ground level is decreasing day by day. It becomes difficult for farmers to cultivate their lands with less water. As the world is revolving around modern technologies, it is also needed to set a goal for the agriculture side as well. Many researchers are working in the field of agriculture. In recent years, farmers started utilizing innovation and their applications to keep their information safe and screen their records. With the smart wireless technology by using IoT we are going to propose a prototype that helps

the farmers to monitor their fields. By using sensors, and open-source Arduino, board the prototype is created. In prototype Microcontroller ATMEGA328P, soil sensor, humidity, and temperature sensor along with GPS module is used. Sensors collect values that help to monitor the fields and to take actions according to those values.

## 2. Literature Survey

This proposed paper is altogether constrained by the Node MCU, which helps to continuous updating of data to the mobile application and the Arduino module is utilized for perusing the analogy input values from the sensors [1].

This paper proposed a system that helps farmers to improve the quality and amount of their field by detecting temperature, humidity values, soil moisture values, and water level of the tank from the field with no intercession from people [2].

In this paper, the framework was worked by utilizing minimal effort sensors like soil and humidity sensors to monitor the field. With the help of wireless transmission, the sensor information is transmitted and reached to the user(farmers). Therefore, they can control the water system. The sensors are connected to the Arduino board [3].

In this paper, the farming framework was intended to locate an optimal solution to the water crisis. They implement IoT innovation utilizing an android gadget, a fundamental controlling unit (MCU), sensors to measure parameters and a water pump, which was utilized to supply water to the field. They used the THINGSPEAK web server, and it utilizes the JSON organization to change over put away information into the intelligible structure [4].

### 3. Proposed System

By using traditional methods of watering in agriculture more amount of water is wasted. To overcome this challenge intelligent irrigation system has been used. In the proposed system, various sensors like temperature, soil, and humidity sensors are connected to the input of the Arduino Uno. The values in which sensors are sensed stored in cloud and signals giving to the output pins. Motor driver and water pumping systems are connected to the output pins. The water pumping system is automatically turned on/off by the circuit which is connected to the motor driver. Farmers by using this system can easily access the details of the field and their condition at any time.

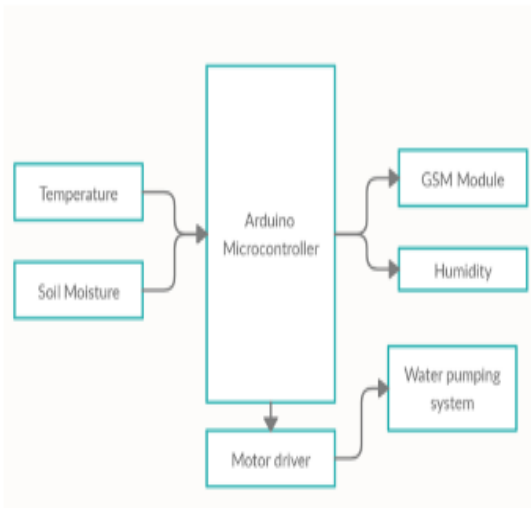


Figure 1: System architecture

### 4. Components Used

#### Soil sensor:

These sensors measure the water content in soil and can be utilized to estimate the measure of stored water in a profile, or how much water system is required to arrive at an ideal measure of immersion. Soil sensors can be

portable and utilized for instant measurements or introduced for long-term checking [5].

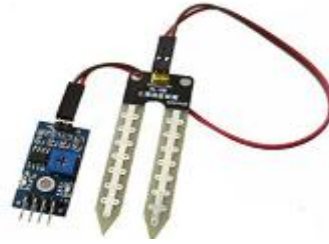


Figure 2: Soil sensor

#### Humidity sensor

It detects measures and normally reports the relative humidity noticeable all around. This estimates both moisture and air temperature [6].



Figure 3: Humidity sensor

#### Motor driver

A Direct Current engine changes over electrical energy into mechanical energy. It comprises of a stator, an armature, a rotor and a commutator with brushes. These are the least difficult kind of engine and are utilized in household appliances, for example, electric razors, and in electric windows in vehicles [7].



Figure 4: Motor driver

#### Arduino

Arduino is an open-source platform that consists of both IDE (Integrated Development Environment) or a physical programmable circuit board and a piece of software that runs on your computer, used to compose and transfer computer code to the physical board utilized for building electronics projects[8].

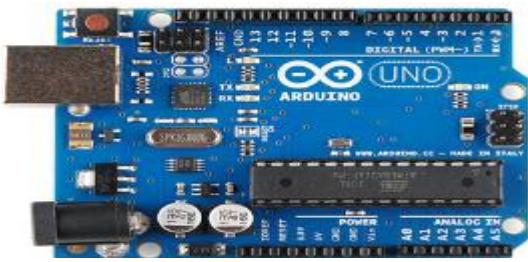


Figure 5: Arduino UNO

## 5. Conclusion

This system implemented was found to be cost-effective and feasible by optimizing the water resources. This proposed system allows cultivation where more amount of water scarcity by improving sustainability. It also reduces the consumption of power and wastage of water. For farmers to work smart this system will help to increase their productivity and reduces the damage of crops.

## 6. Results

The proposed system is interfaced within the board with all sensors on it. It was interfaced with water motor, 12V battery, Arduino UNO and sensors. It was tested by placing the sensors in the soil. If the soil is dry, then the motor automatically pumps the water into the field until it gets enough water.

## Reference

- [1] Aashika Premkumar, Thenmozhi K, P Monishaa, Rengarajan Amirtharajan, and Padmapriya Praveenkumar, "IoT Assisted Automatic Irrigation System using Wireless Sensor Nodes", 2018 International Conference on Computer Communication and Informatics (ICCCI -2018), Jan. 04 – 06, 2018.
- [2] Shweta B. Saraf, Dhanashri H. Gawali, "IoT Based Smart Irrigation Monitoring and Controlling System", 2017 2nd IEEE International Conference on Recent Trends in Electronics Information & Communication Technology (RTEICT), May 19-20, 2017
- [3] Ashwini B V, "A Study on Smart Irrigation System Using IoT for Surveillance of Crop-Field", International Journal of Engineering & Technology, 7 (4.5) (2018) 370-373
- [4] Pavan kumar Naik, Arun Kumbi, Kirthishree Katti and Nagaraj Telkar, "AUTOMATION OF IRRIGATION SYSTEM USING IoT", International Journal of Engineering and Manufacturing Science. ISSN 2249-3115 Vol. 8, No. 1 (2018) pp. 77-88
- [5] <https://soilsensor.com/>
- [6] [https://wiki.eprolabs.com/index.php?title=Humidity\\_Sensor\\_DHT11](https://wiki.eprolabs.com/index.php?title=Humidity_Sensor_DHT11)
- [7] <https://www.hunker.com/13409319/definition-of-a-dc-motor>
- [8] <https://learn.sparkfun.com/tutorials/what-is-an-arduino/all>
- [9] Suganya, Aditya Subramanian, Yagneshwaran. B, Farheen Khan and S.R Sushmitha, "Automatic Irrigation System using IoT", International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 10 | Oct -2017
- [10] Dr. M. Newlin Rajkumar, S. Abinaya and Dr. V. Venkatesa Kumar, "INTELLIGENT IRRIGATION SYSTEM – AN IOT BASED APPROACH", IEEE International Conference on Innovations in Green Energy and Healthcare Technologies (ICIGEH'17)
- [11] R.Nandhini, S.Poovizhi, Priyanka Jose, R.Ranjitha, and Dr.S.Anila, "ARDUINO BASED SMART IRRIGATION SYSTEM USING IOT", 3rd National Conference on Intelligent Information and Computing Technologies, IICT '17
- [12] S Nalini Durg1, M Ramakrishna, "SMART IRRIGATION SYSTEM BASED ON SOIL MOISTURE USING IOT", International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 06 | June 2018.
- [13] Monica M, B.Yeshika, Abhishek G.S, Sanjay H.A,SankarDasiga, " IoT Based Control and Automation of Smart Irrigation System", Proceeding International conference on Recent Innovations in Signal Processing and Embedded Systems (RISE-2017) 27-29 October,2017
- [14] Srishti Rawal, "IOT based Smart Irrigation System", International Journal of Computer Applications (0975 – 8887) Volume 159 – No 8, February 2017