

# SMART IRRIGATION SYSTEM USING IOT

Mr. Nikhil N. Salvithal,<sup>1</sup> Mr. Aditya D. Kalekar<sup>2</sup>, Mr. Ajit P. Kalshetti<sup>3</sup>,  
Mr. Atul K. Gund<sup>4</sup>, Mr. Suraj S. Ardak<sup>5</sup> & Mr. Vishal G. Kedare<sup>6</sup>

<sup>1</sup>Assistant Professor, Computer Science and Engineering, SVERI's College of Engineering,  
Punyashlok Ahilyadevi Holkar Solapur University, Solapur, Maharashtra, India.

<sup>2, 3, 4, 5, 6</sup>UG students, Computer Science and Engineering, SVERI's College of Engineering, Punyashlok  
Ahilyadevi Holkar Solapur University, Solapur, Maharashtra, India.

[nnsalvithal@coe.sveri.ac.in](mailto:nnsalvithal@coe.sveri.ac.in)<sup>1</sup>, [adityadkalekar@coep.sveri.ac.in](mailto:adityadkalekar@coep.sveri.ac.in)<sup>2</sup>, [ajitpkalshetti@coep.sveri.ac.in](mailto:ajitpkalshetti@coep.sveri.ac.in)<sup>3</sup>,  
[atulgund@coep.sveri.ac.in](mailto:atulgund@coep.sveri.ac.in)<sup>4</sup>, [surajsardak@coep.sveri.ac.in](mailto:surajsardak@coep.sveri.ac.in)<sup>5</sup>, [vishalgedare@coep.sveri.ac.in](mailto:vishalgedare@coep.sveri.ac.in)<sup>6</sup>

**Abstract:** Internet of Things is a collection of internet services. Application of IoT is increasing rapidly. Smart irrigation system that could be monitored and controlled remotely. When we connect our irrigation system with using some sensors and monitor it, the whole system can be called as Smart irrigation system in IoT environment or IoT based Smart Irrigation System.

An automated irrigation system for efficient water management has been proposed. Soil Parameters like soil moisture is measured. The GSM module has been used to establish a communication link between the farmer and the field. The current field status will be intimated to the farmer through SMS. This can reduce the human intervention.

**Keywords:** Smart Irrigation, Internet of Thing (IoT), GSM Module, Arduino, Moisture Sensor.

## 1. INTRODUCTION

Agriculture is the strength of Indian Economy. However, for agriculture water consumption is more than rainfall every year. Improving farm yield is essential to meet the rapidly growing demand of food for population growth across the world. An automated irrigation system is needed to optimize water use for agricultural crops. The technique can be used for application of accurate amount of water. By forming sensor network, good monitoring of water regulation in the agriculture field can be achieved. Advanced tools and technology can be used to increase farm yield. The micro-controller from the node controls relay switching unit and watering subsystem accordingly.

## 2. WORKING

### 2.1 Problem Statement:

Agriculture is the strength of Indian Economy. However, for agriculture water consumption is more than rainfall every year. Improving farm yield is essential to meet the rapidly growing demand of food for population growth across the world. An automated irrigation system is needed to optimize water use for agricultural crops. The technique can be used for application of accurate amount of water. By forming sensor network, good monitoring of water regulation in the agriculture field can be achieved. Advanced tools and technology can be used to increase farm yield. The microcontroller from the node controls relay switching unit and watering subsystem accordingly.

## 2.2 Reason for Project:

To generate a system, that will make the existing irrigation system more reliable and with less human intervention and less man-power. The main purpose of project is to provide farmers with automatically operating motor for irrigation depending upon the moisture value of soil.

- Reduce human intervention: Using the smart irrigation system the work can be made easily and it will reduce the human intervention.
- Motor Status: Smart Irrigation System allows you to know the status of the motor using the GSM module.
- Avoid Wastage: In traditional system Indian agriculture was dependent on the monsoon which does not have sufficient source of water this automatic system is implemented to provide water to plants according to their moisture level.

## 3. LITERATURE SURVEY

### 3.1 Existing System Problem/Drawback:

Agriculture is the strength of Indian Economy. However, for agriculture water consumption is more than rainfall every year. Improving farm yield is essential to meet the rapidly growing demand of food for population growth across the world. Drawbacks to surface irrigation include potential over watering and wasteful runoff. If soil lacks proper sloping or doesn't absorb readily, water can't move through the garden. Standing water damages plants and reduces yields for edible crops.

### 3.2 Proposed System:

Nowadays agricultural field is facing lot of problems due to lack of water resources. In order to help the farmers to overcome the difficulties, smart irrigation system has been used. In this system, sensors such as soil moisture are connected to the input pins of Arduino micro controller.

If the sensed value goes beyond the threshold values set in the program, the pump will be automatically switched ON/OFF by the relay circuit and it is connected to the driver circuit which helps to switch the voltage. The farmer will be intimated about the current field condition through GSM module. By using this system, the farmer can control the system of the field from anywhere & at any time.

### A) ARDUINO UNO:

The Microcontroller used here is an Arduino UNO. The UNO is a Microcontroller board based on ATMEGA 328P. The ATMEGA 328P has 32kB of flash memory for storing code. The board has 14 digital input and output pins, 6 analog inputs, 16 MHz quartz crystal, USB, an ICSP circuit and a reset button. The UNO can be programmed with the Arduino software.



**Fig. 1. ARDUINO UNO**

### **B) GSM Module:**

GSM (Global System for Mobile Communication) is a standard developed by the European Telecommunication Standards Institute (ETSI) to describe protocols for second-generation (2G) digital cellular networks used by mobile phones. GSM describes a digital, circuit-switched network optimized for full duplex voice telephony and also expanded to include data communications, packet data transport via GPRS (General Packet Radio Services). The longest distance the GSM specification supports in practical is 35 kilometers (22mi).



**Fig. 2 GSM Module**

### **C) Soil Moisture Sensor:**

Soil Moisture sensor is used to measure the moisture content present in the soil. When the soil moisture value read by the sensor is above the threshold value, low level (0V) will be the digital output and if it is below the threshold level, high level (5V) will be the digital output. The digital pin is used to directly read current soil moisture value to see if it is above threshold or not. The threshold voltage can be regulated with help of potentiometer.



**Fig. 3. Soil Moisture Sensor**

### 3.3 System Structure:

System structure is quite simple and it contain the Arduino kit, GSM module, Relay switch, Moisture sensor, Breadboard and Jumping wires. The moisture sensor will detect the moisture in the soil and according to that it will send the readings to the Arduino. According to the moisture in the soil if it detects low moisture the motor should start and GSM module will send the SMS. When the motor is switched off it should send the SMS.

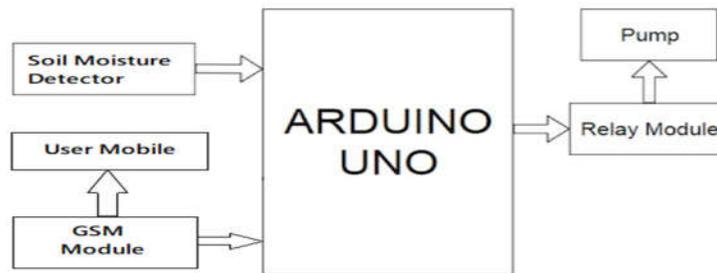


Fig. System Structure

### 4. Conclusion

The main objective of this smart irrigation system is to make it more innovative, user friendly, time saving and more efficient than the existing system. Measuring parameters such as soil moisture, humidity values and the system also includes intruder detecting system. This system will provide the farmers with facility to irrigate their crops automatically as per the need of soil or water quantity to the crop.

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