**AUTOMATIC IRRIGATION SYSTEM**

MINI PROJECT REPORT

for

21CSS201T - COMPUTER ORGANIZATION AND ARCHITECTURE

*Submitted by*

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*Under the Guidance of*

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*In partial fulfilment of the requirements for the degree of*

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE ENGINEERING

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DEPARTMENT OF COMPUTING TECHNOLOGIES

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

KATTANKULATHUR- 603 203

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BONAFIDE CERTIFICATE

Certified that Computer Architecture and organization Mini Project report titled “**Automatic Irrigation System**” is the Bonafide work of **Ekansh Lamba [RA2311003012132]** who carried out the project work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form any other work

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**SRM Institute of Science and Technology**

**College of Engineering and Technology**

**SCHOOL OF COMPUTING**

**21CSS201T**

**COMPUTER ORGANIZATION AND ARCHITECTURE**

**MINI PROJECT REPORT – EVALUATION SHEET**

**ODD Semester: 2024-2025**

Student Register Number : RA2311003012132

Student Name : Ekansh Lamba

Year & Semester : II & III

Section : O2

Project Title : Automatic Irrigation System

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| **Particulars** | **Max. Marks** | **Marks Obtained** |
| Review 1 and 2 | 05 |  |
| Demo verification &viva | 03 |  |
| Project Report | 02 |  |
| **Total** | **10** |  |

**Signature :**

**Staff Name :**

**Date :**

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**Automatic Irrigation System**

**Chapter 1**

**OBJECTIVE:**

Automatic Irrigation System using Arduino and soil moisture sensors is designed to optimize water usage by monitoring real-time soil conditions and automating water delivery. This project aims to enhance agricultural efficiency, reduce water wastage, and minimize the need for manual intervention, making it especially useful for regions facing water scarcity. By continuously monitoring soil moisture levels, the system ensures that plants receive adequate water only when necessary, thus conserving resources and supporting sustainable farming practices. Additionally, this system helps in reducing labour costs and increasing crop yield by maintaining optimal soil moisture levels. The project provides a scalable solution for farmers, landscapers, and gardeners, contributing to more efficient and environmentally responsible agriculture.

**Chapter 2:**

**ABSTRACT:**

In agriculture, efficient water management is crucial to sustaining crop health and conserving water resources, especially in regions prone to drought or with limited access to irrigation systems. Traditional irrigation methods often lead to water wastage due to over-watering or require constant manual intervention, which can be labour-intensive and inefficient. To address these challenges, this project focuses on the design and implementation of an **Automatic Irrigation System** that optimizes water usage by continuously monitoring soil moisture levels through sensors and controlling the irrigation process using an Arduino Uno microcontroller. The system is built with essential components, including soil moisture sensors, an Arduino Uno microcontroller, a water pump, and a relay module. The soil moisture sensors are strategically placed within the soil to capture real-time data on moisture levels. This data is then processed by the Arduino, which decides whether or not to activate the water pump. When the soil moisture level falls below a predefined threshold, the Arduino triggers the relay module to power on the water pump, automatically delivering water to the plants. Once the desired soil moisture level is achieved, the pump is deactivated, preventing excessive watering. This automated process eliminates the need for manual intervention, ensuring that crops receive only the necessary amount of water. As a result, the system significantly reduces water waste, conserves resources, and enhances irrigation efficiency.

**Chapter 3:**

**INTRODUCTION:**

The Project is based upon Closed Loop Control System. In closed loop control system, the feedback loop is there which continuously provide the data and with the help of that data the system configures its output. We can automatically water the plants when we are going on vacation or don’t, we have to bother my neighbours, Sometimes the neighbours do too much of watering and the plants end up dying anyway. There are timer-based devices available in India which waters the soil on set interval. They do not sense the soil moisture and the ambient temperature to know if the soil actually needs watering or not. The purpose is to regulate water and optimize the water flow so that plants are not starved of water. This is particularly useful during summer seasons when water is scarce. During monsoon and winter seasons, the water flow can be optimized depending on the requirement, thus saving precious water. A properly configured soil moisture sensor can save up to 60 percent of water used in irrigation. The designed system can be used in turf grass or with small garden plants. The continuous increasing of food demand requires the improvement in food production technology. The food production requires continues monitoring of crops for irrigation with the help of humans. This continuous monitoring by humans is not possible for all the time. Hence automatic irrigation system is a suitable one which helps to irrigate the crops without the help of human intervention. This system will have continuous monitoring that helps better production. Assimilation is that the artificial application of water to the land or soil It is used to assist in the growing of agricultural crops maintenance of landscapes, and re vegetation of disturbed soils in dry

areas and during periods of inadequate rainfall. When a zone comes on, the water flows through the lateral lines and ultimately finally ends up at the irrigation electrode (drip) or mechanical device heads. Several sprinklers have pipe thread inlets on the lowest of them that permits a fitting and also the pipe to be connected to them. The sprinklers are usually used in the top of the head flush with the ground surface . As the method of dripping will reduce huge water losses it became a popular method by reducing the labour cost and increasing the yields.

**Chapter 4:**

**HARDWARE/SOFTWARE REQUIREMENTS:**

**Hardware Requirements:**

1. **Arduino Uno:**

Acts as the main microcontroller, processing data from the sensors and controlling the relay module for irrigation.

1. **Soil Moisture Sensors:**

Measures the soil's moisture level to determine whether irrigation is needed.

1. **Relay Module:**

Controls the water pump, turning it on or off based on the moisture sensor data sent by the Arduino.

1. **Water Pump:**

Pumps water to the plants when triggered by the relay module. The type (submersible, centrifugal) and capacity of the pump can vary depending on the scale of the project.

1. **Power Supply (Battery/Adapter):**

Provides power to the Arduino and the relay module. A stable power supply is crucial for consistent system operation.

1. **Connecting Wires:**

Connects various components for easy testing and circuit assembly.

1. **Water Storage Tank:**

Stores water for the pump, especially useful in areas without a constant water supply.

**Software Requirements:**

* + 1. **Arduino IDE:**

Used to write, compile, and upload the code to the Arduino board. The IDE also provides libraries and functions needed for sensor and relay control.

* + 1. **Arduino C Language:**

Programming language for the Arduino code, including sensor reading, data processing, and relay control.

* + 1. **Serial Monitor (from Arduino IDE):**

Used for debugging and monitoring sensor data in real-time, helping to ensure that the moisture sensor is accurately reading soil moisture levels.

**Chapter 5:**

**CONCEPTS/WORKING PRINCIPLE:**

**A diagram of a computer program

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**Fig No. 1**

**FLOW CHART:**

A diagram of a water level

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**Fig No. 2**

**Diagram:**

Diagram of a relay system

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**Fig No. 3**

**Closed Loop System:**

**A diagram of a process

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**Fig No. 4**

**Chapter 6:**

**PROGRAM:**

int soilMoisture;

const int moisturePin = A0;

const int relayPin = 3;

const int threshold = 25;

void setup() {

pinMode(relayPin, OUTPUT);

pinMode(moisturePin, INPUT);

Serial.begin(9600);

}

void loop() {

soilMoisture = analogRead(moisturePin);

Serial.print("Soil Moisture Level: ");

Serial.println(soilMoisture);

if (soilMoisture < threshold) {

digitalWrite(relayPin, LOW);

Serial.println("Water Supply: OFF");

} else {

digitalWrite(relayPin, HIGH);

Serial.println("Water Supply: ON");

}

delay(400);

}

**Chapter 7**

**OUTPUT:**

**A screenshot of a computer

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**Fig No. 5**

**A screenshot of a computer

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**Fig No. 6**

**Chapter 8**

**CONCLUSIONS:**

The Automatic Irrigation System using Moisture Sensors and Arduino Uno demonstrates an effective and sustainable approach to water management in agriculture. By automating irrigation based on real-time soil moisture data, this system significantly reduces the need for constant human supervision, conserves water resources, and promotes healthier crop growth. The project is designed to be both scalable and customizable, making it adaptable to a variety of agricultural settings, from small-scale gardens to large farms. Moreover, this solution is low-cost and energy-efficient, providing farmers and gardeners with an accessible tool to improve productivity and support environmental sustainability. Future enhancements could include integrating weather forecasting data and solar power, further reducing water waste and energy consumption, ultimately contributing to smarter and more sustainable farming practices.This project highlights the potential of simple technology to address pressing environmental and agricultural challenges, paving the way for innovations in precision agriculture.

**REFERENCES:**

1. Arduino Official Documentation: <https://www.arduino.cc/> Provides extensive guides, tutorials, and references on using Arduino boards, including setting up and programming for automation.
2. Electronics Hub: *Soil Moisture Sensor with Arduino Uno*  
   <https://www.electronicshub.org/soil-moisture-sensor-arduino/>
3. How to make Automatic Plant Watering System using Arduino UNO and Soil Sensor || Techie Lagan <https://youtu.be/iwkE_HWU-6M?si=959wFftZ7j2job7y>