LAB MANUAL

K. R. MANGALAM UNIVERSITY

COLLEGE PROJECT REPORT

"Automatic Plant Watering System"

By:

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Course: BTech CSE(AI/ML)
Department: SOET

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CERTIFICATE

This is to certify that the project titled "Automatic Plant Watering System" has been successfully completed by Ansh , Shekehr , ritik , tejas under the guidance of Mr.SHAHJAD ASSIST.PROF, in partial fulfillment of the requirements for mini project in BTech CSE(AI/ml) from KR MANGALAM UNIVERSITY during the academic year 2024–2025.

ABSTRACT

The Automatic Plant Watering System is designed to monitor the soil moisture level and supply water automatically to plants when the moisture level falls below a specified threshold. This system utilizes sensors, microcontrollers, and simple water delivery mechanisms to automate the irrigation process. The main goal of the project is to reduce manual efforts, save water, and ensure timely watering, which helps in maintaining healthy plant growth.

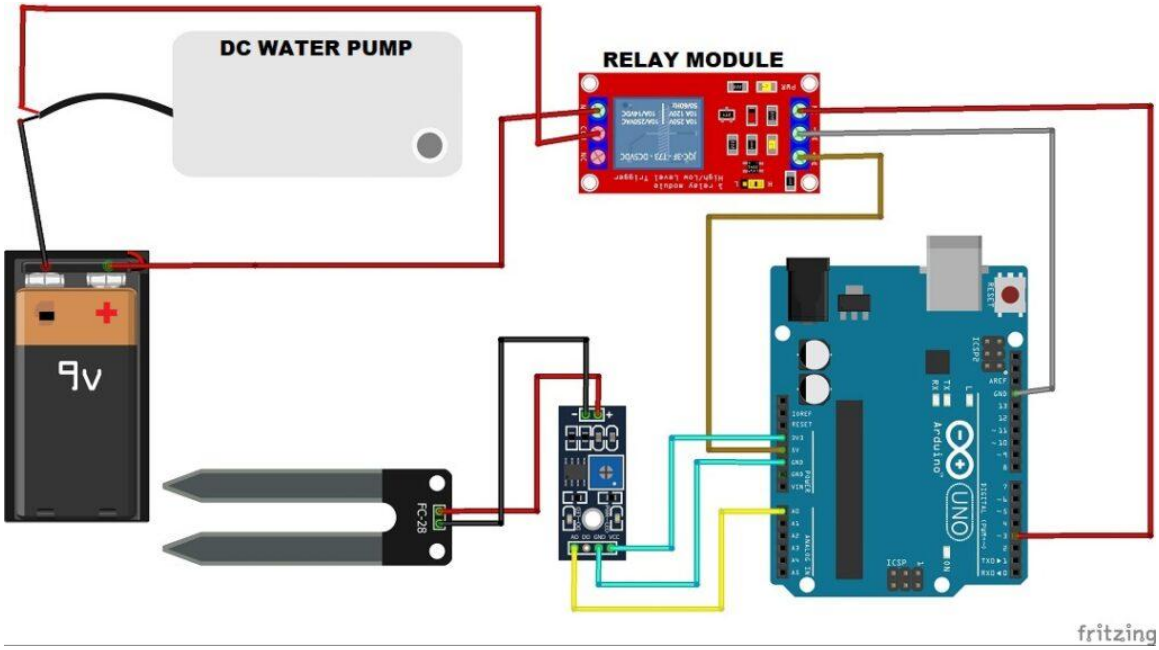
INTRODUCTION

Watering plants is a regular activity that requires time and attention. In this project, we developed an automatic plant watering system using a soil moisture sensor, Arduino microcontroller, relay module, and a water pump. The system detects the soil's moisture content and waters the plant if it is too dry.

COMPONENTS USED

- Arduino Uno – Microcontroller board
- Soil Moisture Sensor – Detects soil dryness
- Relay Module – Controls the water pump
- Water Pump – Delivers water to the plant
- Plastic Pipe – Directs water to plant roots
- Breadboard & Jumper Wires – Connections
- 12V Power Supply – Powers pump and system

CIRCUIT DIAGRAM



WORKING PRINCIPLE

The soil moisture sensor constantly monitors the water content of the soil. If the soil moisture level is below the threshold, the Arduino activates the relay. The relay turns on the pump, which waters the plant. Once the moisture level is adequate, the pump is automatically turned off.

FLOWCHART

Start
↓
Read Soil Moisture
↓
Is Soil Dry? — No → Loop back
↓ Yes
Activate Water Pump
↓
Wait for Moisture to Reach Threshold
↓
Deactivate Pump
↓
Loop back

ADVANTAGES

- Saves time and labor
- Prevents overwatering and underwatering
- Useful for busy individuals or remote plant locations
- Reduces water wastage

APPLICATIONS

- Home gardens and indoor plants
- Agricultural fields and nurseries
- Greenhouses and botanical gardens
- Offices and smart homes

LIMITATIONS

- Requires a power source or battery
- Can be affected by sensor accuracy
- Limited range unless expanded with wireless tech

FUTURE ENHANCEMENTS

- Add IoT connectivity for remote monitoring
- Use solar power for energy efficiency
- Add smartphone control via app
- Use machine learning for watering predictions

CONCLUSION

The Automatic Plant Watering System project demonstrates how embedded systems can be used to automate everyday tasks efficiently. It is an effective tool for modern gardening and has vast potential for scaling into smart agriculture applications.

REFERENCES

- Arduino.cc Documentation
- Electronicsforu.com tutorials
- Research papers on smart irrigation
- Online blogs and YouTube tutorials on plant automation