

PREMIER UNIVERSITY, CHATTOGRAM
Department of Computer Science & Engineering



A report on-

“Plant Watering System using Arduino”

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Submitted To:

Kazi Md. Abrar Yeaser

Lecturer

Department of Computer Science & Engineering

Submitted By:

Nayan Day

ID: 2104010202216

Sajia Akter

ID: 2104010202217

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Abstract

In daily operations related to farming or gardening Watering is the most important cultural practice and the most labor-intensive task. Modern watering systems could be effectively used to water plants when they need it. Adding an automated plant watering system to the garden or agricultural field will help all farmer's plants reach their fullest potential as well as conserve water. In this project, We intended to design a small-scale, smart irrigation system through an Arduino. We sought to have the fully automated system powered through an external power source. This project report is focused on the concept of automatic watering, operated through a programmed operating system. The report aimed to design an automatic watering system for plants.

Table of Contents

Chapter 1	4
Introduction	4
1.1 Introduction	4
Chapter 2	5
Design	5
2.1 List of Equipment.....	5
2.2 Circuit Diagram	5
2.2.1 Block Diagram.....	6
2.3 Flow Chart.....	6
Chapter 3	7
Result & Analysis.....	7
3.1 Result.....	7
.....	7
Figure 5: Measure soil Moisture	7
3.2.1 Testing & Analysis.....	8
Chapter 4	9
Conclusion & Future Enhancements	9
4.1 Conclusion.....	9
4.2 Future Enhancements	9
Chapter 5	10

Chapter 1

Introduction

1.1 Introduction

An automatic watering plant that works both in the rainy season and the dry season is necessary to design. The device used a microcontroller chip programmed based on the detection of agricultural soil moisture sensors. When the soil was dry, the device automatically watered the plants. Conversely, if the soil was wet, the device would not water them. It led to healthy plants because the need for water had been fulfilled all the time. Whenever we go outside for a few days, we always used to worry about our plants as they need water regularly. So here we are making an Automatic Plant Watering System using Arduino, which automatically provides water to your plants. In This Plant Watering System, the Soil Moisture Sensor checks the moisture level in the soil and if the moisture level is low then Arduino switches On a water pump to provide water to the plant. The water pump gets automatically off when the system finds enough moisture in the soil. This system is very useful in farms, gardens, homes, etc. This system is completely automated and there is no need for any human intervention. The main concept behind the project is to save time and ensure the watering of plants.

Chapter 2

Design

2.1 List of Equipment

- Arduino Uno
- 5v Relay Module
- Soil Moisture Sensor
- Water Pump
- Jumper Wires
- Plastic Tube

2.2 Circuit Diagram

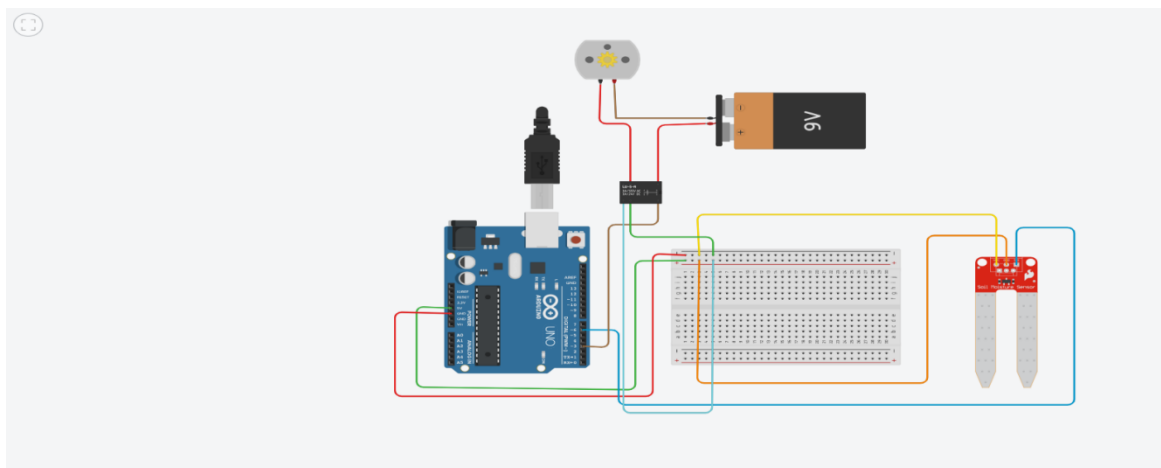


Figure 1: Tinkercad Circuit Design of plant watering system

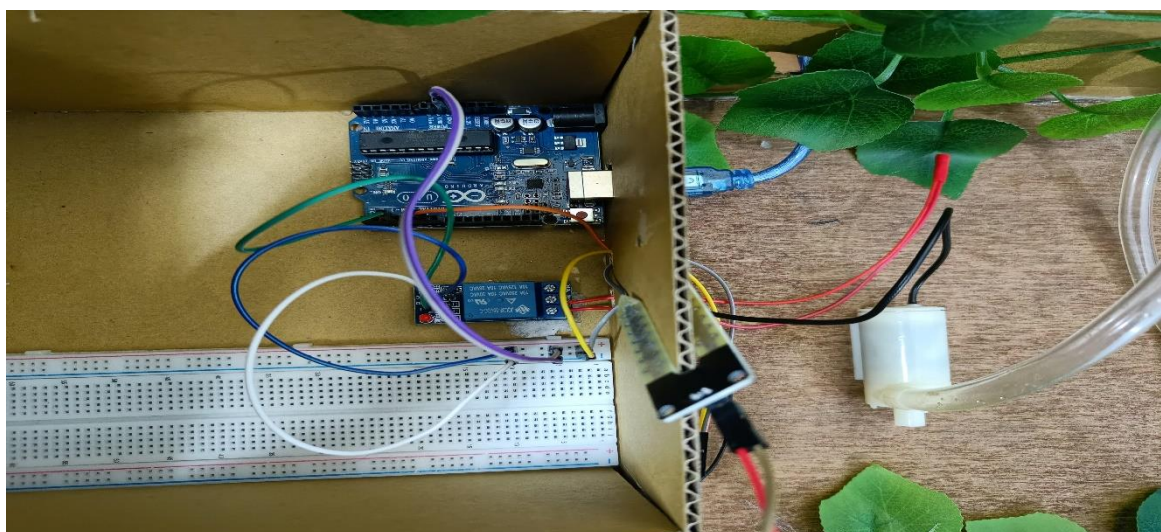


Figure 2: Circuit diagram of plant watering system

2.2.1 Block Diagram

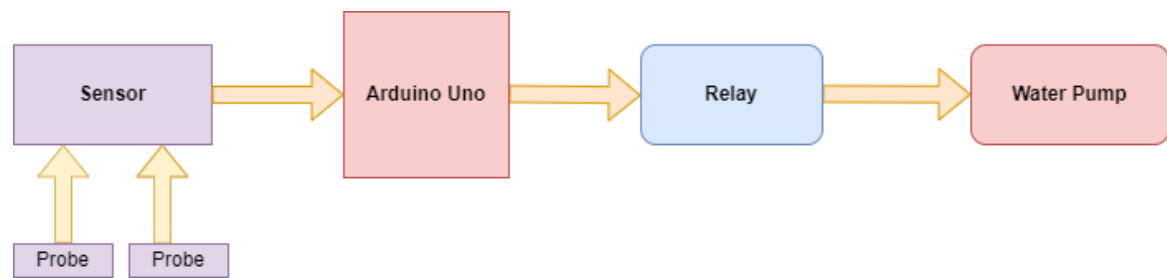


Figure 3: Block Diagram of Plant Watering System.

2.3 Flow Chart

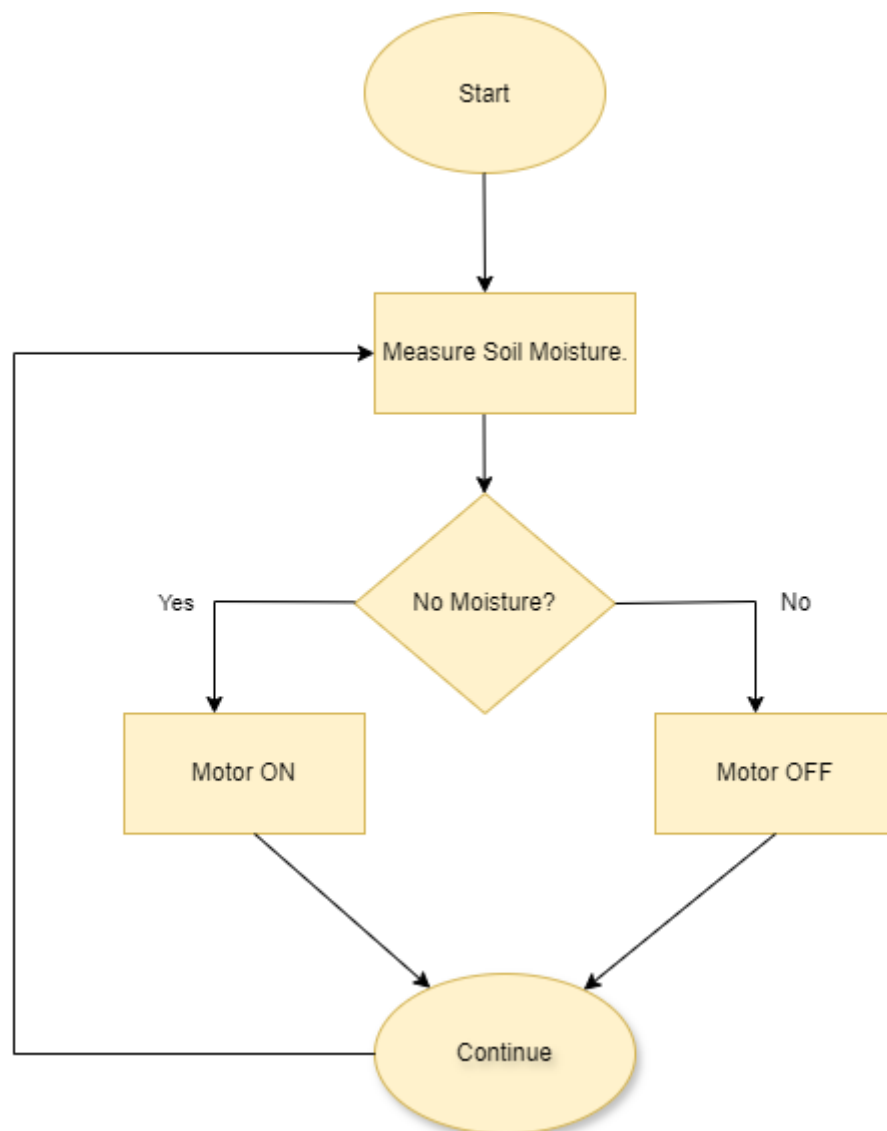


Figure 4: Flow Chart of the Process of plant watering system.

Chapter 3

Result & Analysis

3.1 Result

Figure of the results-



Figure 5: Measure soil Moisture



Figure 6: Flow of Water

3.2.1 Testing & Analysis

Test Case	Input (Water Level)	Expected Output	Actual Output	Analysis
Test 1	HIGH	Relay OFF	Relay OFF	The relay correctly turns off when water level is full (HIGH signal from the sensor).
Test 2	LOW	Relay ON	Relay ON	The relay correctly turns on when water level is low (LOW signal from the sensor).
Test 3	HIGH (for duration longer than delay)	Relay OFF	Relay OFF	The relay remains off as expected when the HIGH signal persists for longer than the delay period.
Test 4	LOW (for duration longer than delay)	Relay ON	Relay ON	The relay remains on as expected when the LOW signal persists for longer than the delay period.

Figure 7: Data Table of Test Case & Analysis

Thus the “Arduino Based Automatic Plant Watering System” has been designed and tested successfully. It has been developed by integrated features of all the hardware components used. The system has been tested to function automatically. The moisture sensors measure the moisture level of the plants. If the moisture level is found to be below the desired level, the moisture sensors sends the signal to the Arduino board which triggers the water pump to turn ON and supply the water to respective plant using the rotating platform. When the desired moisture level is reached, the water pump is turn OFF.

Chapter 4

Conclusion & Future Enhancements

4.1 Conclusion

The system has been designed and tested successfully. Integrating features of all the hardware components used have been developed in it. The presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit.

4.2 Future Enhancements

- Using the Arduino board, we can water multiple plants. By adding a few more lines of code, we can expand the system to water even more plants.
- We can also add smartphone connectivity to receive notifications or monitor the water and plant conditions.
- It can also enable the circuit to refill the tank after a few days, depending on the tank's volume.
- Use solar panels to power the system, making it eco-friendly and efficient, especially outdoors where outlets are scarce.
- Use weather predictions to change when the plants get water, avoiding too much water when it might rain.
- Add a calibration feature to adjust for different soil types and conditions, ensuring accurate watering based on soil moisture levels.

Chapter 5

References

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- <https://projecthub.arduino.cc/GadhaGod/fully-automatic-plant-watering-system-cf61be>
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