IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 8, March 2025
Impact Factor: 7.67

Soil Moisture Detector System

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Abstract: *This project aims to design and develop a Soil Moisture Detection System. This product is used to measure soil moisture level. Some of those who are involved in agriculture sector are having difficulties to monitor their soil moisture level. Not all of those who involve in the agricultural sector can afford a soil moisture sensor because it is expensive and if the sensor's component broke, it cannot be replaced. The purpose of this innovation is to help farmers and gardeners monitor their soil moisture level easily.*

Keywords: Soil Moisture Sensor, Arduino, Nickel-Cadmium Battery, 9V Battery Connector, 9V Rechargeable Battery, Switch

I. INTRODUCTION

The product is made to monitor the soil moisture level using "Soil Moisture Sensor ". Farmers can monitor their soil moisture level for their plants growth because plants growth is affected by soil moisture level. This product can help the farmers to manage their plants at the farm more systematically. The existing product in market is expensive and if there is a component broken in the product, it cannot be replace. This soil moisture sensor components can be replaced if the component is broken. Besides, the price of the components used is cheap. There are also some innovation made from the existing product.

II. LITERATURE REVIEW

A good quality soil is the one with fertility and produce a productive effect. Factors such as the moisture and the soil pH can affect its fertility. Therefore, with a moisture soil sensor, it can determine the moisture and the soil pH.
To ensure a better product with qualities, we are making improvements to this existing product. For example, the sensor without cover and not neat. Therefore, the idea is created for the sensor to be better than before and more qualities is provided such as the cover for the sensor which makes the sensor look more neat and long lasting.

III. METHODOLOGY

To build a Soil Moisture Detector System, you'll need a Arduino, Moisture Sensors, a battery connector, switch, breadboard and a rechargeable battery. The methodology involves hardware assembly, software development for Arduino and securing a components correctly, and testing for functionality.

Hardware component related information:.
Arduino Uno – The micro controller that processes data from the soil moisture sensor and controls the display

DOI: 10.48175/IJARSCT-24552

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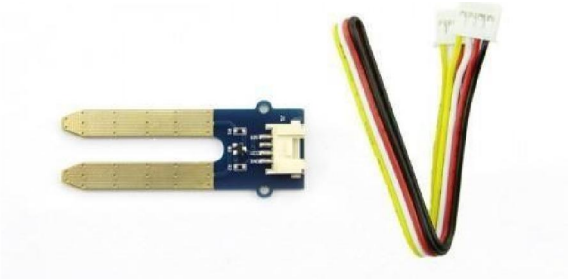
Soil Moisture Sensor – Detects the moisture level in the soil and sends an analog/digital signal to the Arduino.



9V Battery Connector – The 9V battery connector is used to operates the Arduino board. The battery connector function is to supply the current from the dry cell to the board.

9V Rechargeable Battery – To operates the Soil Moisture Sensor successfully, it requires a current supply other than connecting it to computer. Thus, the 9V battery is used as the dry cell to supply the current.

IV. WORKING PRINCIPLE

The soil moisture sensor detects moisture levels by measuring soil conductivity.
The sensor sends an analog signal to the Arduino Uno for processing.
The Arduino converts the signal into a moisture percentage.
Based on the moisture level, the soil is classified as "Dry," "Moist," or "Wet."
The LCD display shows the real-time moisture reading.
This system helps in monitoring soil conditions for better plant care

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V. RESULTS

1. Functionality: The system successfully detects soil moisture levels and displays real-time readings on an LCD. It helps users determine whether the soil is dry, moist, or wet, allowing for timely watering.
2. Real-Time Response: The sensor provides quick and accurate moisture readings, updating instantly when soil conditions change. The Arduino processes and displays the data with minimal delay.
3. Versatility: The system can be used in home gardens, agriculture, greenhouse monitoring, and automated irrigation systems. It is compatible with various soil types and can be modified for wireless data transmission.
4. Discussion: This project demonstrates the importance of moisture monitoring in agriculture and plant care. It can help reduce water wastage, improve crop yield, and optimize irrigation. However, external factors like temperature and soil composition may slightly affect readings.
5. Future Work: The system can be improved by adding wireless connectivity (WiFi/Bluetooth) for remote monitoring, integrating an automated irrigation system, using machine learning for better moisture prediction, and incorporating solar power for sustainable operation.

VI. CONCLUSION

1) The tool has significant benefits in agriculture, especially for those aiming to maintain soil fertility and crop health.
2) Many crops fail to thrive due to soil conditions, making this tool beneficial for cultivation.
3) The components are affordably priced, making them accessible for gardeners who cannot invest in a new soil moisture tool.
4) A study found that 20 respondents agreed on replacing components due to ease of installation, while 10 respondents disagreed, citing time constraints for searching and waiting for delivery.

VII. ACKNOWLEDGMENT

We would like to express our sincere gratitude to Vishweshwarayya Abhiyantriki Padvika Mahavidyalaya, Almala, for providing us with the necessary resources and guidance to successfully complete this research on "SOIL MOISTURE DETECTOR SYSTEM"
We extend our heartfelt appreciation to our mentor, Prof. Sugre D. D., for his continuous support, valuable insights, and expert advice throughout the development of this project. His encouragement and constructive feedback played a crucial role in shaping our research.
We are also grateful to our peers and faculty members for their valuable discussions and suggestions, which contributed to the improvement of our project.
Finally, we extend our special thanks to our families and friends for their unwavering support and motivation during the research and development process.
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