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 Sensor

Prof. Sugre D. D.[1], Mr. Pritam R Shinde[2], Mr. Onkar P Kumbhar[3]
Professor, Department of Computer Engineering[1]
Students, Department of Computer Engineering[2,3]
Vishweshwarayya Abhiyantriki Padvika Mahavidyalaya, Almala, India

Abstract: *The moisture of the soil plays an essential role in the irrigation field as well as in gardens for plants. As nutrients in the soil provide the food to the plants for their growth. Supplying water to the plants is also essential to change the temperature of the plants. The temperature of the plant can be changed with water using the method like transpiration. And plant root systems are also developed better when rising within moist soil.*

Keywords: irrigation management, soil moisture ,capacitive sensor, water efficiency

I. INTRODUCTION

A soil moisture sensor is a device that measures the amount of water in the soil, commonly used in agriculture, horticulture, and environmental science to optimize irrigation and monitor soil conditions. These sensors measure the volumetric water content not directly with the help of some other rules of soil like dielectric constant, electrical resistance, otherwise interaction with neutrons, and replacement of the moisture content.

II. LITERATURE REVIEW

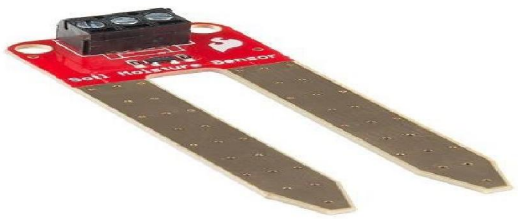
Existing Technologies:

- Review of recent innovations in soil moisture sensing technology, such as wireless sensors, integrated sensor networks, and sensor fusion.
- Development of low-cost, low-power sensors for broader deployment in agriculture and environmental monitoring.
- Review of calibration methods and challenges in sensor accuracy.

II. METHODOLOGY

The methodologies used in soil moisture sensors involve different techniques and approaches for measuring soil moisture content accurately. These methodologies are typically based on various physical principles, and the choice of method depends on factors like the required precision, environmental conditions, and specific application (e.g., agriculture, environmental monitoring).

Hardware component related in
Soil moisturiser sensor:



DOI: 10.48175/IJARSCT-24531

ISSN 2581-9429 IJARSCT

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

Arduino UNO:

Wires:

Working principle:

VCC pin is used for power
AO pin is an analog output
DO pin is a digital output
GND pin is a ground
This module also include a potentiometer that will fix the threshold value amd the value can be evaluated by the comparator-LM393

III. RESULTS

Dry Soil: A low reading (e.g., 0-30%) indicates that the soil is dry and needs watering.
Moderate Soil Moisture: A medium reading (e.g., 30-60%) means the soil is sufficiently moist but need immediate watering.
Wet Soil: A high reading (e.g., 60-100%) suggests that the soil is wet, and watering may not be necessary could be detrimental

IV. CONCLUSION

1. Prevent Over-Watering or Under-Watering: By monitoring soil moisture levels, you can avoid both over-watering, which can damage plants and waste water, and under-watering, which can stress or kill plants.
2. Improve Water Efficiency: It aids in optimizing water usage, promoting more sustainable farming or gardening practices, and conserving water resources.
3. Promote Healthy Plant Growth: Consistently maintaining optimal soil moisture levels supports better root development and healthier plants.
4. Cost Savings: Efficient watering reduces the cost associated with water usage and potential plant replacement.

V. 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 SENSOR."
We extend our heartfelt appreciation to our mentor, Prof.Sugre D.D, for her continuous support, valuable insights, and expert advice throughout the development of this project. Her encouragement and constructive feedback played a crucial role in shaping our research.

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

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.

REFERENCES

[1]. Soil Moisture Measurement for Irrigation Scheduling" by D. Hillel. This book offers insights into various methods for measuring soil moisture and the application of soil moisture sensors in agriculture.
[2]. A Review of Soil Moisture Sensing Technologies for Smart Agriculture" published in Sensors Journal. This paper reviews different types of soil moisture sensors and their applications.
[3]. ISO 13300-1:2009: This standard provides guidelines for measuring soil moisture in various contexts, including agricultural and environmental monitoring.
[4]. International Society for Soil Science (ISSS) provides various papers and standards related to soil moisture measurement techniques and sensor applications.
[5]. Adafruit: A popular resource for electronics and sensors, they offer a variety of soil moisture sensor kits with detailed documentation and guides. Nhttps://www.adafruit.com
[6]. Vegetronix: A manufacturer of soil moisture sensors for agriculture, with information on how they work and where to use them. https://www.vegetronix.com
[7]. Davis Instruments: Provides information about soil moisture sensors used in environmental monitoring and farming. https://www.davisinstruments.com