



Abstract

In agriculture, efficient water management is crucial for optimal crop growth and resource conservation. Traditional irrigation methods often result in either overwatering or underwatering, leading to reduced crop yields and unnecessary water wastage. To address these challenges, a smart irrigation system utilizing an Arduino microcontroller, relay module, water pump motor, and soil moisture sensor is used. It operates on soil moisture data collected by the moisture sensor embedded in the soil. When the soil moisture level falls below a predefined threshold, indicating the need for irrigation.

Introduction

Water scarcity and environmental sustainability are pressing concerns, efficient water management practices are crucial, especially in the agricultural sector in present days. The project aims to address this challenge by leveraging advanced technologies to optimize the irrigation process and promote water conservation.

By integrating sensors and weather data, this system can make intelligent decisions about when and how much water to provide to plants, ensuring optimal growth while minimizing water waste.

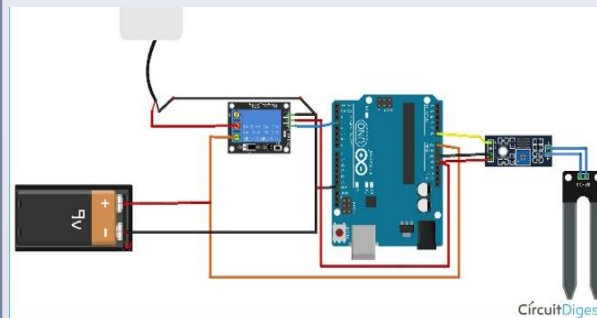
Objective

1. To optimize water consumption
2. To maintain the soil moisture level

Keywords

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|-------------------|--------------|
| 1.Arduino | 2.Relay |
| 3.Moisture Sensor | 4.Automation |

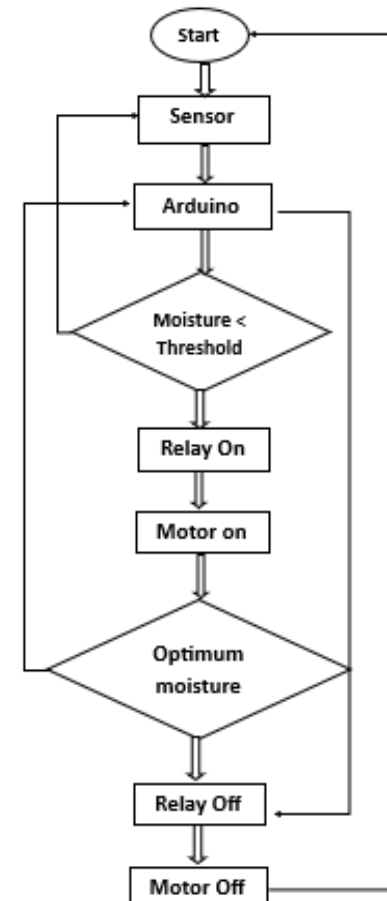
Block Diagram



Proposed Methodology

This system operates based on a logic that: a moisture sensor detects soil moisture levels, triggering the water pump through a microcontroller when moisture is low. After watering, the soil retains moisture, automatically halting the pump. First, connect the relay to the Arduino as per the circuit diagram, then link the soil moisture sensor and pump. Upload the code, create a database, and place the sensor near plant roots for accuracy. Submerge the pump in water. Adjust moisture percentage thresholds as per plant needs. With these steps, your automatic irrigation system is set to nurture your plants in your absence.

Flow Chart



Results



Conclusions

Smart irrigation systems promise water savings, minimal resource waste enhanced crop yields, and remote monitoring. Yet, upfront costs, technical issues, and specialized expertise pose challenges. Nevertheless, they hold great potential for revolutionizing agriculture and fostering sustainability. With the integration of moisture sensors, data analytics and automation it ensures improved farm productivity.

References

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