



SIDDAGANGA INCUBATION FOUNDATION

HACKCULT- 2024

Water-Efficient Irrigation Management

Team Name: "NIGHTWOLF"

Domain : IOT AND EMBEDDED SYSTEMS

Team Members Details

Team Member 1:

- Name: Ravindra Prasad M S
- USN: 1SI22ET044

Team Member 2:

- Name: Jai Vikram S
- USN: 1SI22ET011

Team Member 3:

- Name: AFNAN AHMED KHAN
- USN: 1SI22ET002

Team Member 4:

- Name: SHIVA PRASAD J
- USN: 1SI22ET026

Contents for the Abstract:

1. Introduction:

Water-Efficient Irrigation Management

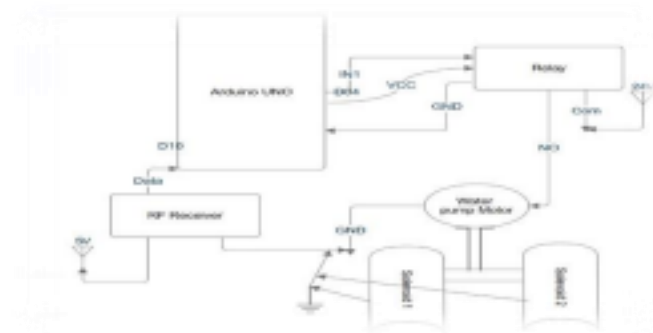
This project presents an intelligent irrigation management system that optimizes water usage by monitoring soil moisture levels. The system consists of 2 Arduino-based transmitter nodes, each integrated with a moisture sensor, and a central receiver node connected to a motor and 2 solenoid valves. The transmitters wirelessly transmit soil moisture data to the receiver, which activates the motor and solenoid valves based on predefined threshold values. When soil moisture levels fall below the threshold, the system irrigates the land; otherwise, it remains off. The

24V motor and solenoid valves are controlled using relays, ensuring efficient water distribution to 2 separate lands. This automated system reduces water waste, conserves energy, and promotes sustainable agriculture practices.

2. Problem Statement and Solution Overview::



4. Block Diagram (System Architecture):



5. Technology Stack / Tools Used:

- Arduino uno microcontroller
- RF 433Mhz module

6. Key Features:

1. Monitor soil moisture levels in real-time.
2. Automate irrigation based on threshold values.
3. Optimize water usage and reduce waste.
4. Promote energy efficiency and sustainable agriculture practices.

7. Innovation Potential & Future Scope

- Advancing Smart Agriculture
- Enhanced Sensor Networks
- Real-Time Data Monitoring

- Sustainability and Resource Management
- Sustainable Agricultural Practice
- Enhanced Resource Management

8. Conclusion:

Water-efficient irrigation management using RF433MHz technology offers a cost effective, reliable, and scalable solution for optimizing water usage in agriculture. Its long-range communication, low power consumption, and compatibility with IoT systems make it particularly suited for both small and large-scale farming applications. By enabling real-time monitoring and automation, it reduces water wastage, supports sustainable farming practices, and helps address water scarcity challenges.

Although challenges like interference and security must be addressed, the technology's integration with AI, renewable energy, and hybrid communication systems presents immense potential for future advancements in smart agriculture and resource conservation.