

**AgroAI: Empowering Farmers
through Smart Irrigation, Crop
Recommendations, and Market
Access using AI, IoT and Edge
Computing**



Problem Statement

Water Wastage and Suboptimal Growth

- Existing irrigation systems lack the precision to deliver water tailored to the needs of crops, leading to water wastage and suboptimal plant growth.

Weather Uncertainties:

- Unpredictable weather patterns impact farming outcomes, causing yield variations and economic instability for farmers.

Lack of Data-Driven Crop Decisions:

- Farmers lack access to technology that provides insights into optimal crop choices based on soil nutrient data and weather conditions.

Absence of Automated Regulation

- The core issue is the absence of an automated mechanism to regulate water release based on real-time soil moisture availability.

Key Challenges

Dynamic Water Demand

Developing a system that can accurately predict and respond to fluctuating water demand in irrigation networks.

Real-time Data Integration

Integrating real-time data from various sources to inform decision-making and optimize water release.

Algorithm Precision

Creating algorithms that can accurately calculate and adjust water release rates based on demand and network conditions.

Valve Control Mechanism

Designing a reliable and efficient valve control mechanism that can regulate water release in a precise and timely manner.

Adaptability

Developing a system that can adapt to different irrigation network configurations and conditions.

User-friendly Interface

Creating an intuitive and easy-to-use interface for farmers and irrigation system operators to interact with the automatic regulation system.

Economic Viability

Ensuring that the cost of implementing and maintaining the automatic regulation system is economically viable for farmers and irrigation system operators.

Solution Overview



Leveraging Artificial Intelligence

The solution involves leveraging artificial intelligence (AI) to enable the automatic regulation of valves for water release in piped and micro irrigation networks.

AI-Powered Soil Moisture Monitoring

AI-powered soil moisture monitoring allows for accurate and real-time measurement of soil moisture levels, ensuring precise irrigation.



Optimizing Resource Utilization

By bridging the gap between water supply and crop demand, the solution optimizes resource utilization, ensuring efficient water usage.

Minimizing Environmental Impact

The automatic regulation of valves based on AI-powered decision-making processes minimizes environmental impact by reducing water wastage and ensuring sustainable irrigation

Analysis and Crop Selection

Soil Analysis

The soil analysis process involves analyzing the soil type and its properties to determine its suitability for different crops. This includes testing the soil's pH level, nutrient content, and moisture retention capacity.

Crop Selection

Using an AI model, we can predict the most suitable crop to grow in the farm based on the soil analysis. This helps in tailoring the irrigation system to the specific crop's water requirements and optimizing water usage.



Edge Computing and IoT System



Efficient Water Management

The edge computing and IoT system allows for automatic regulation of valves for water release in piped and micro irrigation networks. It utilizes artificial intelligence to check the moisture in the soil and start irrigation once it goes below the threshold.



Real-time Data Collection & Processing

The system is deployed at the edge, enabling real-time data collection and processing. This ensures that the irrigation process is efficient and responsive to the current conditions of the soil.

Marketplace for Crops

Efficient Distribution

The marketplace for crops provides a platform for farmers to buy and sell their crops, facilitating efficient distribution and maximizing economic viability.

