Technoholics

Domain: Agriculture, FoodTech & Rural Development
PSID: SIH1293
Problem Statement Title: Automatic regulation of valves for release of water based upon soil moisture availability in the root zone of the crop, using artificial intelligence, in a piped and micro irrigation network of irrigation system.
Organization Name: Ministry of Jal Shakti
Theme Name: Agriculture, FoodTech and Rural Development

Solution to that given problem

Our project introduces an AI-powered Smart Irrigation System poised to revolutionize modern agriculture. Implementing an AI-driven irrigation system with capacitive soil moisture sensors, microcontroller, solenoid valves, and Wi-Fi module ensures precise water delivery. Weather sensors offer contextual data. Reliable power sources and safety components guarantee uninterrupted operation, while data storage and analysis provide valuable insights for efficient crop cultivation.

Process Flow Chart

Data Collection and AI Training
Collect historical data on soil types, crop types, water requirements, and weather conditions. Set up a database to store and manage the data. Train the AI model using historical data to predict irrigation schedules.

Real-time Monitoring and Data Collection
Install soil moisture sensors, weather stations, and water valves in the field. Continuously monitor soil moisture and collect real-time weather data.

AI Decision-Making and Control
Use AI model to analyze real-time data and predict optimal irrigation schedules. Develop control logic to translate AI recommendations into commands for water valves.

Remote Monitoring and User Interaction
Create a user-friendly web or mobile app for farmers. Enable remote monitoring and control of the irrigation system.

Reporting and Continuous Improvement
Develop reporting mechanisms for system performance and sustainability metrics. Continuously update the AI model with new data to improve accuracy and efficiency.

Future scope and Optimization

Optimization :

- Integration of various sensors like Relative Humidity sensors, Temperature sensor etc..
- A decade long climatological data to optimize precise irrigation.
- Realtime monitoring through user friendly application.
- Based on real time data the project can handle fluctuations in whether condition.

Scope :

- Drought contingency though selective irrigation in critical stage.
- Self train model using monitoring data to optimize it self.
- Disease and disorder identification through advance image detection tools like Yolo v 8.
- Drone based monitoring system can be further used to optimized the project based on growth stages.