Real-time irrigation planning system

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Abstract. Irrigation is a crucial agricultural practice, directly impacting crop yield and resource utilization [1]. Traditional irrigation methods often rely on manual scheduling, leading to potential inefficiencies in water usage and potential crop stress due to under or overwatering [2, 3]. Recent advancements in agricultural technology have paved the way for the development of automated irrigation systems that leverage real-time data and software-based planning [4].

This paper presents the development and implementation of a software system designed to optimize irrigation practices for various field crops. By leveraging real-time data on soil moisture, crop type, rainfall, and temperature, it ensures the efficient utilization of water and energy resources.

The system operates by collecting soil moisture data from strategically placed sensors throughout the field and incorporating weather forecasts for the specific geographical location. This information is then processed to calculate and plan the irrigation system's schedule, aiming to minimize water consumption while maintaining optimal soil moisture levels.

Key features of the system include:

— *Real-time data integration:* The system seamlessly incorporates real-time weather forecasts and soil moisture measurements, enabling dynamic irrigation planning.

– *Crop-specific optimization:* The software is tailored to accommodate a variety of crops, allowing for customized irrigation schedules based on individual plant water requirements.

– *User-friendly interface:* The system provides an intuitive interface that facilitates easy data visualization.

– *Flexibility and adaptability:* The software can be adapted to different irrigation systems and field conditions, ensuring its applicability in diverse agricultural settings.

The development of such software has the potential to significantly enhance agricultural productivity and sustainability by reducing water wastage and optimizing irrigation practices. By providing farmers with a reliable and efficient tool for irrigation management, the software system can contribute to more resilient and environmentally friendly agricultural systems.

References

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