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Data Mining for Sustainable Potato Farming and Water Conservation in Smart Agriculture Systems

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Abstract:

Sustainable agriculture is essential for addressing global food security and environmental challenges, particularly in water-intensive crops such as potatoes. This study presents a data mining-based approach for optimizing potato farming practices and promoting water conservation within smart agriculture systems. Sensor networks integrated into agricultural fields collect real-time data on soil moisture, temperature, humidity, and crop health. Data mining techniques—including clustering, classification, and association rule mining—are applied to extract meaningful patterns that support informed decision-making in irrigation scheduling, nutrient management, and pest control. The results demonstrate how predictive analytics can identify resource-efficient farming strategies that minimize water usage while maximizing crop yield and quality. This intelligent framework contributes to the development of sustainable and precision farming systems, promoting environmental stewardship and agricultural productivity.

Keywords:

Data mining, smart agriculture, potato farming, water conservation, sustainability, precision farming.

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