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(57) Abstract :

An Integrated Smart Agriculture System Utilizing IoT and Data Analytics for Crop Monitoring is disclosed, aimed at revolutionizing agricultural practices by leveraging cutting-edge technologies to enhance crop productivity, resource management, and decision-making. The system incorporates a network of IoT-enabled sensors deployed across agricultural fields to monitor critical parameters such as soil moisture, temperature, humidity, light intensity, and nutrient levels in real time. These sensors transmit data to a centralized cloud-based platform, where advanced data analytics and machine learning algorithms process and analyze the information. The system provides actionable insights, including predictive analytics for crop yield, irrigation schedules, and pest or disease detection, enabling proactive intervention. A user-friendly interface accessible via smartphones and web applications allows farmers to monitor field conditions, receive alerts, and execute remote control operations, such as activating irrigation systems or applying fertilizers. The solution emphasizes energy efficiency by integrating solar-powered devices and employing low-power communication protocols. Additionally, it supports interoperability with third-party agricultural management tools and offers scalability to cater to farms of varying sizes.

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