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(57) Abstract :

A Sensor-Enhanced Hydroponic Farming system integrated with IoT technology revolutionizes data-driven agriculture by optimizing crop growth through precise monitoring and control. This system utilizes an array of sensors to continuously measure critical parameters such as nutrient levels, pH, temperature, humidity, and light intensity in a hydroponic environment. The collected data is transmitted in real-time to an IoT platform, enabling farmers to monitor crop conditions remotely and make informed decisions. By employing data analytics and machine learning algorithms, the system can predict optimal growth conditions, detect potential issues early, and automate adjustments to the hydroponic environment, such as nutrient delivery and lighting schedules. This approach not only enhances crop yield and quality but also reduces resource consumption by minimizing water and nutrient wastage. Furthermore, the system's scalability and adaptability make it suitable for various crops and farming scales, from small urban farms to large commercial operations. By integrating cutting-edge technology with traditional farming practices, Sensor-Enhanced Hydroponic Farming with IoT fosters sustainable agriculture, ensuring consistent production and resilience in the face of changing environmental conditions.

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