Chapter 7
IoT-Based Smart Agriculture

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ABSTRACT

The chapter explores how IoT technology can transform the agricultural industry. IoT devices, sensors, and data analytics in agriculture provide a disruptive answer by enabling the monitoring, automation, and optimization of many elements of agricultural operations. The chapter highlights the difficulties that conventional agricultural practices confront, including water scarcity, soil deterioration, and insect control. It emphasizes the demand for creative solutions to solve these problems. The chapter's main emphasis is on how IoT technology might transform agriculture. It explores the numerous ways that IoT is used in smart agriculture, such as precision farming, monitoring livestock, smart irrigation systems, and crop health monitoring. Farmers can make well-informed decisions thanks to IoT devices like sensors, actuators, and drones that enable real-time data collection and analysis. IoT-based smart agriculture has higher yields, better resource utilization, a smaller environmental footprint, and more profitability.

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1. INTRODUCTION: SMART AGRICULTURE

A farming management idea called "smart farming" aims to improve both the quantity and quality of agricultural products. Today's farmers have access to technology like GPS, soil scanning, data management, and the Internet of Things. The purpose of smart agriculture research is to provide a solid foundation for a farm management decision-support system. Population growth, climate change, and labor are all challenges that smart farming believes must be addressed. From planting and watering crops to crop health and harvesting, smart farming has received a lot of technological attention. A system is created in IOT-based smart agriculture to automate the irrigation system while monitoring the agricultural field with the aid of sensors (light, humidity, temperature, soil moisture, etc.). In the context of agriculture, IOT (Internet of Things) refers to the use of sensors, cameras, and other gadgets to convert every aspect and action related to farming into data. The negative environmental externalities of contemporary agriculture will be greatly reduced if smart agriculture is allowed to grow and develop beyond what it is today. Smart cities collect and analyze data using Internet of Things (IoT) devices such as connected sensors, lights, and meters. The cities utilize this information to enhance their infrastructure, public services, and more. Farmers find it challenging to comprehend technical jargon and how to use technology, but they also find it to be a cost-effective solution (Srivastava et al., 2020). Here Figure 1 depicts that there are numerous fields where Smart Agriculture is helping us to improve both the quantity and quality of agricultural products.

Figure 1. Numerous fields where smart agriculture helps us