Chapter 4
Role of Secure Image Transmission in Agricultural Health Monitoring

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ABSTRACT

Digital technology adoption for health monitoring has become essential in the quickly changing agricultural landscape. In order to protect sensitive data that is gathered from a variety of sources, including drones, sensors, and satellites, this chapter examines the crucial role that secure image transmission plays in agricultural health monitoring. In order to preserve data integrity and guarantee that agricultural stakeholders receive timely and accurate information for efficient decision-making,

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secure transmission techniques such as encryption and end-to-end protocols are crucial. This chapter outlines the many advantages of secure image transmission, such as improved data integrity, prompt decision-making, heightened stakeholder trust, and defense against cyberattacks. Strong security measures are also required for compliance with data privacy regulations and efficient resource management as agricultural data becomes more digitalized.

INTRODUCTION

Real-time data collection and monitoring are essential in today's agriculture to maximize crop yields and farm operations. In order for farmers, agronomists, and other agricultural stakeholders to gather visual data from a variety of sources, including drones, satellites, and sensors, image transmission (Pandey, B. K., & Pandey, D., 2025) is essential. In the age of precision agriculture, the ability to precisely and effectively manage crops, livestock, and environmental conditions is made possible by these images.Real-time monitoring of crops and fields is one of the main applications of image transmission in agriculture. Drones with high-resolution cameras and sensors are able to take precise pictures of the farmland, which can be used to learn important information about possible pest infestations, crop health, and soil moisture levels. On the other hand, a larger-scale perspective provided by satellite imagery makes it possible to monitor a large area of agricultural land. Farmers can identify trends, monitor different stages of growth, and evaluate the effects of weather-related events like droughts and floods with the use of these photos. Farmers are better able to react proactively to new issues because they have instant access to visual data, which facilitates faster and more informed decision-making.

The use of image transmission in precision agricultureis a significant additional benefit. In precision agriculture, inputs like pesticides, fertilizers, and water are applied selectively to different parts of a field according to their individual needs (Khadka, M. et al., 2025). Farmers can identify stress areas in their crops, such as nutrient deficiencies or pest infestations, by analysing the transmitted images and applying treatments only as needed. Because it avoids using excessive amounts of chemicals and water, this minimizes waste, lowers production costs, and has a minimal negative impact on the environment. By guaranteeing that resources are used effectively, precision agriculture raises overall productivity and produces healthier and higher-yielding crops.Image transmission is useful for evaluating livestock health in addition to crop monitoring. Farmers can identify early signs of illness or injury by using real-time images and videos of animals captured by livestock monitoring systems fitted with cameras and sensors. Artificial intelligence (AI) (Satheesh, N. et al., 2025) can be integrated with these systems to analyze the images and notify

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www.irma-international.org/chapter/generative-ai-enabled-iot-applications-for-smart-cities/343452