

Chapter 2

AI–Based Solutions for Future Trends in IoT and Remote Sensing Integration for Precision Agriculture

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DOI: 10.4018/979-8-3693-7994-3.ch002

ABSTRACT

This chapter focuses on the use of AI, IoT, and remote sensing technologies in precision agriculture. This explores how the technologies can be used in collaboration to benefit the improvement of yield in agriculture, efficiency in resource use and sustainable utilization of resources. Among them, current practices consist on crop health monitoring, yield prediction, precise irrigation and correct soil management are presented where they are currently being used and the latest applied technologies are showed in the following chapter. Also, it defines the difficulties associated with these solutions: their cost, data compatibility issues, and the necessity of qualified staff. The summarization of the potential of AI and IoT as well as the remote sensing in the farming industry is also provided as well as a focus on the future trends like edge computing and 5G connectivity. It outlines the matters that should be considered by the policy makers and the need for collaboration among various fields as a way of enhancing the uptake of these technologies.

INTRODUCTION

Overview of Precision Agriculture

This chapter focuses on the use of artificial intelligence, Internet of things, and remote sensing in precision agriculture. This explores how the technologies can be used in collaboration to benefit the improvement of yield in agriculture, efficiency in resource use and sustainable utilization of resources (Victor, N., et al., 2024). In this chapter, the author briefly covers some current areas of employments of AI in crop health management, yield prediction, precision irrigation, and soil health assessment including some selected AI novel technologies case studies (Ye et al., 2013). Also, it defines the difficulties associated with these solutions: their cost, data compatibility issues, and the necessity of qualified staff. The summarization of the potential of AI and IoT as well as the remote sensing in the farming industry is also provided as well as a focus on the future trends like edge computing and 5G connectivity (Sarjerao, J. S., and Sudhagar, G., 2024). It outlines the matters that should be considered by the policy makers and the need for collaboration among various fields as a way of enhancing the uptake of these technologies.

Precision agriculture revolves around the need of farmers to learn about the variability of production within the field. Some of them are; Soil fertility, availability of water, existence of pest, diseases and other natural factors such as weather conditions (Pincheira et al., 2020). Farmers are then able to acquire data from these sources; sensors, satellite imagery, other remote sensing technologies which help

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