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Artificial Intelligence and Internet of Things in Smart Farming

This book provides a broad overview of the areas of artificial intelligence (AI) that can be used for smart farming applications, through either successful engineering or ground-breaking research. Among them, the highlighted tactics are soil management, water management, crop management, livestock management, harvesting, and the integration of Internet of Things (IoT) in smart farming. Artificial Intelligence and Internet of Things in Smart Farming explores different types of smart framing systems for achieving sustainability goals in the real environment. The authors discuss the benefits of smart harvesting systems over traditional harvesting methods, including decreased labor requirements, increased crop yields, increased probabilities of successful harvests, enhanced visibility into crop health, and lower overall harvest and production costs. It explains and describes big data in terms of its potential five dimensions—volume, velocity, variety, veracity, and valuation—within the framework of smart farming. The authors also discuss the recent IoT technologies, such as fifth-generation networks, blockchain, and digital twining, to improve the sustainability and productivity of smart farming systems. The book identifies numerous issues that call for conceptual innovation and has the potential to progress machine learning (ML), resulting in significant impacts. As an illustration, the authors point out how smart farming offers an intriguing field for interpretable ML. The book then delves into the function of AI techniques, such as AI in accelerating the development of nano-enabled agriculture, thereby facilitating safe-by-design nanomaterials for various consumer products and medical applications. This book is for undergraduate students, graduate students, researchers, and AI engineers who pursue a strong understanding of the practical methods of machine learning in the agriculture domain. Practitioners and stakeholders would be able to follow this book to understand the potential of ML in their farming projects and agricultural solutions. Features: • Explores different types of smart framing systems for achieving sustainability goals in the real environment • Explores ML-based analytics such as generative adversarial networks (GAN), autoencoders, computational imaging, and quantum computing • Examines the development of intelligent machines to provide solutions to real-world problems, emphasizing smart farming applications, which are not modeled or are extremely difficult to model mathematically • Emphasizes methods for better managing crops, soils, water, and livestock, urging investors and businesspeople to occupy the existing vacant market area • Discusses AI-empowered Nanotechnology for smart farming

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