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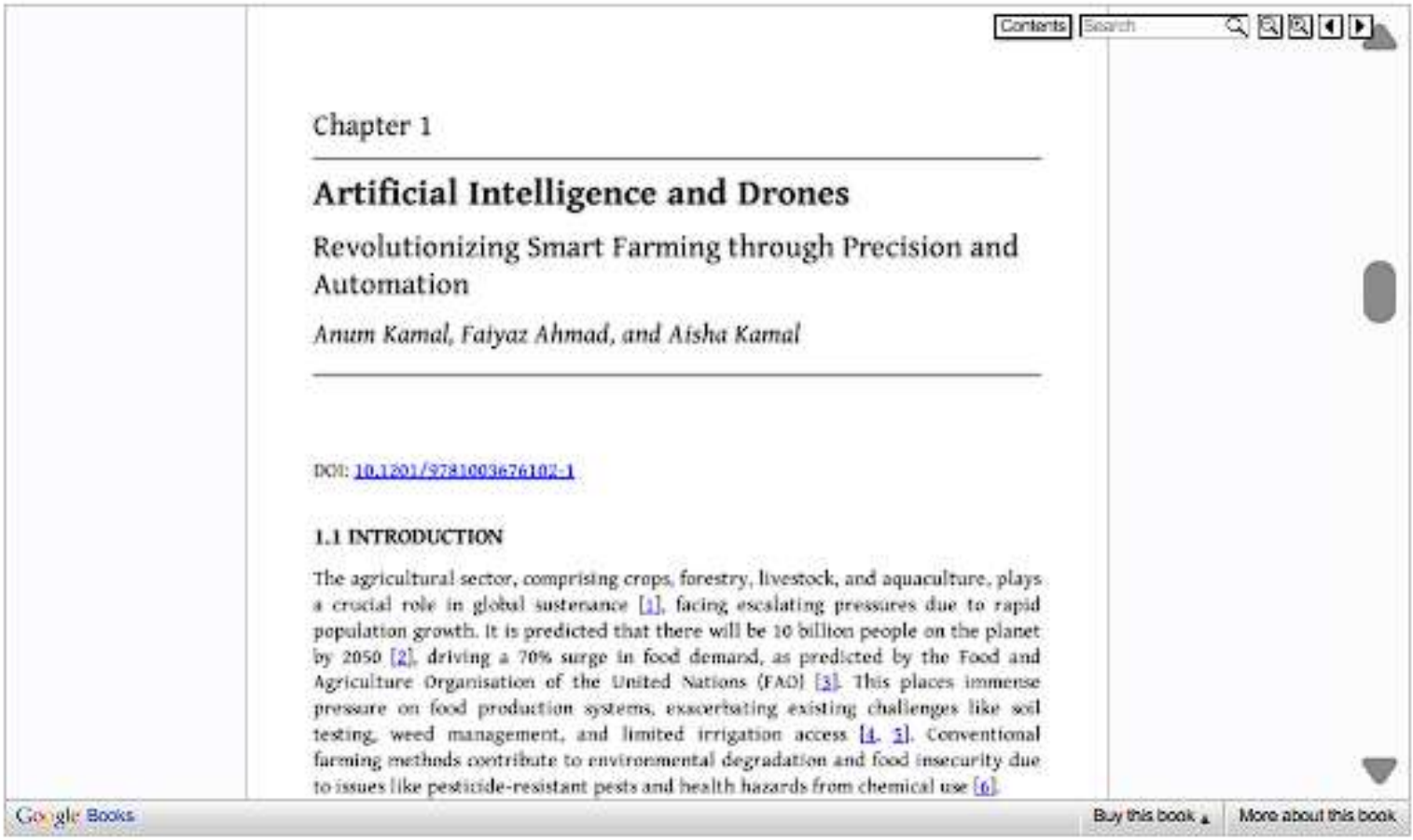
ARTIFICIAL INTELLIGENCE AND INTERNET OF THINGS FOR SMART AGRICULTURE



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Chapter 1

Artificial Intelligence and Drones

Revolutionizing Smart Farming through Precision and Automation

Anum Kamal, Faiyaz Ahmad, and Aisha Kamal

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1.1 INTRODUCTION

The agricultural sector, comprising crops, forestry, livestock, and aquaculture, plays a crucial role in global sustenance [1], facing escalating pressures due to rapid population growth. It is predicted that there will be 10 billion people on the planet by 2050 [2], driving a 70% surge in food demand, as predicted by the Food and Agriculture Organisation of the United Nations (FAO) [3]. This places immense pressure on food production systems, exacerbating existing challenges like soil testing, weed management, and limited irrigation access [4, 5]. Conventional farming methods contribute to environmental degradation and food insecurity due to issues like pesticide-resistant pests and health hazards from chemical use [6].

Chapter

Artificial Intelligence and Drones

Revolutionizing Smart Farming through Precision and Automation

By Anum Kamal, Faiyaz Ahmad, Aisha Kamal

Book Artificial Intelligence and Internet of Things for Smart Agriculture

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ABSTRACT

As the global population continues to grow, ensuring food security and sustainable agricultural practices becomes increasingly vital. In the fields of precision agriculture and smart farming, emerging technologies like Artificial Intelligence (AI), the Internet of Things (IoT), and cloud computing have enormous potential. These technological breakthroughs facilitate real-time data collection, including the acquisition of high-resolution crop imagery via Unmanned Aerial Vehicles (UAVs). Harnessing these innovations has the potential to reshape agriculture profoundly, ushering in swifter decision-making processes, cost reductions, and heightened yields. This transformative advancement aligns seamlessly with the principles of precision agriculture, optimizing practices in terms of appropriate locations, timings, and quantities. This chapter aims to explore the transformative role of AI and drones in the field of smart farming. It will provide an in-depth analysis of how these technologies have revolutionized farming practices, enhanced efficiency, and improved crop yields. It will highlight the benefits of using AI and drones, such as early disease detection, optimized resource management, reduced environmental impact, and increased profitability. Additionally, the chapter will address the challenges and future prospects of integrating AI and drone technologies into smart farming systems.

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