



Chapter 14

Energy Solutions Based on Artificial Intelligence: Methods and Challenges

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ABSTRACT

Artificial intelligence is revolutionizing energy by optimizing production, distribution, and consumption. It predicts demand, improves network management, integrates renewable energy sources, and increases efficiency and reliability. AI-controlled systems adjust consumption according to demand and environmental factors, optimizing energy use. Preventive maintenance reduces downtime and improves infrastructure reliability. Artificial intelligence algorithms predict renewable energy production, manage supply and demand, and optimize energy storage in line with sustainable development. Artificial intelligence is transforming energy trading through data analysis and peer-to-peer transactions. Artificial intelligence, blockchain, smart contracts, and the internet of things will optimize production, consumption, and transactions, promoting energy independence and resilience.

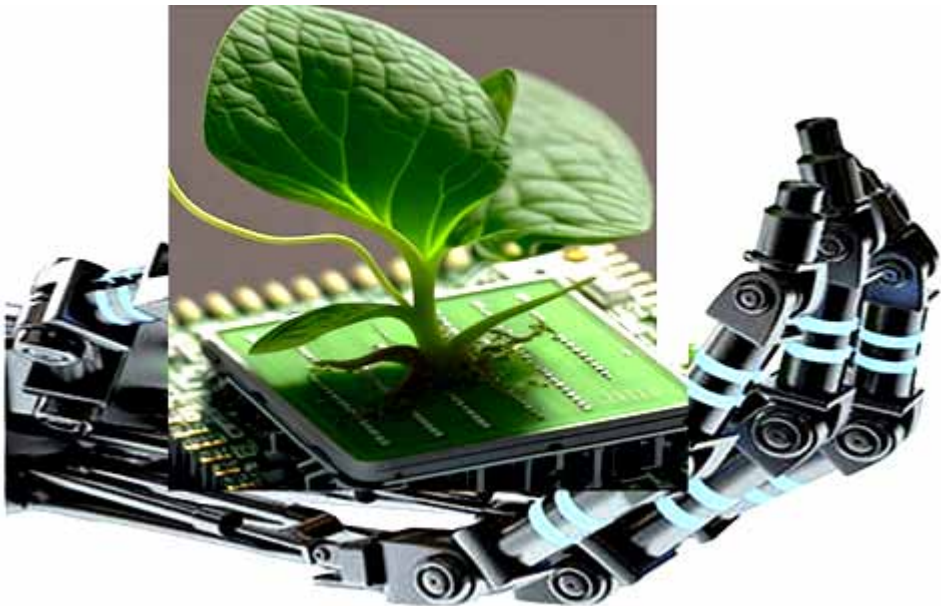
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INTRODUCTION

In recent decades, the world has witnessed a growing recognition of the urgent need for environmental sustainability (Smith, 2021). The rapid industrialization, urbanization, and population growth of the past century have placed tremendous strain on our planet's natural resources and ecosystems. In the quest for environmental sustainability, ethical considerations play a pivotal role in shaping our approach to addressing complex environmental challenges. Environmental sustainability includes the responsible management of natural resources (Hassan et al., 2023), the conservation of biological diversity and the mitigation of the effects of climate change. However, achieving sustainability requires not only technical solutions but also a deep understanding of the ethical dimensions associated with our actions and decisions. Fig. 1 simply representing the imagination of AI sustainable environment.

Ethics and environmental sustainability are intertwined because our actions have profound implications for the well-being of ecosystems, future generations, and the planet as a whole. Ethical considerations guide us in making choices that balance human needs and aspirations with the protection and preservation of the natural world (Adams & Brown, 2019). It involves recognizing the intrinsic value of nature and acknowledging our responsibility to act as responsible custodians.

Figure 1. AI sustainable environment



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