How can artificial intelligence help the smart grid?

By leveraging the potential of Artificial Intelligence (AI), the Smart Grid (SG) can monitor, control, and optimize the operation of MG, promoting energy efficiency, and aiding the transition to sustainable energy solutions .

What types of AI systems are possible in the smart grid?

Two types of AI systems are possible in the smart grid: virtual AI and physical AI. Virtual AI systems include informatics that can help grid operators perform their jobs. Physical AI systems include self-aware AI systems that can optimize and control specific grid operations with or without human intervention.

What are the challenges of artificial intelligence in smart grids?

Challenges of Artificial Intelligence in Smart Grids Traditional power systems are very complex, and their analysis and control primarily depend on physical modeling and numerical calculations.

Are Al-driven smart grids achieving the SDGs?

The study concludes that AI-driven smart grids are pivotal in achieving the SDGsby providing scalable and efficient solutions for renewable energy integration, thereby fostering sustainable development and reducing environmental impacts.



Abstract: Smart grids powered by artificial intelligence have emerged as a potentially game-changing method for enhancing the dependability and durability of electricity networks. This article examines the incorporation of AI technologies into power infrastructures, with a focus on sophisticated sensing and monitoring systems, data analytics





In this paper, we present a literature review about utilizing AI in the key elements of smart grids including grid-connected vehicles, data-driven components, and the power system network. This will result in highlighting technical challenges of the integration of electric vehicles to the grid and the power network operation as well.



GridMarket has created a custom buildout of its AI data platform for Samoa to analyze all viable opportunities for distributed energy integration in partnership with the local government and utility. ??? The GridMarket Platform is providing a unified and coordinated approach to nation-wide clean energy deployment in Samoa



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Given the broad applications of AI, the rapid advancements of RESs, and the growing interest in incorporating new technologies into a grid, this review aims to present the use of various AI-based approaches for different applications in MG, particularly in the contexts of optimization, forecasting load demand and renewable energy production

This book covers the applications of various big data analytics, artificial intelligence, and machine learning technologies in smart grids for demand prediction, decision-making processes, policy, ???



This survey presents a structured review of the existing research into some common AI techniques applied to load forecasting, power grid stability assessment, faults detection, and security





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This study integrates Artificial Intelligence (AI) into smart grids to enhance their efficiency and reliability, directly supporting the United Nations Sustainable Development Goals (SDGs), particularly SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 11 (Sustainable Cities and Communities).



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The papers are contributing to challenges and opportunities from increasing penetration of renewables, digitalization, hybrid operation of AC and DC grids, and aging infrastructure as providing AI is one of the great solutions of these.





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