The Role of Artificial Intelligence and Cybersecurity in Energy Management and Optimization

Motasem AbuDawas
Irbid National University, Irbid, Jordan

Abstract

Artificial Intelligence (AI) is revolutionizing the energy sector by enhancing efficiency, optimizing energy consumption, and integrating renewable energy sources into power grids. AI-driven technologies such as machine learning, deep learning, and predictive analytics help in demand forecasting, grid stability, and energy storage management. However, as AI integration in energy systems grows, cybersecurity threats also increase, necessitating robust protective measures. This research explores how AI is transforming energy production, distribution, and consumption, while also highlighting the cybersecurity challenges and solutions that ensure safe and resilient energy infrastructure. The study examines AI's impact on smart grids, industrial energy usage, and household applications, emphasizing its role in reducing carbon emissions, enhancing energy security, and mitigating cyber threats.