ISSN 2535-1451

Advanced Machine Learning for Renewable Energy Optimization in Smart City Network Infrastructures

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Abstract:

The integration of renewable energy sources into smart city infrastructures presents significant challenges, including the need for efficient energy management, grid optimization, and balancing supply with demand. This research explores the application of advanced machine learning techniques to optimize renewable energy utilization in smart city network infrastructures. By utilizing machine learning algorithms such as deep learning, reinforcement learning, and ensemble methods, the study develops predictive models that analyze energy consumption patterns, weather conditions, and renewable energy generation forecasts. These models help optimize energy distribution, storage, and grid operation, ensuring a reliable and sustainable energy supply. The research focuses on enhancing the integration of solar, wind, and other renewable energy sources into smart city grids, reducing energy waste, and minimizing costs. The findings demonstrate the effectiveness of advanced machine learning models in achieving optimal energy efficiency, enhancing grid stability, and contributing to the overall sustainability goals of smart cities.

Keywords:

Machine learning, renewable energy optimization, smart cities, grid management, energy efficiency, sustainability.

REQUEST FOR FULL TEXT

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