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Renewable Energy Efficiency Optimization Through IoT-Based Quantum Computing and Neural Network Models

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Abstract:

Maximizing the efficiency of renewable energy systems is essential for achieving sustainable energy goals in smart environments. This study explores a novel integration of Internet of Things (IoT) frameworks with quantum computing and neural network models to optimize renewable energy efficiency. By collecting real-time environmental and operational data via IoT sensors, the system utilizes quantum algorithms for rapid data processing and neural networks for pattern recognition and predictive modeling. The hybrid model enhances energy flow management, fault detection, and load forecasting across solar and wind energy infrastructures. Experimental simulations demonstrate the proposed method's ability to significantly reduce energy waste and improve system responsiveness, contributing to more reliable and eco-friendly energy management solutions.

Keywords:

Renewable energy, efficiency optimization, IoT, quantum computing, neural networks, smart energy.

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