Hybrid Machine Leaning Techniques for Smart Energy Forecasting and Optimization

ABSTARCT:

Optimizing energy management has emerged as a critical research subject due to the growing global demand for energy and growing concerns about environmental sustainability. Energy management systems have been completely transformed by recent developments in digital technology and artificial intelligence (AI), which have improved sustainability, dependability, and efficiency. This survey offers a thorough analysis of energy acquisition, management, and consumption optimization tactics with an emphasis on AI-driven methods such digital twin technology, machine learning, deep learning, and fuzzy logic. We look at how they are used in smart grids, smart homes, and property management systems, among other energy management fields. The paper outlines important approaches, evaluates their efficacy, and talks about the difficulties and restrictions that come with putting them into practice. This study attempts to direct future research and real-world applications in sustainable energy optimization by combining findings from other studies.

Keywords: **Energy management, Artificial Intelligence, Smart Grid, Digital Twin, Machine Learning, Optimization, Sustainability.**