

In this paper, we synthetically analyzed and summarized the application of artificial intelligence in the field of seawater desalination with renewable energy. Artificial intelligence application in desalination is mainly divided into four aspects: expert decision-making, optimization, prediction and control by sequence.

Algorithms for artificial intelligence are data-driven models that are based on statistical learning theory and are used as a tool to take use of the data that the power system and its users generate. Initially, we perform a thorough literature analysis of artificial intelligence (AI) applications related to renewable energy (RE).

There are several applications of AI in renewable energy that involve analysis of sequential and time-series data, such as predictive maintenance (predicting the remaining useful life of machines), forecasting energy consumption, and load monitoring. The literature already reports several interesting works in this direction.

Another key AI application is predictive maintenance, where the performance of energy assets is continuously monitored and analysed to identify potential faults ahead of time. Maintenance typically happens on a regular schedule; poles on a transmission line, for example, might be examined once within a pre-defined period and repairs carried out as needed.

In recent years AI applications in energy systems have gained more focus [6]. ... Another type of renewable energy that can be modeled by AI and ML methods is wind energy which many studies have conducted for forecasting and optimizing power generation of this renewable energy [24]. Another area that ML can be show a promising future is the ...

The use of renewable energy systems requires an optimization procedure to find out the most efficient use of such systems. Among the methods that predicts the performance of renewable energy systems are the AI techniques. AI techniques are heavily used in renewable and sustainable energy applications.

This review specifically explored the applications of diverse artificial intelligence approaches over a wide range of sources of renewable energy innovations spanning solar ...

1 Introduction. 1.1 Relevance of Renewable Energy; 1.2 Renewable Energy Sector without the influence of Artificial Intelligence; 1.3 Artificial Intelligence in the Renewable Power Sector; 1.4 Survey Framework of this Research; 2 AI Driven Methods For Renewable Energy. 2.1 Forecasting Renewable Energy Generation using Deep Learning; 2.2 Big Data and Machine Learning for ...

Possible applications of AI in a renewable energy platform were shown. The changing consumption patterns, which have arisen as a consequence of the COVID-19 pandemic, could be detected by AI. Thus, making them easier to deal with. It was also shown how AI can increase the much-needed flexibility of renewable energy.

AI-controlled services can ...

Since artificial intelligence and machine learning have a wide range of applications, it may be difficult to select and implement suitable methods for future research. In order to ...

The numbers highlight the enthusiasm of energy corporations for AI in renewable energy. Projections suggest that the worldwide AI market for clean energy will exceed \$75.82 billion by 2030. This ...

4. Renewable energy forecasting. And on the subject of renewable and intermittent sources of energy, AI can help with forecasting when renewable energy is best generated or how much is available at any given time, which in turn allows ...

Although many countries support AI applications in the energy industry, its usage in the RE sector remains limited (Cheng and Yu, 2019). The main obstacle is that the proposed AI methods for optimizing RE are expensive and complex (Jiang and Raza, 2023) and finding a reputed software provider and configuring the software is a time-consuming process (Jimenez and ...

As more countries, companies and individuals seek energy sources beyond fossil fuels, interest in renewable energy continues to rise. In fact, world-wide capacity for energy from solar, wind and other renewable sources increased by 50% in 2023 (link resides outside ibm ). More than 110 countries at the United Nations' COP28 climate change conference ...

Simulating renewable energy sector through AI techniques could achieve a better monitoring, operation, maintenance and storage for RES. For instance, AI-based renewable energy generation prediction could provide a basis for demand side management to narrow the gap between energy generation and consumption, and thus, improve the grid stability.

Transitioning from fossil fuels to renewable energy sources is a critical global challenge; it demands advances -- at the materials, devices and systems levels -- for the efficient harvesting ...

AbstractThe use of artificial intelligence (AI) has gained tremendous popularity in recent years, and it has become ubiquitous for use in the energy sector. ... review focuses on studies that highlight the realm of AI to benefit the energy sector as a key enabler to the growth of renewable energy sources from wind, solar, geothermal, ocean as ...

The integration of Artificial Intelligence (AI) into renewable energy systems represents a transformative approach to addressing the challenges of energy sustainability and climate change. This paper conducts a comprehensive bibliometric analysis of the scientific production related to AI applications in renewable energy, as indexed in Scopus over the last decade ...

But the need to highlight the significance of artificial intelligence (AI) in dealing with inevitable

environmental issues still requires more attention. This study aims to analyze the application of AI applications in predicting, developing, and implementing wind and solar energy resources through a bibliometric analysis from 1991 to 2022.

The use of artificial intelligence in renewable energy. While all countries aim to use AI to incorporate renewable energy and improve its efficiency, the implementation process will be a challenge. ... Network management is one of the most important applications of AI in the energy sector (Singh et al., 2020b).

Applications of AI and IOT in Renewable Energy provides a future vision of unexplored areas and applications for Artificial Intelligence and Internet of Things in sustainable energy systems. The ideas presented in this book are backed up by original, unpublished technical research results covering topics like smart solar energy systems ...

In line of with this trend, this special issue aims to present state-of-the-art studies on application of AI in renewable energy systems. There are in total 17 papers accepted for this special issue after careful peer-to-peer ...

Recent shift towards renewable energy resources has increased research for addressing shortcomings of these energy resources. As major issues are related to intermittency and uncertainty of renewable supply, new technologies like artificial intelligence and machine learning offers lot of opportunity to address these issues as they are basically meant for processing of ...

In the third section, applications of AI in renewable energy utilisations were provided, in terms of solar potential evaluation, multi-level stochastic uncertainty analysis, smart controls, fault detection and diagnosis, single and multi-objective optimisations. Both challenges, outlooks and recommendations are provided, such as expansion on ...

In the renewable energy industry, operation and maintenance (O& M) costs are an essential part of commercial success and play a crucial role in important measures such as levelized cost of energy (LCOE) [1, 2]. To minimize O& M cost, it is critical to identify faults in the early stages. Once a fault progresses to a more severe stage, the cost for repair can become ...

TY - GEN. T1 - Artificial Intelligence Applications in Renewable Energy. AU - Buster, Grant. PY - 2020. Y1 - 2020. N2 - Addressing new methodologies in deep learning (DL), machine learning (ML) and artificial intelligence (AI), the webinar speakers will provide an overview of the literature spanning these three overlapping fields as applied to energy systems research.

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# Application of ai in renewable energy