Artificial intelligence-based methods for renewable power system operation

The new-type power system with the high penetration of renewable energy accessed is of strong uncertainty and complexity, which can be challenging for the traditional methods to control. It"s significant to introduce artificial intelligence to meet the challenge. This paper proposes a cloud-edge collaborative framework based on multi-agent deep reinforcement learning for power ...

Research on the application of artificial intelligence approaches to power and renewable energy systems is now underway. ... the maximum power point of a solar cell array and the integrated system"s gross mechanical power operation. Solar insolation is the essential input to the neural network, and the converter chopping ratio corresponding ...

A modern renewable energy forecasting system blends physical models with artificial intelligence to aid in system operation and grid integration. This paper describes such a system being developed for the Shagaya Renewable Energy Park, which is being developed by the State of Kuwait. The park contains wind turbines, photovoltaic panels, and concentrated ...

Artificial Intelligence-based Smart Power Systems includes specific information on topics such as: Modeling and analysis of smart power systems, covering steady state analysis, dynamic analysis, voltage stability, and more Recent advancement in power electronics for smart power systems, covering power electronic converters for renewable energy ...

In the twenty-first century, Artificial Intelligence has become one of the most advanced technologies employed in various sectors [1,2,3,4,5,6,7,8,9,10,11,12,13].The United Arab Emirates was the first country to launch AI Strategy in the region and world; that shows the adoption of AI in the Federal government"s strategic plans is inevitable [14,15,16].

Artificial Intelligence for Power System and Renewable Energy Optimization ... The main problem in planning the optimal operation of renewable energy sources and battery storage systems is the amount of data that must be considered to cover an entire observation period. ... management system and the optimal allocation and operation of the ...

Creating a smart city means integrating existing buildings and infrastructure with smart technology. In certain cities, for example, if the Internet of Things (IoT)-based infrastructure and public services are created and managed, it is able to become a smart city (Zekic-Susac et al. 2020) will have the same facilities as before and will have only smart technology.

Therefore, reasonable operation methods of renewable energy generation equipment are required to achieve

automated system control and improve the automation with grid intelligence [29, 159]. It is important to actively promote new intelligent infrastructures to reduce energy consumption and measures that are consistent with sustainable ...

This book covers the practical application of AI-based methods in modern power systems. The complexity of current power system operations has dramatically increased due to the higher penetration of renewable energy sources and power electronic components. ... Artificial Intelligence in the Operation and Control of Digitalized Power Systems is a ...

Renewable energy has been increasingly integrated into power grid, especially in smart grid. It is expected to account for 40% of electrical power generation in 2050 across the world [].Tremendous interests have been given to develop technologies for integrating renewable resources into smart grid in a sustainable and reliable way [2,3,4].Wind power as the largest ...

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generation forecasts; optimized power dispatch, which minimizes costs while satisfying operational constraints; effective system control to ensure a stable power supply; and electricity markets that support bidding and trading decisions associated with RE. However, the uncertainties in RE generation make renewable power systems challenging to operate. For ...

The integration of renewable energy sources (RESs) has become more attractive to provide electricity to rural and remote areas, which increases the reliability and sustainability of the electrical system, particularly for areas where electricity extension is difficult. Despite this, the integration of hybrid RESs is accompanied by many problems as a result of the intermittent ...

This paper provides a systematic overview of some of the most recent studies applying artificial intelligence methods to distribution power system operation published during the last 10 years. Based on that, a general guideline is developed to support the reader in finding a suitable AI technique for a specific operation task. ...

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Artificial Intelligence in Power Systems Operation and Control ... power system operation and control are challenged by the higher penetration of power-electronic-interfaced energy sources at both the transmission and distribution sides. Furthermore, the complexity and uncertainty of supply and demand, in conjunction with

the forthcoming ...

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