

Can edge intelligence be applied to microgrids?

This paper does not specifically consider the application of edge intelligence to microgrids. However, Albatineh proposes a two-level solution that combines the advantages of cloud computing for power distribution and edge computing for power information processing. A learning-based engine can establish the communication between the two levels.

Is there a cloud computing architecture for the microgrid's EMS?

After conducting an exhaustive review of the literature, this research identified a cloud computing architecture for the microgrid's EMS, a general vision was constructed and completed with the search for models including, specifically, Artificial Intelligence and Machine Learning. Fig. 1. Published articles. Source: Authors. 3.

What is microgrid management?

Microgrid management A MG is a local network consisting of DGs, ESS, and dispersed loads, which can operate in two modes: connected to the power grid or in island mode. The MGs install in the low voltage (LV) and medium voltage (MV) distribution networks.

What is a microgrid cluster (MGC)?

Another recognized that a microgrid cluster (MGC) gives the power system more flexibility to exchange power and energy among components, and energy demand can be satisfied with the integration of energy storage systems (ESS) and distributed generation (DG) systems through a MG.

How can AI improve microgrid energy management?

Advanced data-driven energy management strategies based on deep reinforcement learning enhance MG stability and economy. Recent advances in microgrid energy management have increasingly relied on integrating AI techniques to enhance system reliability, optimize energy distribution, and reduce operational costs.

How does a microgrid function?

Microgrids consist of diverse and adjustable power components, making the power system complex and difficult to optimize. The existing traditional adjusting methods for microgrids are manual and centralized, requiring many human resources with expert experience.

cloud computing for power engineering. Automatic One-Line Diagrams ... develops software that helps planners and investors validate the technical and financial performance of Microgrids with confidence. Our platform enables a broad audience, from business decision makers to scientists working on cutting-edge research. ...

This idea of a threshold mechanism for task execution in a multi-agent system used for cloud computing reduces waiting times, speeds up processing, and efficiently uses resources. In Figure 3, Microgrid's Cloud ...

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model with a cloud-based hierarchical structure architecture for computers [11]. To explain how cloud computing can be included in the Microgrid architecture to increase the EMS efficiency and to describe the components of a microgrid with a focus on distributed energy management system [12]. A cloud-based MAS platform has been developed to ...

A cloud-fog computing framework for real-time energy management in multi-microgrid system utilizing deep reinforcement learning. ... Uncertainties in a microgrid (MG) result in challenges in reaching the optimal production-consumption balance via the energy management system (EMS). Therefore, multi-MG systems are proposed to achieve more ...

This research is proposed novel method in IoT (internet of things) based edge cloud computing architecture with microgrid energy management of VANET. Here the VANET communication is carried out based on IoT edge cloud computing module and the smart microgrid architecture is used for energy management in VANET. Then each vehicle energy has been ...

For this purpose, an islanded microgrid with multiple agents which is using cloud-fog computing is proposed here, in order to reduce the computing burden on the central control unit as well as reducing data exchange among units. ... Over the past decade, with the appearance of cloud computing, Internet data management has dramatically improved ...

The digital twin (DT) has recently been forth in the rapid advancements at cloud computing and artificial intelligence (AI). It has numerous applications in smart cities, Industrial 4.0, internet of things (IoT), etc. In the digital space, the DT creates a multiphysics mirror integrated into the physical system. Status information was supplied into the microgrid DT of ...

Tencent, one of China's largest technology companies, has commissioned a new microgrid at its High-Tech Cloud Data Center in Tianjin. With a total installed capacity of 10.54 MW, it is expected the microgrid will produce 12 million kWh of electricity per year - equivalent to the power consumption of 6,000 households - according to a statement from the company.

In this paper, we propose a Cloud Edge architecture that leverages Artificial Intelligence (AI) and data analytics for microgrid energy optimisation and net zero carbon emissions. This ...

Fog layer: With the potential of local servers and decentralized computational processes, this subsection

includes network equipment. This layer can be extended the cloud computing near the devices to short-time data storage and convenient the real-time analysis. For the proposed technique in MG, this layer determines the neighbor virtual topology.

AbstractThe digital twin (DT) has recently been forth in the rapid advancements at cloud computing and artificial intelligence (AI). It has numerous applications in smart cities, Industrial 4.0, internet of things (IoT), etc. In the digital space, the DT ...

DOI: 10.1186/s13677-021-00259-1 Corpus ID: 237458706; Power flow adjustment for smart microgrid based on edge computing and multi-agent deep reinforcement learning @article{Pu2021PowerFA, title={Power flow adjustment for smart microgrid based on edge computing and multi-agent deep reinforcement learning}, author={Tianjiao Pu and Xinying ...

The paradigm of the Internet of Things (IoT) and cloud-edge computing plays a significant role in future smart grids. The data-driven solution integrating the artificial intelligence functionalities brings novel methods to address the nontrivial task of economic dispatch in microgrids in the presence of uncertainties of renewable generations and loads. This article ...

Towards zero CO₂ emissions society, large shares of renewable energy sources and storage systems are integrated into microgrids as part of the electrical grids for energy exchange aiming to effectively reduce the stress from the transmission grid. However, energy management within and across microgrids is complicated due to many uncertainties such as imprecise knowledge on ...

The authors of (Gupta and Rastogi, 2021) provide a cloud computing platform for microgrid power management. The strategy links the system's current computer and storage capabilities with external computing devices, enhancing data processing and interaction and providing a cost-effective and rapid mechanism for microgrids to meet their computational ...

Additionally, edge-cloud computing environments have been explored to address the challenges of privacy and communication resources in centralized reinforcement learning-based microgrid management, utilizing federated deep reinforcement learning (FDRL) to optimize energy management strategies .

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Cloud edge computing can work out the problem of data privacy disclosure [15], [16], [17]. A cloud edge computing framework [18] is proposed to realize dynamic ED of microgrid, and its ED is conducted on a local digital signal processor (DSP) chip and a remote cloud computing platform (CCP).

Increasingly, data center operators are turning to microgrids to improve electric resilience, lower energy costs and achieve sustainability goals.. Data Centers That Double as Power Plants. To power its operations,

Tencent, an internet, cloud computing and technology company that is perhaps best known outside of China for its video games, e-commerce and ...

3.2 Microgrids employ cloud computing. In recent years, the shift to cloud computing has picked up speed, and no stop is in sight . Cloud computing has drawn a lot of interest as a viable strategy for providing ...

This paper proposes a learning-based decision-making framework for the economic energy dispatch of an islanding microgrid based on the cloud-edge computing architecture. Cloud resources are ...

The digital twin (DT) has recently been forth in the rapid advancements at cloud computing and artificial intelligence (AI). It has numerous applications in smart cities, Industrial 4.0, internet ...

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