

This Special Issue is dedicated to provide a communication platform for the application of artificial intelligence in power and energy systems. This Special Issue welcomes original research articles and reviews discussing the latest research on theories, methods, techniques, and applications of AI in power and energy systems.

In the context of AI applications in RE systems and technologies, this involves a comprehensive examination of the algorithms, models, and statistical and analytical techniques employed. ... The AI approaches in power systems can be primarily characterized as expert systems (ES) [105] and machine learning based ensemble methods [106].

humanities to natural and applied sciences, this seminar will focus on AI applications in electric power systems. In this context, application of artificial neural networks (ANNs) and fuzzy logic is commonly referred to in the literature as AI applications in power systems. Over the past 25 years or so, feasibility of the application of AI for ...

Advances in machine learning and artificial intelligence (AI) techniques bring new opportunities to numerous intractable tasks for operation and control in modern electric distribution systems. Nevertheless, AI applications for such grids as cyber-physical systems encounter multifaceted challenges, e.g., high requirements for the quality and quantity of ...

This paper reviews various AI techniques that can be applied in power system operation, control and planning, such as neural networks, genetic algorithms, fuzzy logic and swarm intelligence. It also discusses the challenges and opportunities of using AI in power ...

Since then, data mining and artificial intelligence have become increasingly essential areas in many different research fields. Naturally, the energy section is one area where artificial intelligence and machine learning can be very beneficial.

This Special Issue, "Application of Artificial Intelligence in Power System Monitoring and Fault Diagnosis", aims to introduce the latest advances in this field and discusses the application of AI technology in power system modeling and control, state estimation, performance diagnosis, and prognosis, among other fields.

Artificial Intelligence Models in Power System Analysis 235 + State estimation + Reactive power planning and control. 3 AI Applications in Power System 3.1 AI in Transmission Line The fuzzy logic system renders the output of the faulty type based on the fault diagnosis. Whereas, ANN and ES serve to enhance the line performance. The environ-

This paper presents an in-depth exploration of the application of Artificial Intelligence (AI) in enhancing the resilience of microgrids. It begins with an overview of the impact of natural events on power systems and provides data and insights related to power outages and blackouts caused by natural events in Estonia, setting the context for the need for resilient ...

Hybrid AI-physics models. AI applications in power-system optimization. AI-driven smart grids. Renewables and demand integration through AI-based methodologies. AI-based solutions for system protection. Interpretable AI models. Novel AI-based monitoring/situational awareness algorithms. Risk and uncertainty modelling with AI. Prof. Dr. Pedro ...

13. References o Warwick k, Ekwue A. and Aggarwal R.(ed).Artificial intelligence techniques in power systems.The institution of Electrical Engineers, London, 1997. o International Journal of Engineering Intelligent Systems,The special issue on AI applications to power system protection, edited by M.M.Saha and B.Kasztenny, vol.5,No.4,December 1997, pp.185-93.

In recent years, the artificial intelligence (AI) technology is becoming more and more popular in many areas due to its amazing performance. However, the application of AI techniques in power systems is still in its infancy. Therefore, in this paper, the application potentials of AI technologies in power systems will be discussed by mainly focusing on the ...

for AI before the 21st century. Applications of AI to Load Forecasting Despite the second winter AI was facing, power engineers found several AI applications in power systems. In the 1990s, AI became a hot topic among the power engineering community. At power engineering society general meetings, when

ZHAO et al.: OVERVIEW OF AI APPLICATIONS FOR POWER ELECTRONICS 4635 Fig. 2. Application of AI in the life-cycle of power electronic systems. Section II-A implies that the relevant discussions are presented in part A of Section II. Fig. 3. Sankey diagram of AI methods and applications in each phase of the life-cycle of power electronic systems.

Advanced machine-learning models have recently demonstrated outstanding performance when applied to energy and power system applications. Nevertheless, power experts and users may find it hard to trust the results of such algorithms if they do not fully understand the reasons for a certain algorithm's output, and how it operates in practice.

AI - New Applications in Power Systems. Many problems in power systems are based on several non-feasible requirements. Therefore, AI techniques are the only option to solve them. Current approach of AI in power system applications are: Planning for Generation expansion, power system reliability, transmission expansion, and reactive power.

In 1989, Zhang et al. [53] presented a bibliographical survey of expert systems in electric power systems. Madan and Bollinger [54] continued this work by presenting the application of artificial intelligence (mainly

expert systems) to power systems.

Due to the energy transition and the distribution of electricity generation, distribution power systems gain a lot of attention as their importance increases and new challenges in operation emerge. The integration of renewables and electric vehicles for instance leads to manifold changes in the system, e.g. participation in provision of ancillary services. To solve these ...

Furthermore, the degree of nonlinear loads is increasing in modern power systems, and this is an expected trend in the future [8]. Power electronics have been introduced in modern power system, via the uptake of manufactured appliances with high efficiency, high controllability, and decreased size [9]. Loads and power electronic devices such as ASDs, CFLs, LED lamps, ...

In recent years AI applications in energy systems have gained more focus [6]. ... [30]], high forecast accuracy is required in multiple time horizons to achieve better energy management and power system planning. Since such systems consist of regulations, schedules, dispatching, and unit commitment, an intelligent system is unavoidable, ...

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