

The limited available fossil fuels and the call for sustainable environment have brought about new technologies for the high efficiency in the use of fossil fuels and introduction of renewable energy. Smart grid is an emerging technology that can fulfill such demands by incorporating advanced information and communications technology (ICT). The pervasive ...

10 6 Framework for data acquisition and analysis in the Smart Grid 16 11 7 Example of extracting value using BDA 17 ... IEEE SMART GRID BIG DATA ANALYTICS, MACHINE LEARNING AND ... 20 development of the smart grid are recent technology breakthroughs in energy storage, electric 21 vehicles (EV) and operation and efficiency ...

As part of the smart grid, new energy vehicles can be used both as grid energy storage modules and power systems. Big data technology can fully explore new energy ...

Zhou et al. discussed impact of analysis of big data analytics with electrical system . Wang and Zhu provided a review of data-driven control techniques for smart grids . Gupta and Sharma presented an overview of big data in smart grid . Niyato discussed impact of machine learning in power and energy sector .

Our work has demonstrated that SMASH is able to perform data storage, query, analysis and visualization tasks on large data sets at 20 TB scale. ... The experimental results suggest that SMASH provides industry a competitive and easily operable platform to manage big energy data and visualize knowledge, with potential to support data-intensive ...

A smart grid in cities [8], [9], [10] is a modernized infrastructure of information and communication that facilitates the optimization of the power system in four stages i.e. production of energy, transmission of energy, distribution among consumers, and low-cost storage solution. Other major benefits of the smart grid [4] have been depicted. The main domains accepted by ...

Big data characteristics in smart grid The characteristics of big data in smart grid is also in accordance with the universal 5 V big data model in many researches (Zhu et al., 2015) as below: (i) Volume - refers to the vast amount of data generated, which makes data sets too large to store and analyze using traditional database technology.

The role of energy is cardinal for achieving the Sustainable Development Goals (SDGs) through the enhancement and modernization of energy generation and management practices. The smart grid enables ...

In domestic energy sector, IoT technologies are the main driver for integration of distributed energy storage (DES) systems, e.g. battery of electric vehicles (EVs), roof top photovoltaic panels and local solar thermal

storage systems in energy systems leading to a more flexible and scalable power grid (Ahmad & Zhang, 2021; Bedi et al., 2018).

The experimental data is sourced from the State Grid ESG big data platform, including real-time data from clean energy power stations (such as wind and solar power generation capacities), power ...

In the end-to-end lifecycle of big data from data acquisition, communication, storage, processing and analytics, big data analytic is the most important service for Smart Grid stakeholders. The big data generated by the digitized smart grid exhibits tremendous potential for customers as well as utility providers to optimize the grid performance.

In order to ensure the reliability and high efficiency of the optimal scheduling strategy of distributed energy system, this paper combines big data technology to study the energy ...

Energy big data not only include the massive smart meter reading data, but also the huge amount of data from other sources, such as the weather data, the GIS data and the asset management data. The energy big data has the "4V" (i.e., volume, velocity, variety and value) and "3E" (i.e., energy, exchange and empathy) characteristics ...

The development of big data analytics in smart power/energy systems; Applications of big data analytics in the power/energy system context; Data sources and their standardization for smart power/energy systems; ...

Datasets from Yulara solar park and Palo Alto's electric vehicle charging data have been utilized for this research. The paper focuses on two primary aspects: short-term forecasting of photovoltaic power generation and ...

The application of big data in the energy sector is considered as one of the main elements of Energy Internet. Crucial and promising challenges exist especially with the integration of renewable ...

While dynamic energy management (DEM) in conventional electricity grids is a well-investigated topic, this is not the case for SGs. This is due to its much more complicated nature, since complex decision-making processes are required by the control centers [4], [5]. Energy management systems (EMSs) in SGs include i) real-time wide-area situational awareness ...

Research topics in big data include energy asset and operations management [13], DSM [13], fault detection [13], predictive maintenance and monitoring for equipment [13], power quality analysis [13], energy and load forecasting [13, 14], parallel processing [14], and cloud data mining [13, 14]. As observed, there are some mutual areas of research between AI and BD, ...

By combining massive data with collected information from different links of the energy system, various entities, such as power utilities, customers, energy investment, ...

Energy systems around the world are going through tremendous transformations, mainly driven by carbon footprint reductions and related policy imperatives and low-carbon technological development. These ...

Big data is an ascendant technological concepts and includes smart energy services, such as intelligent energy management, energy consumption prediction and exploitation of Internet of Things (IoT) solutions. As a result, big data technologies will have a significant impact in the energy sector. This paper proposes a high level architecture of a big data ...

Energy Storage Grand Challenge Energy Storage Market Report 2020 December 2020 . Foreword . As part of the U.S. Department of Energy's (DOE's) Energy Storage Grand Challenge (ESGC), DOE intends to synthesize and disseminate best-available energy storage data, information, and analysis to inform decision-making and accelerate technology ...

BD technology represents a new generation of framework, with its core objective being to economically extract valuable information from a vast amount of data through high-speed data capture, exploration, and analysis [5, ...

This method achieves precise optimization of parameters for grid-forming energy storage systems by deeply mining and analyzing big data on new energy generation and grid ...

The construction of a new type of power system requires the exploration of the collaborative control potential of source-grid-load-storage. To meet the demands of the development of the new power system, this paper proposes a ...

Hive [26] and Impala [27] are two SQL-like high-level declarative languages that express big data analysis tasks. They facilitate querying and managing big data residing in distributed storage. Hive express big data analysis tasks in MapReduce operations. Whereas, Impala is a real-time interactive SQL query tool on big data [27]. Impala does ...

The rapid development of the global economy has led to a notable surge in energy demand. Due to the increasing greenhouse gas emissions, the global warming becomes one of humanity's paramount challenges [1].The primary methods for decreasing emissions associated with energy production include the utilization of renewable energy sources (RESs) and the ...

Considering the problems faced by promoting zero carbon big data industrial parks, this paper, based on the characteristics of charge and storage in the source grid, designs ...

This study proposes a smart grid model named "GridOptiPredict", which aims to achieve efficient analysis and processing of power system data through deep fusion of deep learning and graph neural network, so as to improve the intelligent level and overall efficiency of power grid operation. The model integrates three core

functions of load forecasting, power grid ...

Energy is one of the most important parts in human life. As a significant application of energy, smart grid is a complicated interconnected power grid that involves sensors, deployment strategies ...

This paper introduces the big data analytics and corresponding applications in smart grids. The characterizations of big data, smart grids as ...

Big data has potential to unlock novel groundbreaking opportunities in power grid that enhances a multitude of technical, social, and economic gains.

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