

Power System Event Classification and Localization Using a Convolutional Neural Network Huiying Ren^{1*}, Z. Jason Hou¹, Bharat Vyakaranam², Heng Wang² and Pavel Etingov² ¹Earth System Data Science, Pacific Northwest National Laboratory, Richland, WA, United States, ²Electricity Infrastructure, Pacific Northwest National Laboratory, Richland, WA, United States

An apparatus includes an upstream/downstream probability module that determines, for each measurement point in an electrical power system, an upstream/downstream probability. The apparatus includes a zone module that identifies a plurality of zones within the power system and an upstream/downstream module that identifies, for each measurement point and for each ...

1 INTRODUCTION. Large-scale integration of distributed energy sources (DERs) in the power system landscape increases the deployment of the power electronic converter, smart inverters and related loads [].According to the utility-scale solar report by the Lawrence Berkeley National Laboratory, the proportion of utility-scale PV in the United States would increase from ...

[7], model validation, load characterization, and event detection and localization which is the focus of this work. Event detection is the problem of detecting the occurrence of safety-critical events in a power system, such as outages, switching operations, or cyber attacks, while event localization deals

The first method used is a novel device-level unsupervised deep learning-based data-driven approach for event detection, localization, and classification over streaming PMU data, using ...

An event localization algorithm based on the number of PMUs involved in the event detection stage is proposed. ... Timely detection and classification of power system events are essential for ...

Detection and timely identification of power system disturbances are essential for situation awareness and reliable electricity grid operation. Because records of actual events in ...

Power system event analysis has two approaches - i) model-driven, and ii) data-driven. Unlike the first one, the data-driven approach is independent of the system structure and operational status. Hence it is more flexible, practicable, and robust [3]. ... Localization of the events described in Case1- Case of several events occurring back to ...

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An online algorithm for event detection and localization in unbalanced three-phase distribution systems is

proposed using a convex relaxation and a matrix partitioning technique, capable of identifying topology changes and attributing them to specific categories of events. The recent introduction of synchrophasor technology into power distribution systems has given impetus to ...

Lastly, Event localization is the process of identifying the specific location of events, such as branch fault, branch tripping, bus fault, bus tripping, and generator tripping. It also involves determining the underlying cause of events, particularly for forced oscillations, by the analysis of measurements. ... Other power system issues can ...

A framework for event detection, localization, and classification in power grids based on semi-supervised learning based on invertible neural network is proposed, which has an enhanced separating capability for events and outperforms other approaches under a low labeling rate. Real-time situational awareness and event analysis are crucial to the security of the ...

Real-time multiple event analysis is important for reliable situational awareness and secure operation of the power system. Multiple sequential events can induce complex superimposed pattern in the data and are challenging to analyze in real time. This paper proposes a method for accurate detection, temporal localization, and classification of multiple events in real time ...

The work by Dutta et al. presented a ± 1 -PMU event localization approach for distribution system considering ... The paper also highlights the impacts of severe frequency events within power systems.

DETECTION AND LOCALIZATION IN ACTIVE DISTRIBUTION SYSTEMS (1) Mrs.Dr.SARADA (2)Y.HEMALATHA ... adopted for event localization in power electronics networks and active distribution systems. Rule-based data -driven analytics [23], signal property algorithms, such as autoencoders convolutional

This paper presents an online event location estimating process in a wide-area power system using the phasor measurement unit (PMU). For real-world applications of PMU-based event location ...

Real-Time Faulted Line Localization and PMU Placement in Power Systems through Convolutional Neural Networks ... fast reclosures, and complicated transient states after a fault event make real-time fault location in power grids challenging. Existing localization techniques in this area rely on simplistic assumptions, such as static loads, or ...

Among all the above-mentioned issues, the power system oscillation problem has received much attention in the last decades. The inter-area oscillation whose frequency ranges from 0.1 to 0.8 Hz is found in power system events. Based on the power energy transmission, low-frequency oscillations have been well studied. Extensive research on low ...

Further, for rich historical measurements, valuable data may still be limited, especially for targets like

identifying system events that rarely occur in the power system. To enhance the event type differentiation and localization for a data-limited grid, we propose a Transfer Learning (TL) framework to transfer knowledge from a data-rich grid ...

Many methods have been investigated for the identification of power system events, including DT (Bykhovsky and Chow, 2003; Dahal and ... and graph search algorithms are used for event localization ...

wave is constant. The velocity for the calculation of event localization was determined based on the model of the power cable system [5] or it was measured during the power cable system deployment [6] or during maintenance. Mostly only the velocity at one frequency component or a general velocity was used [6]. It was also pro-

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power systems, the need for advanced monitoring and decision-making is becoming increasingly important. This is especially true for transmission lines, which are crucial ... Most event localization techniques are based on time measurements by timestamping the TW. Traditional methods require two timestamps for event localization [16]. With

Real-time detection and analysis of cascading events are crucial to avoiding large blackouts in power systems. Based on spectral distribution analysis (SDA) of online monitoring data, this paper ...

To enhance the event type differentiation and localization for a data-limited grid, we propose a Transfer Learning (TL) framework to transfer knowledge from a data-rich grid (source grid) to ...

Line trip events widely exist in power systems. They can result in power outages and a huge economic loss if not promptly detected and localized. ... -based line trip event detection algorithm and a Relative Phase Angle (RPA)-based line trip event localization algorithm. First, frequency and relative phase angle features during a line trip ...

THE LU SYSTEM FOR DCASE 2024 SOUND EVENT LOCALIZATION AND DETECTION CHALLENGE Axel Berg ^{1,2}, Johanna Engman ¹, Jens Gulin ^{1,3}, Karl Astrom ¹, Magnus Oskarsson ¹ ¹ Computer Vision and Machine Learning, Centre for Mathematical Sciences, Lund University, Sweden, ² Arm, Lund, Sweden, ³ Sony Europe B.V., Lund, Sweden . Abstract This ...

Timely detection and classification of power system events are essential for situation awareness and reliable electricity grid operation. It is also a crucial step with regard to...

Large wide-area power grids monitoring systems generate a large amount of phasor measurement unit (PMU) data. Single variable analysis methods are often applied to the relative phase angle difference (RPAD)



Event localization power systems

between two PMU locations for event detection.

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