

Distribution network automation system identifier



Overview

Distribution Automation Design Guide, 3 This topology describes a setup where network management remains centralized at the Network Operations Center (NOC).

Key Takeaways

A Distribution Network Automation System Identifier is a system or model used to uniquely recognize and manage the topology and components of an automated electrical distribution network, such as IDENIS.

Overview
A Distribution Network Automation System Identifier serves to automatically identify the structure, topology, and operational status of a power distribution network. It enables utilities to monitor, control, and optimize the network in real time, supporting applications like fault detection, feeder switching, Volt/VAR control, and integration of distributed energy resources (DA) .

Key Functions

- **Topology Recognition:** Identifies the network layout, including feeders, laterals, and sublaterals, even under changing operational conditions .
- **Fault Location and Isolation:** Supports automated fault detection and restoration without human intervention, improving reliability and reducing outage times .
- **Data Integration:** Collects and processes measurement data from sensors, smart meters, and field devices to maintain an accurate model of the network .

- **Real-Time Decision Support:** Provides actionable insights for automated control of switches, transformers, and other field devices .

Example: IDENIS

The Intelligent Distribution Electricity Network Identification System (IDENIS) is a machine learning-based identifier that uses deep neural networks (DNNs) to map measurement data to network topology. Key features include :

- **Feature Selection:** Uses LightGBM to reduce computational complexity while maintaining high accuracy.
- **Topology Identification:** DNN models discriminate network structures under varying operational conditions.
- **Incremental and Transfer Learning:** Enhances scalability and adaptability to different network configurations.
- **High Accuracy:** Achieves identification accuracy above 98% on test systems like IEEE 33 and PG&E 69 nodes.
- **Real-Time Performance:** Efficient computation meets practical operational requirements for live distribution networks.

Benefits

- **Enhanced Reliability:** Automated identification reduces human error and improves fault response times.
- **Operational Efficiency:** Optimizes network operations, including load balancing and voltage control.
- **Scalability:** Supports large-scale networks with distributed energy resources.
- **Integration with DA Systems:** Works alongside SCADA, FLISR, and other distribution automation applications . In summary, a Distribution Network Automation System Identifier like IDENIS is a critical component of modern smart grids, enabling utilities to maintain accurate, real-time knowledge of network topology and operational status, thereby supporting automated decision-making and improving overall grid performance.

Article Content

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This topology describes a setup where network management remains centralized at the Network Operations Center (NOC), but

Support

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Distribution Automation

Distribution automation (DA) is a family of technologies, including sensors, processors, information and communication networks,

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Each of the Distribution Automation Scenarios focuses on specific purposes that distribution automation may be used for. The

Support

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Distribution Automation Systems (DAS)

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Overall architecture of distribution network automation system (1) Main station composition and configuration The main station

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Implementing automation system in distribution networks needs a huge investment that usually cannot be funded

Substation and distribution automation a necessity for utilities

What is substation and distribution automation? Substation and distribution automation helps utilities remotely monitor, control and

Distribution Automation | Siemens

Our distribution automation solutions optimize primary equipment O&M, boost supply safety & voltage

Distribution Automation For Fault Isolation And FLISR

Distribution automation improves feeder reliability through automated switching, FLISR fault isolation, and service

What is distribution network automation?

What is distribution network automation? Distribution network monitoring, control and automation Distribution automation is the

Distribution Automation and Advanced Distribution Management Systems ...

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This paper centers on the mountainous distribution network automation strategy based on self-healing technology,

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With the current increase of distributed generation in distribution networks, line congestions and PQ issues are

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Distribution Automation (DA) is a collection of technologies like sensors, processors, communication networks, and switches that

An overview on distribution automation system

The concept of distribution automation system is put forward to improve power supply reliability and power quality to users. To begin

Distribution automation fundamentals | Eaton

Distribution automation is an integrated solution of field apparatus, devices, communications and software applications designed to

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Distribution Automation Handbook

The handbook describes various power distribution system constructions and elements there-of, technical considerations, distribution

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Distribution Automation Systems have been defined by the Institute of Electrical and Electronic Engineers (IEEE) as systems that

Distribution Automation

Distribution automation is an important method to improve the reliability, quality and capacity of power supply, and helps to realize

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IEEE Standard 1366, which defines distribution reliability indices such as SAIDI (System Average Interruption Duration Index) and

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

