This export type is temporarily disabled.

Try using another option from the Export menu. If no export alternatives are suitable, contact the Scopus Support Center.

Journal of Modern Power Systems and Clean Energy • *Open Access* • Volume 10, Issue 6, Pages 1648 - 1657 • 1 November 2022

Document type
Article • *Bronze Open Access* • *Green Open Access*

Source type
Journal

ISSN
21965625

DOI
10.35833/MPCE.2021.000444

View more

Adaptive Fault Detection Based on Neural Networks and Multiple Sampling Points for Distribution Networks and Microgrids

Marin-Quintero J.[a, b] ; Orozco-Henao C.[b] ; Bretas A.S.[c] ; Velez J.C.[b] ; Herrada A.[b] ; Barranco-Carlos A.[b] ; Percybrooks W.S.[b]
Save all to author list

[a] Electric And Electronic Engineering Program, Universidad Tecnológica De Bolivar, Cartagena, Colombia
[b] Universidad Del Norte, Electrical And Electronic Engineering Department, Barranquilla, Colombia
[c] Distributed Systems Group, Pacific Northwest National Laboratory, Gainesville, United States

Abstract

Smart networks such as active distribution network (ADN) and microgrid (MG) play an important role in power system operation. The design and implementation of appropriate protection systems for MG and ADN must be addressed, which imposes new technical challenges. This paper presents the implementation and validation aspects of an adaptive fault detection strategy based on neural networks (NNs) and multiple sampling points for ADN and MG. The solution is implemented on an edge device. NNs are used to derive a data-driven model that uses only local measurements to detect fault states of the network without the need for communication infrastructure. Multiple sampling points are used to derive a data-driven model, which allows the generalization considering the implementation in physical systems. The adaptive fault detector model is implemented on a Jetson Nano system, which is a single-board computer (SBC) with a small graphic processing unit (GPU) intended to run machine learning loads at the edge. The proposed method is tested in a physical, real-