Power Quality Detection with Classification Enhancible
Wavelet-Probabilistic Network in a Power System

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Abstract: This paper proposes a model of disturbance detection for harmonics and voltages using wavelet-probabilistic network (WPN), which is a two-layer architecture, containing the wavelet layer and probabilistic network. It uses the wavelet transformation (WT) to extract the features from various disturbances and probabilistic neural network (PNN) to analyze the translation patterns from time-domain distorted wave and perform classification tasks. In this paper, the proposed WPN detects the disturbances of harmonics and voltages. The proposed WPN has been tested for the power quality problems caused by harmonics, voltage sag, voltage swell, and voltage interruption. It has also been compared with wavelet networks as well as combined the WT and conventional neural network. The test results show that this simplified network architecture, enhanced the classification performance, and shortened the processing time for detecting disturbing events.

Index Terms—Wavelet-Probabilistic Network (WPN), Wavelet Transformation (WT), Probabilistic Neural Network (PNN).

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