SMART IDENTIFICATION OF POWER QUALITY EVENTS USING NEW STOCKWELL TRANSFORM AND MACHINE LEARNING ALGORITHM

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Abstract:
Accurate detection, classification and mitigation of power quality (PQ) distortive events are of utmost importance for electrical utilities and corporations. An integrated mechanism is proposed in this paper for the identification of PQ distortive events. The proposed features are extracted from the waveforms of the distortive events using modified form of Stockwell’s transform. The categories of the distortive events were determined based on these feature values by applying extreme learning machine as an intelligent classifier. The proposed methodology was tested under the influence of both the noisy and noiseless environments on a database of seven thousand five hundred simulated waveforms of distortive events which classify fifteen types of PQ events such as impulses, interruptions, sags and swells, notches, oscillatory transients, harmonics, and flickering as single stage events with their possible integrations. The results of the analysis indicated satisfactory performance of the proposed method in terms of accuracy in classifying the events in addition to its reduced sensitivity under various noisy environments.

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