Article Abstract

Title:	**Improved transformer protection using probabilistic neural network and power differential method**
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Abstract:	This article presents a novel technique to distinguish between magnetizing inrush current and internal fault current of power transformer. An algorithm has been developed around the theme of the conventional differential protection method in which parallel combination of Probabilistic Neural Network (PNN) and Power Differential Protection (PDP) methods have been used. Both PNN and PDP method are independent of harmonic contents of differential current. The proposed algorithm is capable of detecting fault and its type in the eventuality of fault in the transformer. Moreover, the combination of PDP method with the PNN makes it capable to detect light internal faults for all ratings of transformers which improve the overall performance of digital differential protection scheme. For evaluation of presented algorithm, relaying signals of various operating conditions of power transformer, including internal faults, external faults, over-excitation and inrush conditions were obtained through modeling of transformer in PSCAD/EMTDC. The performance of proposed amalgamated technique (i.e. combined PNN and PDP method) is compared with the PNN, Feed Forward Back Propagation (FFBP) neural network and the conventional harmonic restraint methods. The results amply demonstrate the capability of the proposed algorithm in terms of accuracy and speed. The algorithm has been implemented in MATLAB.
Keywords:	Digital differential protection, Protective relaying, Probabilistic neural network, Active power relays, Power differential method.