RE: Submission  
Submission ID: TD0028  
'Busbar Protection Using a Wavelet Based ANN'  
Power System Relaying  
Primary Committee of the TD2016 Submission Site.  
  
The reviewing committee has advised us that the conference paper that you submitted for the 2016 IEEE PES Transmission & Distribution Conference & Exposition has been rejected.  The reason for rejection is enclosed.  
  
Reviewer 1:  
Comments:       This paper proposes a busbar protection technique using wavelet transformation and artificial neural networks (ANN). The technique is claimed to be useful not only for busbar protection but also for backup line protection. A key claimed benefit of the technique is that it is immune to CT saturation since it uses information from only the first 1/8th of one fundamental frequency cycle of the current transient. While the author is to be congratulated for seeking alternatives to a historically challenging problem of busbar protection, this reviewer has some pressing concerns with the proposed technique when used for busbar protection.  
First, it appears that this technique is not able to discriminate between a fault on one side of a current transformer and the other. The author should be aware that a busbar protection zone is defined by the locations of the current transformers surrounding it. The main criterion of busbar protection is that it should operate for faults within the zone and not operate for faults anywhere outside, including immediately outside it. The author has appeared to be able to train the ANN to discriminate between busbar (internal) faults and external faults more than 5% of the distance along any of the connected transmission lines. This reviewer is unable to see how the technique can discriminate between internal faults and external faults immediately outside the protected zone. To demonstrate a useful technique, the author must include cases in Section III.B.1 with a fault locations at 0% and 100% of the lines. The author must also add cases for an external fault on an adjacent busbar or transformer separated from the protected zone by only a closed circuit breaker.  
Second, it appears that the ANN has been trained by tens of thousands of simulations on the example power system (a portion of the IEEE 118 bus case). There is no evidence or discussion of how the technique would work on a different power system, or even on the same system with one or more components being out of service. It would not be practical for a protection system to be have to be trained for each different power system or each configuration of the same power system. Protection systems have to be able to be widely applied without being trained with thousands of simulations for each specific power system arrangement.  
Third, if the technique is proposed to provide backup protection for transmission lines connected to a bus, the author should clarify how the technique would be used in a backup application. This reviewer considers a backup application to be time delayed (at least for faults near the remote line terminal) to allow primary protection to work first. This reviewer does not understand how a technique that uses only information from the first 1/8th cycle from fault initiation can provide time delayed backup protection.  
Considering that the author sees potential for protection applications of the proposed technique of modal transformation plus discrete wavelet transform plus ANN for high speed protection, he may consider preparation of a different paper promoting the proposed technique for general protection applications or in combination with other protection techniques for busbar protection or backup protection. However in that other paper, the author must also address the issue of training an ANN for general application on a wide variety of networks.  
In general, the author is encouraged to seek editorial assistance when preparing IEEE papers. This reviewer found five editorial mistakes on the first page and several more on subsequent pages. The first page mistakes are noted here for the convenience of the author, but the remaining mistakes are not listed, in the hope that the author will understand the need for editorial assistance.  
Abstract "..causing them through.." does not make sense. This needs to be clarified.  
Abstract "..lines connect to the same bus." should be "..lines connected to the same bus."  
Section I. First paragraph. "In current differential scheme current, transformers are..." should be "In a current differential scheme, current transformers are..."  
Section I. First paragraph. ".installed on ongoing and outgoing transmission lines". Should be ".installed on incoming and outgoing transmission lines." Or something similar. "ongoing" is not meaningful in this context.  
Section 1. Fourth paragraph. "Our paper uses only one of the currents.." is not clear. Is this one of three phase currents in one line? Or maybe one set of three phase currents out of all the incoming and outgoing transmission lines? If only one set of three phase currents, what will happen if that line is out of service? If only one set of three phase currents, how will the scheme differentiate between faults just inside or outside the busbar protection zone?  
Another important editorial issue throughout the paper is the use of the term "post event" and "post transient". The word "post" means "after". After the event there is no transient data because steady state conditions exist. The proposed technique is using data generated during the event or during the transient. Use of the word "post" should be avoided in any future publication proposal regarding transient conditions.  
  
We thank you for your continued interest in the Power & Energy Society.  
  
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