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"A REVIEW ON POWER SWING PROTECTION OF TRANSMISSION LINE WITH FAULT DETECTION CLASSIFICATION "

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ABSTRACT

This paper presents a survey of numerous papers and different procedures of Transmission line Protection over a previous decade. Electrical force transmission lines convey electrical power and thus, have been the significant component of intensity framework as the force progression is concerned. Force progression is a significant worried for any force framework, consequently brokenness anytime of intensity framework results into major efficient misfortune. Fake Neural Network is a delicate processing technique, which, when prepared, can substitute customary separation transfers or mathematical transfers with a bit of leeway that it changes itself with the changing organization designs. Because of attributes of Artificial Neural Networks, for example, design acknowledgment, speculation, adaptation to internal failure, rapid equal preparing, it can distinguish, arrange and find the shortcomings. The primary target of this venture is to build up an incorporated Artificial Neural Network based insurance plot, that can resolve the issues related with customary separation security methods. In this theory, back spread calculation based Artificial Neural Network will be created. For mistake minimization, Gradient Descent strategy will be utilized. The presentation of ANN, at that point can be contrasted and the written works accessible.

Key Words: *Artificial Neural Networks, Power, Transmission line, economical.*

I. INTRODUCTION

The detection of fault during a power swing is a challenge for the stable operation of the power system due to several reasons such as protection problems, current voltage, sub-harmonic oscillations and forward frequencies especially when a series is compensated for fluctuations in current and current-frequency wave forms. Here a sequence of the wrong sequence process is suggested, error detection, approximate location and location of the error and the start time of the error in relation to the system's reference clock during the power switch in the fined line series. In the proposed work the current negative sequences were analyzed as it keeps some parameters in the system in a healthy state. This method is tested by a series of charged power systems including the SMIB system and the WSCC-9bus-3machine system with their own unique system and combination of unusual conditions. The power changes caused by various errors are compared with PSCAD / EMTDC and MATLAB / SIMULINK and are compared with the available techniques to validate the effectiveness of the proposed strategic algorithm.

The rapid and accurate detection of an fault in the power system is an important part of energy recovery. Power Swing is caused by a major disruption in the power system, which if left unchecked can lead to poor transmission and unwanted stumbling blocks of breakers, changes in load interference, unwanted transmission performance in various network locations, power outages or power outages. If an fault occurs during a power switch, the transmission should detect the fault and take immediate action. Detection of errors in a series compensated line during a power swing is a

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major challenge due to the various frequency components in the fault indicators depending on the error location, type, compensation level etc. difficulty distinguishing fault from power swing. It suggests a process for detecting fault in fine lines during power changes. In the case of unequal errors, negative sequences are detected and due to the passing of the current signals in the first period, a negative sequence is present even in the three phase errors. To detect errors while turning on a series compensated line, the aggregate amount (CUSUM) of the change in the magnitude of the sequence of negative sequences suggested in this paper. Performance is tested in most cases of SMIB system and 9-bus system developed via SIMULINK / PSCAD.

II. LITERATURE REVIEW

D. V. Coury et. al. have shown how the conventional relay for the transmission line has limitation due to fixed settings and changing network configurations. The paper presented by them has shown the how Artificial Neural Network has been capable of generalizing the non-linear input data and has shown encouraging results in Distance Protection Scheme employed with ANN. In their research paper, the Artificial Neural Network has been used as a pattern classifier to simulate a distance relay. The protection zone of relay has been careful 80 percentage of one section of transmission line. Research paper has shown that the ANN relay can provide a fast and precise operation, keeping its reach accuracy when faced with different fault conditions considering the DC offset in the current waveforms as well as network changes. D. V. Coury and D.C. Jorge have mentioned that the process involved training and testing different ANN configurations until satisfactory performance was achieved. They have pointed out that the ANN tool has opened new dimension in relay idea, which should be widely investigated, allowing researchers to deal with various harms related to transmission line protection. [1]

Mario Oleskovicz et. al. Improved performance to the conventional distance relay was expected, once the ANN could learn the different fault conditions as well as network changes in order to operate in less time correctly. In their work, relay protection zone considered was 96 % of a transmission line length. ANN was supposed to take trip or restrain decision when input pattern of LG (forward and reverse direction) presented to the ANN. The ANN module was probable to learn the correct relay operation during changing network conditions. They have concluded that the use of ANN as an alternative protection model for transmission lines was investigated and relay protection zone was determined by forward and reverse single line to ground fault condition only. It was seen that the performance of ANN to classify forward and reverse fault condition was good quality but ANN reflected poor performance in classification of fault whether it was inside or outside the protection zone. [2]

M Oleskovicz et. al A complete scheme, by which the distance protection of transmission line can be achieved and has been shown in this paper. This paper has shown important work in complete scheme such as some ANN modules detect fault, some ANN modules classify the fault and some ANN modules place the fault in a given transmission line. Also, this paper has suggested different architectures in the literature to solve problems related to power systems. The paper has mentioned that Neural Networks are useful for power system applications because they can be trained with off-line data. The work, in this paper has presented an ANN move toward to simulate a complete scheme for distance protection of a transmission line. In order to perform this simulation, the distance protection task was subdivided into different neural network modules for fault detection, fault classification as well as fault location in different protection zones. They have used three-phase voltages and currents sampled at 1 KHz, in pre and post fault conditions, were utilized as inputs for the proposed scheme. The results obtained in this paper showed that the performance of ANN was highly satisfactory concerning accuracy and velocity of response for all modules described. The ANN output converged to the correct levels very quickly after up to 5 ms of the fault occurrence. The ANN module has also worked as direction discriminator.ANN relay estimated the expected response in around 98% of the 4,050 patterns tested considering changes in the operational conditions of the system. [3]

Eisa Bashier M et. al is stat that This paper describes how back propagation neural network architecture has been used as an alternative approach for transmission line protection. The RMS values of voltages and currents have been considered as inputs and the derived impedances have been used to train the neural network. The results were satisfactory and could have been impressive if more input patterns were used for training the neural network. Due to the

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litheness of the nural networks which accept any real values as an input, resistant to errors in the training data and fast evaluation. [4]

Hasan Rastegar, et. al has revealed that the series compensation can influence the relay performance. The distance relay operation is precious in series compensated line due over-reach or under-reach. Artificial Neural Network has been used to overcome such problems typically faced by the relay. The Neural Network undergoes training with the changing line parameters. The trained ANN then, can be used as relay providing output such as fault detection, classification etc. when the transmission line is compensated with Static Synchronous Series Compensation (SSSC). [5]

S. Websper et. al Fundamental to ensuring the correct and accurate process of this scheme has been detailed research into extracting the best features from the available phase voltage and current waveforms. It is apparent from the results presented that, by including information from the unfaulted phase(s), the protection technique lends itself very well to such factors as variable source impedances and variable fault resistance, including high resistance earth faults. It is also shown that, by including phase angle relationships between voltage and current signals as part of the input features to the ANNs, the attributes of the technique are further enhanced, in particular in the presence of prefault load. The performance demonstrates that the designed protection relay gives very low under overreach errors under a whole variety of practically encountered system and fault conditions; this is in marked contrast to the performance attained from traditional distance protection techniques which, even with adaptive features, give large errors (in excess of 10%) under many practically encountered different conditions. [6]

A.P.Vaidya, et al mentioned that every fault condition has particular pattern. ANN, as a pattern recognizer, can improve the relay performance. The paper tells that the traditional electromechanical relay process is affected because of effects of fault resistance. An LG fault has been considered and it was seen that ANN was capable of identifying the model. Resistance and Reactance were the inputs provided to Artificial Neural Networks. Levenberg-Marquardt (LM) algorithm in association with back propagation method has been used in this research paper. Results have depicted that the LM method requires less epochs but training period is longer than other algorithm. The suggested neural network is able to detect fault condition and it determines whether the fault is in the protected zone or outside the zone. [7]

F. Zahra et al design of the ANN for transmission line protection can be essentially treated as a pattern acknowledgment problem. The ANN identifies the patterns of associated Voltage and Current frequency components and gives a relaying decision. Using this neural network the relaying decision could be obtained within a cycle after the fault inception. [8]

Falguni Patel et. al This paper presents a review of many papers and various techniques of Transmission line Protection over a past decade. Electrical power transmission lines carry electrical power and hence, have been the important element of power system as the power continuity is concerned. Power continuity is a major concerned for any power system, hence discontinuity at any point of power system results into major economical loss. Artificial Neural Network is a soft computing method, which, once trained, can substitute conventional distance relays or numerical relays with an advantage that it adjusts itself with the changing network configurations. Due to characteristics of Artificial Neural Networks such as pattern recognition, generalization, fault tolerance, high speed parallel processing, it can detect, classify and locate the faults. The main objective of this project is to develop an integrated Artificial Neural Network based protection scheme, that can resolve the problems associated with conventional distance protection techniques. In this thesis, back propagation algorithm based Artificial Neural Network will be developed. For error minimization, Gradient Descent method will be used. The performance of ANN, then can be compared with the literatures available. The main aim of this paper is to put all studies together under single heading for comparison & better understanding of ANN.[9]

Mehdi Mohammadi Ghalesefidi et al . The power swing can cause a false tripping of distance function and intensify the system disturbance by tripping non-faulted lines. Therefore, power swing blocking function is needed to prevent the malfunction of the distance relays. In this paper, a phaselet method is proposed based on the estimation of current samples and error calculations between estimated and actual values. To increase the speed and sensitivity of the algorithm, the phaselet method with a short data window is used. For further analysis of power swing, a two-area system and 39-bus New England system has been simulated using DIgSILENT power factory software. The proposed

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method has been tested for different modes of power swing (including fast and multi-mode swings) and the fault during power swing by using an experimental setup including the relay test set and distance relay. The obtained results show that the proposed method can exhibit fast and suitable performance in the actual conditions. [10]

III. CONCLUSION

This paper has described the threats that computer viruses to research and development multi-user computer systems; it has attempted to tie those programs with other, usually simpler, programs that can have equally devastating effects. Many author were investigated how anti-virus software analyzes the infected file and shows pro-missing approach for malware detection in the future. To combat the never ending virus generation, the anti-virus software company should work closely with researchers to find potential approach that both work efficiency and accuracy.

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