The electrical power system consists of so many different complex dynamic and interacting elements; which are always prone to disturbance or an electrical fault.The back_error_propagation algorithm is effectively used for several purposes including its application to error functions (other than the sum of squared errors) and for the calculation of Jacobian and Hessian matrices.One of the major reasons for taking the back propagation algorithm is to eliminate the one of the constraints on two layers ANNs; i.e. similar inputs lead to the similar output.The weights of the back_error_propagation algorithm for the neural network are chosen randomly; feeds back in an input pair and then obtain the result.Thus; the fault classification method required a neural network that allows it to determine the type of fault from the patterns of pre fault and post fault voltages and currents; which are generated from the values measured from a three phase transmission line of an electrical power system at one terminal.Some of the important factors are the selection of type of network; architecture of the network (which includes the selection of number of layers; number of neurons in each layer; selection of activation functions; learning algorithms parameters etc.); termination criteria etc.There are lot of algorithms based upon ANN have been developed; tested and implemented practically in electrical power systems (Dalstein and Kulicke 1995; Bouthiba 2004; Venkatesan and Balamurugan 2007; Lin et al. 2001).Jayabharta Reddy and Mohanta (2007) proposes and wavelet transform and fuzzy logic based algorithm for fault classification; but the fuzzy logic gives poor performance at boundary line cases.Some algorithms based upon ANN for location of faults and relay architecture for protection of transmission line are also suggested by the researchers (Sanaye_Pasand and Kharashadi_Zadeh 2006; Lahiri et al. 2005).The various electrical transient system faults are modelled; simulated and an ANN based algorithm is developed for recognition of these faulty patterns.The use of high capacity electrical generating power plants and concept of grid; i.e. synchronized electrical power plants and geographical displaced grids; required fault detection and operation of protection equipment in minimum possible time so that the power system can remain in stable condition.Artificial neural network Artificial neural network (ANN) can be applied to fault detection and classification effectively because it is a programming technique; capable to solve the non linear problems easily.They are widely accepted and used in the problem of fault detection and fault classification because of the following features: Number of transmission line configuration are possible as there can be any possibility from short length; long length; single circuit transmission line to double_circuit transmission lines; etc.Angel L. Orille Fernandez et al. (2002) presented the finite impulse response (FIRANN) method to detect and classify the fault.As far as ANNs are considered they exhibit excellent qualities such as normalization and generalization capability; immunity to noise; robustness and fault tolerance.There are various parameters like values of the pre fault and post fault voltages and currents of the respective three phases in steady state required for precise fault detection and classification.The artificial neural networks (ANNs) are very powerful in identifying the faulty pattern and classification of fault by pattern recognition.An efficient and reliable protection method should capable to perform more than satisfactory under various system operating conditions and different electrical network parameters.It is observed that the algorithm developed is capable to perform fast and correct classification for different combinations of faulty conditions; e.g. fault type; fault resistance; fault location and short circuit MVA of the system.The algorithm which employed ANNs programming offers many

advantages; but it also suffers with many disadvantages; which are very complex in nature.Back propagation neural network (BPNN) In the Back propagation neural network (BPNN) the output is feedback to the input to calculate the change in the values of weights.