Training process reduction based on potential weights linear analysis to accelerate back propagation network.

ABSTRACT

Learning is the important property of Back Propagation Network (BPN) and finding the suitable weights and thresholds during training in order to improve training time as well as achieve high accuracy. Currently, data pre-processing such as dimension reduction input values and pre-training are the contributing factors in developing efficient techniques for reducing training time with high accuracy and initialization of the weights is the important issue which is random and creates paradox, and leads to low accuracy with high training time. One good data preprocessing technique for accelerating BPN classification is dimension reduction technique but it has problem of missing data. In this paper, we study current pre-training techniques and new preprocessing technique called Potential Weight Linear Analysis (PWLA) which combines normalization, dimension reduction input values and pre-training. In PWLA, the first data preprocessing is performed for generating normalized input values and then applying them by pre-training technique in order to obtain the potential weights. After these phases, dimension of input values matrix will be reduced by using real potential weights. For experiment results XOR problem and three datasets, which are SPECT Heart, SPECTF Heart and Liver disorders (BUPA) will be evaluated. Our results, however, will show that the new technique of PWLA will change BPN to new Supervised Multi Layer Feed Forward Neural Network (SMFFNN) model with high accuracy in one epoch without training cycle. Also PWLA will be able to have power of non linear supervised and unsupervised dimension reduction property for applying by other supervised multi layer feed forward neural network model in future work.

Keyword: Preprocessing; Dimension reduction; Pre-training; Supervised Multi-layer Feed Forward Neural Network (SMFFNN); Training; Epoch.