ABSTRACT

In gamelan instrument, there is no standard frequency tone ladder system as in modern music instrument. Gamelan is made by master of gamelan instrument maker based on feeling and hearing, as well as in terms of gamelan treatment. Gamelan treatment will be more efficient if can be done by other than master of gamelan instrument maker. To solve this problem, this research will be identifying Javanese gamelan instrument using radial basis function networks.

Radial basis function networks is a multilayer feed-forward networks whose training is hybrid. Radial basis function networks has been frequently used for classification, identified patterns or signal processing, because the training process faster than the other networks. The training process of a radial basis function networks often done by gradient descent method. Although this method is known better than other conventional training methods, the training using gradient descent still require considerable computational time. Thus, in this research will be using extended Kalman filter for optimizing the accuracy and computational time of radial basis function networks training result. Neural networks training using extended Kalman filter done by formulating neural networks as a concept of state variable similar to the non-linear dynamic systems.

Based on the simulation, the using of extended Kalman filter training method for identifying type of instrument produces an accuracy about 100%, while gradient descent is only 88.99%. For instrument tone identification, extended Kalman filter produces accuracy of 99.04% and the gradient descent only produces accuracy of 37.26%. Beside that, computational training time that required by extended Kalman filter faster than the computational training time that required by gradient descent. Thus, extended Kalman filter is better than the gradient descent as a radial basis function networks training method for identification of Javanese gamelan instrument.

Keywords: Extended Kalman Filter, Gamelan, Gradient Descent, Identification, Radial Basis Function Networks