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MULTI STEP AHEAD PREDICTION OF LASER TIME SERIES USING NEURAL NETWORK MODELS.

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Abstract

In this paper, a focused time lagged recurrent neural network (FTLRNN) model with gamma memory is developed for multi step ahead (k=1,5,10,20,50) prediction of typical Laser time series . It is observed that such problem exhibit a rich chaotic behavior. This paper compares the performance of three neural network configurations namely a Multilayer Perceptron (MLP), Self organizing feature map (SOFM) and proposed FTLRNN with gamma memory. The standard back propagation algorithm with momentum term has been used for all the models. It is seen that estimated dynamic FTLRNN based model with gamma memory filter clearly outperforms the MLP and self organizing feature map (SOFM) NN in various performance matrices such as Mean square error (MSE), Normalized Mean Square Error (NMSE) and Correlation Coefficient (r) on testing as well as training data set for Multi step prediction (K = 1, 5, 10, 20, 50). In addition, the output of proposed neural network model closely follows the desired output for multi step prediction for the Laser time series.

Originality/value : This paper is one of few studies for multi-step ahead prediction of Laser time series. This study suggests that a properly trained dynamic neural network model of a system generate a forecast with better accuracy and also help to achieve

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Key Words : Chaotic, Multi-step prediction, Cross validation, Focused time lagged neural network.