

## TIME SERIES FORECASTING USING SARIMA AND ANN MODELS FOR RAINFALL IN BADULLA

Dananjali K.T.<sup>1\*</sup>, Wijesinghe W.A.D.S.K.<sup>2</sup> and Ekanayake J.B.<sup>3</sup>

<sup>1</sup>Centre for Computer Studies, Sabaragamuwa University of Sri Lanka, Sri Lanka

<sup>2</sup>Department of Economics and Statistics, Faculty of Social Sciences and Languages, Sabaragamuwa University of Sri Lanka, Sri Lanka

<sup>3</sup>Department of Physical Sciences and Technologies, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Sri Lanka \*dananjali@ccs.sab.ac.lk

Rainfall is one of the most important factors of the natural system in Badulla district. Because Badulla is the important agriculture-based district among all other districts in Sri Lanka. Agriculture largely depends on the intensity and variability of rainfall. Therefore, an early sign of possible rainfall can help to solve several problems related to agriculture such as seeding, harvesting. Rainfall forecasting could play a significant role in the planning and management of water resource systems also. In this study, Statistical model and Artificial Neural Network Models (ANN) were used to forecast weekly rainfall for six months lead-time for Badulla district. Data set consists of the past 15 years of data. According to that results, the best ANN prediction model was selected based on Root Mean Squared Error (RMSE), Mean Absolute Error (MAE) and Mean Squared Error (MSE). Linear Regression model performed the best prediction quality, RMSE: 21.04, MAE: 15.9 and MSE: 442.7. Based on the Mean Squared Error (MSE), Mean absolute percentage of Error (MAPE), and Residual analysis, Seasonal Autoregressive Integrated Moving Average (SARIMA) (301) (011) was the best fitted statistical model for this rainfall data. It performed MSE: 454. The predicted results from the selected models were compared with some real facts to decide the accuracy of the prediction. The prediction quality showed that ANN model and SARIMA both models have performed approximately similar accuracy. Therefore, rainfall can be forecasted by using these models with reasonable accuracy.

**Keywords:** ANN, Forecasting, Linear regression, Rainfall, SARIMA