An Artificial Neural Network Model for Rainfall Prediction on the Basis of Agro-ecological Regions (AER) in Sri Lanka

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There are many studies done for testing the capability of rainfall forecasting using artificial neural networks. In Sri Lankan context, this study presents another model that uses Agra Ecological Regions as the basis instead of currently popular administrative districts. An Agra Ecological Region represents a particular combination of climate, soil and relief, so this study tries to find out the advantage and accuracy of giving a weather report per each Agra Ecological Region. For the purpose, two locations from *WL4* region, Bandaranayaka International Airport *(UM)* and Galle weather station *(WM043495)* were considered. The Artificial Neural Network was trained using 10 years of daily data from each selected station using split-sample method. The accuracy of predicting rainfall probability, rain or non-rain status is tested. Selected Artificial Neural Network is a pattern recognition, feedforward based neural network, which uses hyperbolic tangent function as the transferring function and back propagation method as the training algorithm. Mean temperature, mean dew point, mean humidity, mean sea level pressure, mean visibility and mean wind speed were selected as inputs for the neural network. According to the binary classification strategy, the status of each day was defined as rain or non-rain. Mean value of each weather parameter was compared with each locations, and there were no significant difference between the actual values and the predicted values. The estimated error rate of making predictions using the proposed model was less than 35%. According to the results obtained, this model tends to be giving more precise results compare to the district based weather forecasts. Keeping several classification parameters as targets and using more observatory points are the recommendations to improve the accuracy of the results of this forecasting model.

Keywords: Artificial Neural Network, binary classification, rainfall forecasting, climate, pattern recognition