



## **HOURLY SOLAR RADIATION FORECASTING USING ARTIFICIAL NEURAL NETWORK MODEL FOR COLOMBO, SRI LANKA**

**M. G. A. Saumyamala and N. V. Chandrasekara**

Department of Statistics and Computer Science  
University of Kelaniya  
Sri Lanka

### **Abstract**

Sri Lanka is a tropical country located close to the equator with abundant sunlight throughout the year. For efficient utilization of this solar resource for power generation in photovoltaic (PV) systems and agricultural modelling, prior knowledge of global solar radiation (GSR) in the future is important. Limited availability of onsite GSR data and the high cost are the main barriers in forecasting GSR for Sri Lanka. As a solution this study suggests an artificial neural network (ANN) model to forecast hourly solar radiation using weather data and solar angles to forecast GSR in Colombo, specifically using feedforward neural network (FFNN) trained with Levenberg-Marquardt (LM) back propagation algorithm. Hourly weather data for 6 weather variables and two solar angles from 1st of March 2017 to 14th of February 2018 were used for training, validation and testing the network. Input parameters and training parameters were adjusted to identify the most accurate network configuration and the performance of the network was measured using normalized mean

---

Received: April 11, 2019; Revised: May 16, 2019; Accepted: May 20, 2019

2010 Mathematics Subject Classification: 62M45, 62P12, 62P35, 68T01.

Keywords and phrases: forecasting, global solar radiation, feedforward neural network, normalized mean squared error.

Communicated by Fuxia Cheng