

Predicting Global Solar Radiation Using Recurrent Neural Networks and Climatological Parameters

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Abstract : Several meteorological parameters were used for the prediction of monthly average daily global solar radiation on horizontal using recurrent neural networks (RNNs). Climatological data and measures, mainly air temperature, humidity, sunshine duration, and wind speed between 1995 and 2007 were used to design and validate a feed forward and recurrent neural network based prediction systems. In this paper we present our reference system based on a feed-forward multilayer perceptron (MLP) as well as the proposed approach based on an RNN model. The obtained results were promising and comparable to those obtained by other existing empirical and neural models. The experimental results showed the advantage of RNNs over simple MLPs when we deal with time series solar radiation predictions based on daily climatological data.

Keywords : recurrent neural networks, global solar radiation, multi-layer perceptron, gradient, root mean square error

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