

Multivariate Time Series Analysis for Rainfall Prediction with Artificial Neural Networks

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Abstract

In water resources management, rainfall prediction with high accuracy is still one of controversial issues particularly in countries facing heavy rainfall during wet seasons in the monsoon climate. The aim of this study is to develop an artificial neural network (ANN) for predicting future six months of rainfall data (from April to September 2020) from daily meteorological data (from 1971 to 2019) such as rainfall, temperature, wind speed, and humidity at Seoul, Korea. After normalizing these data, they were trained by using a multilayer perceptron (MLP) as a class of the feedforward ANN with 15,000 neurons. The results show that the proposed method can analyze the relation between meteorological datasets properly and predict rainfall data for future six months in 2020, with an overall accuracy over almost 70% and a root mean square error of 0.0098. This study demonstrates the possibility and potential of MLP's applications to predict future daily rainfall patterns, essential for managing flood risks and protecting water resources.

Keywords : Artificial Neural Network (ANN), Multilayer Perceptron (MLP), Rainfall Prediction, Multivariate Time Series Analysis

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