Multilayer Perceptron Neural Networks for Estimating Missing Rainfall Data

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The quality and completeness of rainfall data have always played an important role in time series analysis and prediction for future water-related disasters. It requires to estimate missing data correctly for better results of rainfall prediction with high accuracy. In recent years, multilayer perceptron (MLP) neural networks have been applied to solve stochastic problems in data science. This study suggests a novel approach for estimating missing rainfall data with MLP neural networks. For this purpose, a mathematical model was created to analyze and predict the time series of daily rainfall data from 2003 to 2017 at six rain gauge stations in Seoul, Korea. Here, rainfall data with missing values during 20 days of time periods was considered for reconstruction of missing data at one specific rain gauge station from complete rainfall data records at five different stations. They were divided into training, validation, and testing datasets with a percentage of 70%, 15%, and 15%, respectively. This study investigates an effect of changes in data periods considered in MLP neural networks and it indicates that rainfall time series for a longer time period play a more effective role in rainfall data reconstruction.