

# Recurrent Neural Network for Rainfall Analysis and Prediction

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Rainfall analysis and prediction are indispensable for disaster prevention as well as for a range of planning purposes, which include design and construction of hydraulic structures, reservoir operation, water supply for agricultural production, etc. Even though artificial neural network (ANN) has attracted more attention in data analysis and forecasting, there have been limited studies that focused on rainfall analysis and prediction from recurrent neural network (RNN). This study presents a novel analysis approach to predict rainfall time series in which, long short-term memory (LSTM) and interpolation methods were mainly considered. To derive more accurate future rainfall, dropout and batch normalization were also applied at the design stage of neural network. Daily rainfall data from 1981 to 2017 were used at four stations in South Korea, and rainfall pattern, total number of rainy days and total amount of rainfall in 2017 were selected for prediction factors from RNN. It was trained from observed rainfall data from 1981 to 2015 and validated from comparison results with those in 2016. It was found that the proposed approach could give a future description of rainfall characteristics by using the only feature of past rainfall data. As results, irregularities in daily rainfall pattern result in prediction errors and thus appropriate interpolation methods need to be firstly considered for better rainfall prediction. RNN-based rainfall analysis can offer an alternative way of describing future rainfall characteristics and potentially help improve risk management approaches for severe flood and drought in changing environment.

**Keywords** : Recurrent Neural Network; Rainfall Prediction; Rainfall Interpolation