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Use of the Neural Network to Predict Discharge During High Flow at The Yufong Bridge

Chien-Hsin Lai[1]   Yan-Chang Chen[2]

ABSTRACT   The relation of rainfall and runoff in a catchment area is extremely complex and high nonlinear. It is always difficult to describe the hydrological processes by the concept of stochastic models. In this study, the radial basis function neural network (RBFNN) is used to construct a rainfall-runoff to predict the one-hour-ahead discharge and two-hour-ahead discharge of the Choshui River at the Yufong Bridge during high flow. The fuzzy min-max clustering method which is used to train the network at the first phase clusters the data of rainfall and runoff. Then, the linear regression is used to calibrate the parameters between the hidden layer and the output layer. The modified RBFNN can be trained by the hybrid learning algorithm. Thus, it speeds the training of the RBFNN. One of the advantages of the modified RBFNN is that only one parameter has to be selected. The network structure and parameters can be automatically determined by the training data.

Generally, neural network has a better forecasting ability than the concept or stochastic models. It is used to predict the discharge of the Yufong Bridge. The results show the potential use of the neural network to construct a flood forecasting model.