Comparison of Artificial Neural Network and Fuzzy Interface System in Kurdistan Province Rainfall Forecasting

Abstract

Precipitation process is a function of many factors that Statistical methods have little accuracy for its forecasting. Rainfall prediction using Artificial Neural Network and Fuzzy Inference System has been considered, recently. Kurdistan province with 28,203 km² is located between 34 °, 45 to 36 °, 28 North latitude and 42 °, 31 to 48 °, 16 East longitude and Due to the high Precipitation, is one of the most watery provinces in Iran. In this study, the efficiency of artificial neural network and fuzzy inference systems evaluated based on the monthly data in the period of 1982 to 2012 in rainfall prediction. %70 of data for training and %30 of them was considered for Model evaluation. For this, a multilayer perceptron Artificial Neural Network models with sigmoid function and Levenberg–Marquardt algorithm was used. According to statistical criteria such as the correlation coefficient, Nash coefficient and RMSE Between observed and predicted data, Models efficiency was evaluated. The results showed that the Relative Humidity and Temperature has most influence to predict monthly precipitation at all stations. Also results indicate a higher efficiency of Neural Network than Fuzzy Inference System in Kurdistan province monthly precipitation forecasting.

Key words: Rainfall forecasting, Artificial Neural Networks, Fuzzy Inference System, Kurdistan Province

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