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Rainfall runoff modeling using single GN model

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Rainfall-runoff modeling is useful in many water resources applications. Historically, researchers have relied on conventional techniques of conceptual or statistical methods for rainfall-runoff modeling. Over last two decades, artificial neural networks (ANNs) have become popular tools among hydrologists for this purpose. The ANN models developed so far use McCulloch and Pitts Artificial Neuron (MPAN) as the building block in a feed-forward ANN trained using back-propagation algorithm (FFBPANN). In this study, we present rainfall-runoff models built on the new generalized neuron (GN) model. The GN model offers many advantages over the traditional MPAN e.g. ability to model the non-linearity in a physical system through non-linear discriminant functions, and no need to go through the trial and error procedure of determining optimal number of hidden layers and neurons. Here, we present results from two ANN models, the first is a FFBPANN and the second is a single GN model. Rainfall and flow data from Kentucky River catchment were employed to develop the models. The results obtained in this study indicate that the GN model can be a promising alternative for rainfall-runoff modeling.