

Application of Soft Computing Techniques in River Flow Modeling in The Case of Euphrates-Tigres Basin

Hüseyin DALKILIC¹, Pijush SAMUI², and SEFA YEŞİLYURT¹

¹Erzincan Binali Yildirim University

²National Institute of Technology Patna

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Abstract

River stream estimation is a subject matter that needs constant research and development since it is all-important in the management of water resources, meeting the water demand, irrigation and agricultural activities, and providing distant signal in unwanted situations such as floods. Unfortunately, a universal technique has not been found yet although many techniques have been used for estimation and modelling. This has made it necessary to develop different techniques and/ or to make comparisons between techniques and to determine the most accurate method for the parameters used. In this study, using the 1981-2010 flow data of 14 stations located across Euphrates-Tigris basin, evaluations have been made through Adaptive-Network Based Fuzzy Inference Systems (ANFIS), Support Vector Regression (SVR-SVMR) techniques, and the newly used Gauss Process Regression (GPR), Extreme Learning Machine (ELM) and Emotional Neural Network (ENN) artificial intelligence techniques, and through rank analysis, it is aimed to find out which technique gives better results and to overcome some problems in traditional methods. Although all models work well, the sequence with regards to the comparison outcomes of the techniques obtained from rank analysis was observed to be ELM, GPR, ENN, SVM, ANFIS respectively. In addition, stream values were used in the whole study, these values were examined within 3 different combinations and it was observed that the best result was found in the combination of [input]Q(t-3),Q(t-2),Q(t-1)/[output]Q(t). Keywords: River Flow Modelling; ANFIS; SVM; GPR; ELM; ENN

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