TIME SERIES FORECASTING OF PARAMETERS IN HYDRAULIC ENGINEERING USING ARTIFICIAL NEURAL NETWORKS

IVAN HALKJEVIĆ ¹, GORDON GILJA ²

¹ Faculty of Civil Engineering, University of Zagreb, Croatia, halkijevic@grad.hr
² Faculty of Civil Engineering, University of Zagreb, Croatia, ggilja@grad.hr

Abstract

Time series of a parameter represent a development of its value in time and from a continuous function. Problems related to time series data, such as pattern recognition, data classification, time series and dynamic systems analysis, as well as time series forecasting problems are frequently solved using Artificial neural networks (ANN). They usually provide an alternative forecasting approach to traditional regression models. The forecasting is usually based on parameter’s past values through the process of ANN learning. This process includes the analysis of the past (historical) data with the aim to discover some hidden, not so obvious and non-linear dependencies that can be used for predicting the future values of the parameter under consideration. The learning relies only on past and long enough data collection without any need for further information. Depending on the problem and the available data ANN can provide forecasting functionality with varying degrees of success and setting up the network can also be time consuming. In general, the disadvantage is that the error of prediction cannot be estimated. There are many different ways for using ANN in forecasting and they are usually case specific. This paper presents an overview of some ANN applications in forecasting, with emphasis on design parameters in hydraulic engineering.

Keywords: artificial neural networks, forecasting, time series, network learning, hydraulic engineering