Artificial Neural Networks (ANNs) have seen an explosion of interest over the last two decades and have been successfully applied in all fields of chemistry and particularly in analytical chemistry. Inspired from biological systems and originated from the perceptron i.e. a program unit that learns concepts, ANNs are capable of gradual learning over time and modeling extremely complex functions. In addition to the traditional multivariate chemometric techniques, ANNs are often applied for prediction, clustering, classification, modeling of a property, process control, procedural optimization and/or regression of the obtained data.

This communication aims at presenting the most common network architectures. Multi-layer Perceptrons (MLPs), Radial Basis Function (BRF), Kohonen’s self-organizations maps (SOM), counter- (or back-) propagation (CP-ANNs), quick-propagation (QP-ANNs), Delta-bar-Delta, Conjugate Gradient Descent, and Quasi-Newton are the most widespread network architectures and algorithms used today. All architectures correlate input variables to output variables through nonlinear, weighted, parameterized functions, called neurons. In addition, various training algorithms have been developed in order to minimize the prediction error made by the network.

Moreover, ANNs applications in water analysis and water quality are reviewed. ANNs proved to be a powerful, yet often complementary, tool for water quality assessment, prediction and classification.