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Draw on artificial neural networks to assess and predict water quality

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Draw on artificial neural networks to assess and predict water quality

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Abstract. Water is one of the important vehicles for diseases of an infectious nature, which makes it essential to assess its quality. However, the assessment of water quality in reservoirs is a complex problem due to geographic limitations, sample collection and respective transport, the number of parameters to be studied and the financial resources spent to obtain analytical results. In addition, the period between sampling and analysis results must be added. This work describes the development of an Artificial Neural Network (ANN) to predict the biochemical and chemical oxygen demand based on the water pH value, the dissolved oxygen, the conductivity and its temperature. The models were trained and tested using experimental data (N=605) obtained from superficial water samples used to irrigate and produce water for public use, collected between September 2005 and December 2017. To evaluate the performance of the ANN models, the determination coefficient, the mean absolute error, the mean square error and the bias were calculated. It was determined that an ANN with topology 4-6-5-2 could be used successfully to predict the variables' output. Indeed, good agreement was observed between the observed and predicted values, with the values of the coefficient of determination ranging from 0.813 to 0.979.

Keywords: Artificial Intelligence; Artificial Neural Networks; Biochemical Oxygen Demand; Chemical Oxygen Demand; Water Quality

