# Application of artificial intelligence (AI) techniques in water quality index prediction: a case study in tropical region, Malaysia

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Abstract The management of river water quality is one the most significant environmental challenges. Water quality index (WQI) describes several water quality variables at a certain aquatic environment and time. Classically, WQI is commonly computed using the traditional methods which involved lengthy computation, consume timing and occasionally associated with accidental errors during subindex calculation. Thus, providing an accurate prediction model for WQI is highly required. Recently, the artificial neural networks (ANNs) have been examined for similar prediction applications and exhibited a remarkable ability to capture the nonlinearity pattern between predictors and predictand. In the current research, two different ANN algorithms, namely radial basis function neural network (RBFNN) and back propagation neural networks models, have been applied to examine and mimic the relationship of WQI with the water quality variables in a tropical environment (Malaysia). The input variables categorized into two different architectures and have been inspected. In addition, comprehensive analysis for the performance evaluation and the sensitivity analysis of the variables have been conducted. The results achieved are positively promising with high performance accuracy belonging to RBFNN model for both scenarios. Furthermore, the proposed approach offers an effective alternative to compute and predict WQI, to the fact that WQI manual calculation methods involved lengthy computations, transformations, use of various subindex formulae for each value of the constituent water quality variables, and consuming time.