Optimizing water quality indexing using the adaptive neuro-fuzzy inference system for cost-effective enhanced monitoring and pollution control

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In order to maintain aquatic ecosystems, ensure safe drinking water, and manage water resources sustainably, water quality monitoring is crucial. Traditional Water Quality Index tools often overlook complex non-linear relationships between different water quality parameters, while few can be adjusted to different contexts. This paper suggests an Adaptive Neuro-Fuzzy Inference System based optimised Water Quality Index model to improve monitoring accuracy and lower associated costs. Fuzzy logic and neural networks are combined in the Adaptive Neuro-Fuzzy Inference System model to provide a reliable, affordable framework for more accurate water quality assessment. The proposed approach not only improves the accuracy of water quality assessments but also optimises resource allocation for pollution control. Adaptive Neuro-Fuzzy Inference System based strategy performs better than traditional techniques and provides a more accurate dependable and economical tool for managing water quality.