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***SVR-BASED INTELLIGENT MODELLING WITH SOM FEATURES SELECTION FOR
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SVR-BASED INTELLIGENT MODELLING WITH SOM FEATURES SELECTION FOR WATER QUALITY INDEX PREDICTION

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Abstract:

Modeling surface water quality using artificial intelligence techniques plays a vital role in efficiently managing limited water resources and protecting the environment. Water quality is a key aspect of water production and distribution systems. Assessing the quality of surface water is complex and requires significant time and effort due to the numerous influencing factors. Accurate prediction of water quality parameters is crucial for early detection of pollution and improving decision-making in water resource management. Thresholds, often referred to as guidelines, have been established for specific parameters to evaluate water quality for various uses. Overall water quality is assessed by comparing multiple measured parameters against these threshold values. A valuable tool for integrating all water quality indicators into a single measure is the Water Quality Index (WQI). This study developed a hybrid model combining Self-Organizing Maps (SOM) for feature selection and an Support Vector Regression (SVR) to predict the WQI at the Tilesdit Dam in Algeria. Water samples collected from six different locations between 2009 and 2018 were used to train the model. The results demonstrated a strong correlation ($R^2 = 0.99$) between the observed and predicted WQI values, highlighting the SVR model's capability to provide accurate and reliable estimates of water quality. In conclusion, this approach offers a promising solution for water quality monitoring and resource management, outperforming conventional artificial neural networks. The findings suggest that the proposed methodology can be effectively applied in future water quality assessment studies.

Keywords: Water quality prediction, Water quality index (WQI), SOM, SVR, Algeria.

General area of research: Applied Mathematics (Scientific Computing, Mathematical Modeling)

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