Machine learning approach for groundwater contaminant prediction: data acquisition and method selection


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Abstract

The study aims at finding effective tool that quickly predicts ex-situ measured constituents by using in-situ measured parameters to improve the efficiency of screening for groundwater pollutants. This study stage focuses on two sub-targets, namely reviewing the potential technique and analyzing the available data in Taiwan. Previous studies proved that machine learning can successfully predict toxic metal using common parameters as model input. When collecting groundwater data in Taiwan, the results give high potential to conduct the research. Therefore, it is possible to simulate groundwater contaminant in Taiwan by in-situ or real-time monitoring parameters, using machine learning algorithms.
Machine Learning Algorithm for Prediction of Heavy Metal Contamination in the Groundwater in the Arak Urban Area

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Abstract

This paper attempts to predict heavy metals (Pb, Zn and Cu) in the groundwater from Arak city, using support vector regression model (SVR) by taking major elements (HCO₃, SO₄) in the groundwater from Arak city. 150 data samples and several models were trained and tested using collected data to determine the optimum model in which each model involved two inputs and three outputs. This SVR model fit captures the prime idea of statistical learning theory in order to obtain a good forecasting of the dependence among the major elements in the city of Arak. Finally, on the basis of these numerical calculations using SVR model, from the experimental data, conclusions of this study are exposed. By comparison between the predicted and the measured data it indicates that SVR model has strong potential to estimation of the heavy metals in the groundwater with high degree of accuracy.

Keywords: Groundwater; Support vector regression; Heavy metals; Arak