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PREDICTION OF WATER QUALITY INDEX USING GENETIC PROGRAMMING

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Abstract

Many human-made activities today are contaminating groundwater sources, with mining operations contributing significantly to this degradation. Based on a few water quality characteristics, the water quality index (WQI) for groundwater in gold mining regions of Kolar Gold Fields (KGF), Karnataka, India, was calculated. In this study, the cause effect models for WQI were developed considering the significant parameters obtained from multiple regression analysis. The procedure of choosing the input parameters is among the most crucial ones in a data-driven technique. In situation of scarcity of observed data, most significant input parameters were found by using Genetic Programming (GP). Time step models are also developed for most significant parameter which are most useful to predict quality of water. Several statistical indices were used to evaluate the GP model's prediction performance. The findings demonstrate that the GP model has a great deal of potential for forecasting WQI based on the employed water quality variables, with the $R^2 = 0.967$ utilizing 9 parameters, with arsenic being the most important parameter using the time series model. As such, it may be a useful tool for quickly determining the water quality of a region.

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