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PREDICTION OF EFFLUENT QUALITY IN SEWAGE TREATMENT PLANTS BASED ON FUZZY ROUGH SET AND ARTIFICIAL NEURAL NETWORKS

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Abstract

With the continuous improvement of urbanization level and the continuous progress of industrialization, the construction and operation problems of urban sewage treatment plants are becoming increasingly prominent. Effective water quality prediction not only helps ensure that the water environment quality meets national standards, but also provides timely and scientific decision-making support for the operation of sewage treatment plants. The quality of effluent from urban sewage treatment plants has a significant impact on the surrounding water environment. Therefore, accurate prediction of the effluent quality of urban sewage treatment plants is the foundation of urban water environment management and protection. This article used fuzzy rough set to preprocess the operating data of sewage treatment plants in China in recent years, and applied it to artificial neural networks models for training. Experimental definition: x represents the influent COD concentration, pH value and other parameters, and y represents the effluent COD concentration. Based on the training data, the effluent quality was predicted and verified. When the x value was 0.2-0.4 from the artificial neural networks training model, the fitting value showed a higher y value. When the x value was 0.8, the y value showed a lower value. When the x value was between 0.8 and 1, the difference between the predicted value of the effluent quality of the sewage treatment plant and the actual value is only 0.02. The method based on fuzzy rough set and artificial neural networks could effectively predict the effluent quality of sewage treatment plants, and had high accuracy and stability.

Key words: effluent water quality, fuzzy and rough collection, neural networks, sewage treatment, water quality prediction

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