Predictive models using supervised neural network for pollutant removal efficiency in petrochemical wastewater treatment

Varun Geetha Mohan[a], Al-Fahim Mubarak Ali[a], Mohamed Ariff Ameedeen[a], Bincy Lathakumary Vijayan[b], Afrig Aminuddin[c], Wiwi Widayani[c]

[a] Universiti Malaysia Pahang, Faculty of Computing, Pekan, 26600, Malaysia

[b] Universiti Malaysia Pahang, Faculty of Industrial Sciences and Technology, Gambang, 26300, Malaysia

[c] Faculty of Computer Science, Universitas Amikom Yogyakarta, Sleman, Indonesia

ABSTRACT

The important process in wastewater treatment is the removal of pollutants, and the dataset having so many features may cause difficulty training the data and predicting key variables. This work aims to propose set parameters through normalization techniques, feature selection techniques, and AI techniques. The datasets have 36 features and a key parameter, and experimental datasets contain 628. Constant factor, Z-score, and Min-max normalization are the normalization techniques used to normalize the petrochemical wastewater dataset. SelectKBest, ExtraTreeClassifier, PCA, and RFE are the feature selection techniques for data mining. Then finally done with AI implementation with the help of a supervised neural network technique called backpropagation neural network (BPNN).

KEYWORDS

Backpropagation neural network; Feature selection; Normalization; Petrochemical wastewater treatment processes

ACKNOWLEDGMENT

The experimental work has been done by the Universiti Malaysia Pahang (UMP) from the Grant (TRGS/1/2018/UMP/02/2/2) under Grant No. RDU191802-2. The authors might want to thank the Ministry of Education Malaysia for giving us the Trans-Disciplinary Research Grant (TRGS) for us to do this research.