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Assoc. Prof. Dr. Yunus Kaya
Bayburt University
ICENSTED 2025 Conference Chairman

2nd International Conference on Engineering, Natural Sciences, and Technological Developments (ICENSTED 2025)

June 20-23, 2025

ANFIS-Based Intelligent Modelling with PCA Features Selection for Optimal Coagulant Dosage in Drinking Water Quality Monitoring

Mohamed Ladjal[1,2], Mohammed Assam Ouali[1,2], Hamza Bennacer[1,3], Abousoufyane Slatnia[1,2], Mohamed Imed Khelil[1]

[1]Laboratory of Analysis of Signals and Systems (LASS), University Pole of M'sila, 28000 M'sila, Algeria
[2]Department of Electronics, Faculty of Technology, University Pole of M'sila, 28000 M'sila, Algeria
[3]ECP3M Laboratory, University- of Mostaganem, Mostaganem, 27000, Algeria
Corresponding author: Mohamed Ladjal (e-mail: mohamed.ladjal@univ-msila.dz)

Abstract

Coagulation is the most important step in drinking water treatment. Determining the optimal coagulant dosage is vital for the maintenance of acceptable treated water quality, as insufficient dosage will result in unqualified water quality. Moreover, coagulant dosing rate is non-linearly correlated to raw water indicators such as turbidity, conductivity, pH, temperature, etc. Optimal coagulant dosage modelling of surface water quality using artificial intelligence techniques is essential for the effective management process and environmental protection of water resources production and distribution systems. Therefore, in this study, an adaptive neuro-fuzzy inference system (ANFIS) model and principal component analysis (PCA) were developed to predict the optimal coagulant dosage in the Cheliff dam from Mostaganem (Algeria). The proposed model in this paper contains PCA in feature selection and the ANFIS method for predicting the optimal coagulant dosage values. Fifteen of them were collected in 4 seasons during the period 2017-2018 from Cheliff dam were used to develop PCA-ANFIS hybrid model. As a result, a relatively higher correlation was found between observed and the coagulant dosage applied values. The results indicated that the ANFIS model gave reasonable estimates for the output predicted value with a high degree accuracy and robustness. In conclusion, this paper suggests that PCA-ANFIS methodology produce very successful findings and has the ability to predict coagulant dosage in water resources. The outcomes of this research provide more information, simulation, and prediction about water quality status. PCA-ANFIS model can be used in further researches on water quality assessment. Its performance is more competitive when compared with artificial neural networks. Furthermore, the results demonstrated that the proposed procedure has a great potential in water quality monitoring.

Keywords: Water quality prediction, Supervised machine learning, Coagulant dosage, PCA, ANFIS, Algeria

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Online Session – 29 (in English) Head of Session: Asst. Prof. Dr. Sebahat Oztekin	
16:00 – 17:30	Biological Control of Citrus Anthracnose Using Essential Oils *Saliha Ogab*[*]*, M'hamed Benada, Boualem Boumaaza*
	Overweight, Calcium Intake, and Calcium Levels in a Group of Children in Tebessa (Algeria) *Khalida Abla*[*]*, Nassima Toumi-Halaimia, Sawsene Ziani*
	Study of Effect on Pregnant Rats Pretreated with Methanolic Extract of *Ruta Montana* *Ghadjati Nadhra, Mahdeb Nadia, Bouzidi Abdelouahab*[*]
	Evaluation of the Antibacterial Activity of the Methanolic Extract of Ephedra Major Collected from the Batna Region, Algeria *Benseghir Hassane*[*]*, Hezil Djamila, Benammar Leyla, Hachemi Messaoud, Fayssal Bouchemla, Zekri Kaouther, Tamaarat Soundous Malak, Zemouli Aya*
	Composition and Structure of Benthic Diatom Assemblages Across the Safsaf Watershed Northeastern Algeria *Hadjer Kaddeche*[*]
	Chemical Composition, Acute Toxicity, and Pharmacological Activities of Essential Oils from Medicinal Plants of Southern Algeria *Mohammed El Amin Said*[*]*, Youcef Benaissa Keddar, Khedidja Benouis, Kaoutar Si Afif*
	Statistical Optimization of Antibiotic Degradation Using the Fenton Process: ANOVA-Based Experimental Analysis *Mouna Chala*[*]*, Nassima Boudrahem, Ahlam Atik Hamoud, Fatima Boumechhour*
	ANFIS-Based Intelligent Modelling with PCA Features Selection for Optimal Coagulant Dosage in Drinking Water Quality Monitoring *Mohamed Ladjal*[*]*, Mohammed Assam Ouali, Hamza Bennacer, Abousoufyane Slatnia, Mohamed Imed Khelil*
17:30 – 17:45	Break
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	Effect of Cocoa Powder Addition on Milk Quality and Antioxidant Potential *Samira Lagha-Benamrouche, Djamila Hezil*[*]
	Long Terminal Repeat-Retrotransposons in Poaceae: Abundance, Evolution, and Impact on Genome Structure

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