Drinking Water Quality Assessment Using Fuzzy Inference System Method: A Case Study of Rome, Italy

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Abstract : Drinking water quality assessment is a major issue today; technology and practices are continuously improving; Artificial Intelligence (AI) methods prove their efficiency in this domain. The current research seeks a hierarchical fuzzy model for predicting drinking water quality in Rome (Italy). The Mamdani fuzzy inference system (FIS) is applied with different defuzzification methods. The Proposed Model includes three fuzzy intermediate models and one fuzzy final model. Each fuzzy model consists of three input parameters and 27 fuzzy rules. The model is developed for water quality assessment with a dataset considering nine parameters (Alkalinity, Hardness, pH, Ca, Mg, Fluoride, Sulphate, Nitrates, and Iron). Fuzzy-logic-based methods have been demonstrated to be appropriate to address uncertainty and subjectivity in drinking water quality assessment; it is an effective method for managing complicated, uncertain water systems and predicting drinking water quality. The FIS method can provide an effective solution to complex systems; this method can be modified easily to improve performance.

Keywords : water quality, fuzzy logic, smart cities, water attribute, fuzzy inference system, membership function
Conference Title : ICMFLS 2023 : International Conference on Mathematical Fuzzy Logic and Set
Conference Location : Amsterdam, Netherlands
Conference Dates : August 03-04, 2023