Water Potability Prediction Using a Feedforward Neural Network

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Abstract

This project explores the application of a Feedforward Neural Network (FNN) to classify water potability using a dataset of water quality parameters. The model was designed with a focus on maximizing precision to reduce the risk of misclassifying unsafe water as safe. To improve predictive performance, the dataset was enhanced through various feature engineering techniques. A wide hyperparameter search led to a two-layer FNN architecture that achieved a precision score of 92.9%. Although some traditional machine learning models delivered more balanced performance, the FNN's conservative prediction strategy makes it well-suited for safety-sensitive applications. The results highlight important trade-offs between other performance metrics as well as offer directions for further improvement.