Wine Quality Prediction using Machine Learning Techniques

Prof. Shubhkirti Bhodke, Prof. Mrunali Jadhav, Gyaneshwar Sewatkar

Tulsiramji Gaikwad-Patil college of Engineering and Technology, Nagpur

Abstract: *Wine quality assessment is a vital task in the winemaking industry, traditionally carried out by human experts through sensory evaluation. This process, while valuable, is subjective and prone to inconsistencies. This research proposes a data-driven approach using machine learning algorithms to predict wine quality based on physicochemical attributes. The study utilizes the Wine Quality dataset from the UCI Machine Learning Repository, exploring various classification algorithms including Decision Tree, Random Forest, Support Vector Machine (SVM), Artificial Neural Networks (ANN), and Gradient Boosting Classifier. Performance evaluation is conducted using accuracy, precision, recall, F1-score, and confusion matrices. The results indicate that machine learning provides an efficient, consistent, and scalable method for wine quality prediction, which can aid in quality control and production optimization in the wine industry.*

Keywords: Wine Quality, Machine Learning, Classification, Data Analysis, Random Forest, SVM, ANN, Gradient Boosting