Final Project Overview: Wine Quality Prediction

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Course: CISB60 - Introduction to Machine Learning and Deep Learning

Objective

This project focuses on predicting wine quality using machine learning and deep learning techniques, leveraging the chemical properties of wine as features to classify its quality.

Dataset Description

The dataset contains detailed information about the chemical composition of wines, sourced from a publicly available wine quality dataset. Features include pH, alcohol content, residual sugar, and more, with the target variable being wine quality.

Methods Used

- Machine Learning: Support Vector Machine (SVM) to classify wine quality.
- Deep Learning: A neural network to capture complex relationships in the data.
- Hyperparameter Tuning: Experiments with learning rates and batch sizes to optimize performance.
- TensorBoard Integration: Used for visualizing training metrics.

Results Summary

Both models demonstrated high accuracy for the majority class but struggled with class imbalance, leading to lower recall for the minority class. Hyperparameter tuning showed minimal impact on validation accuracy, indicating model stability. TensorBoard provided useful insights into training progress.