Advanced Machine Learning
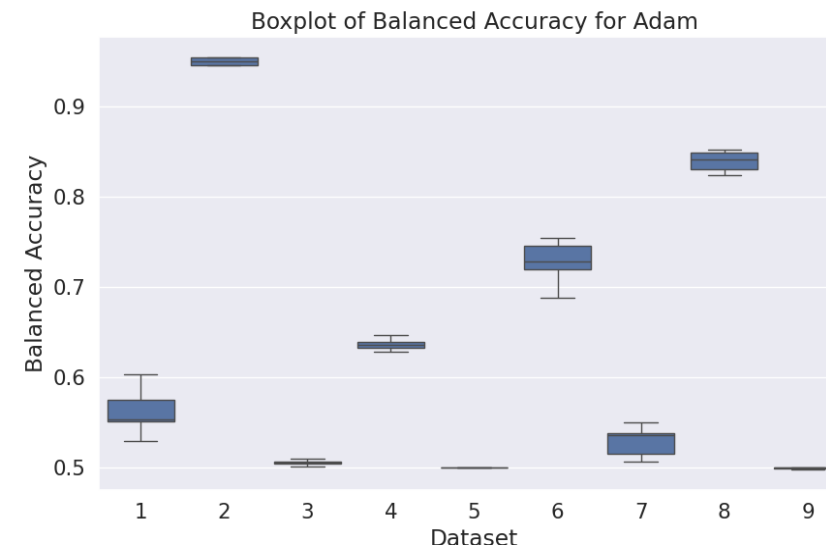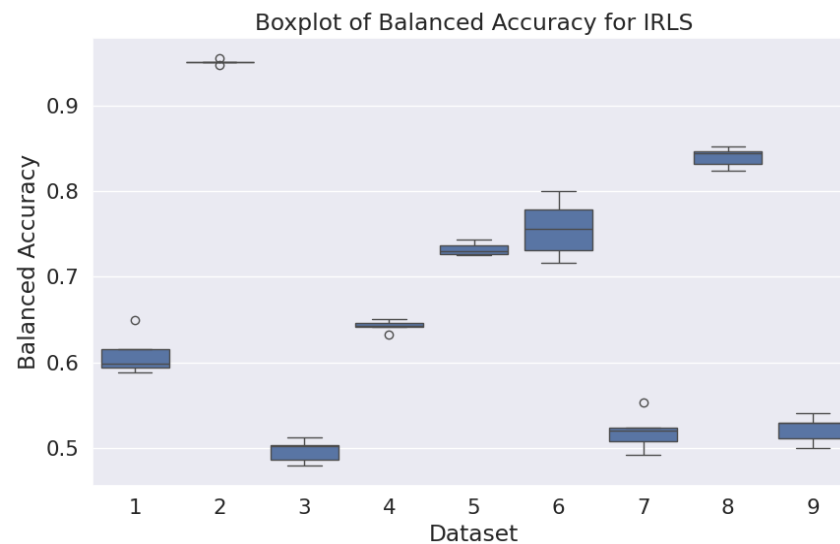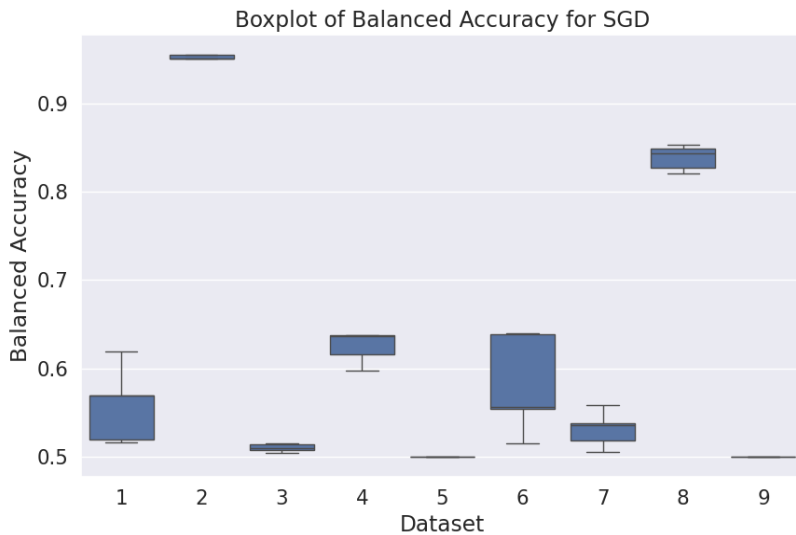
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Agenda

- Problem
- Methodology
- Convergence analysis
- Baseline comparison
- Interactions comparison

Problem

- Implementation of different optimization algorithms and comparison their performance in binary classification on several datasets:
    1. diabetes
    2. banknote-authentication
    3. pollen
    4. puma32H
    5. MagicTelescope
    6. vehicle
    7. pc3
    8. waveform-500
    9. ozone-level-8hr

- Tested optimizers:
    1. Stochastic Gradient Descent (SGD)
    2. Adaptive Moment Estimation (ADAM)
    3. Iterative Reweigthed Least Squares (IRLS)

- Data preprocessing steps:
    1. Remove highly correlated features (>0.8 Pearson coefficient)
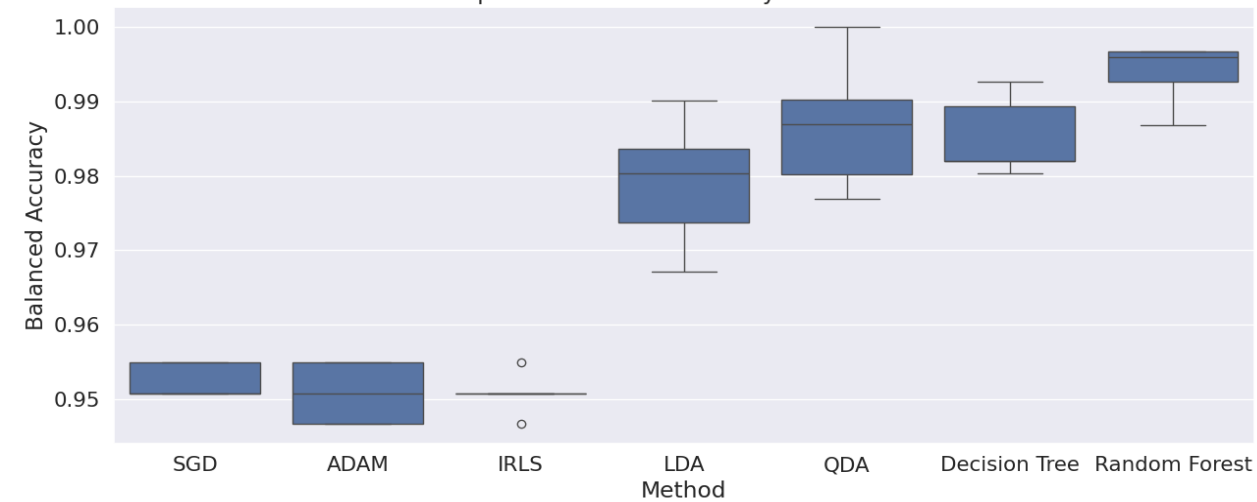   2. Mean value imputation (all features were numeric)

Boxplot of Balanced Accuracy for SGD

Boxplot of Balanced Accuracy for IRLS

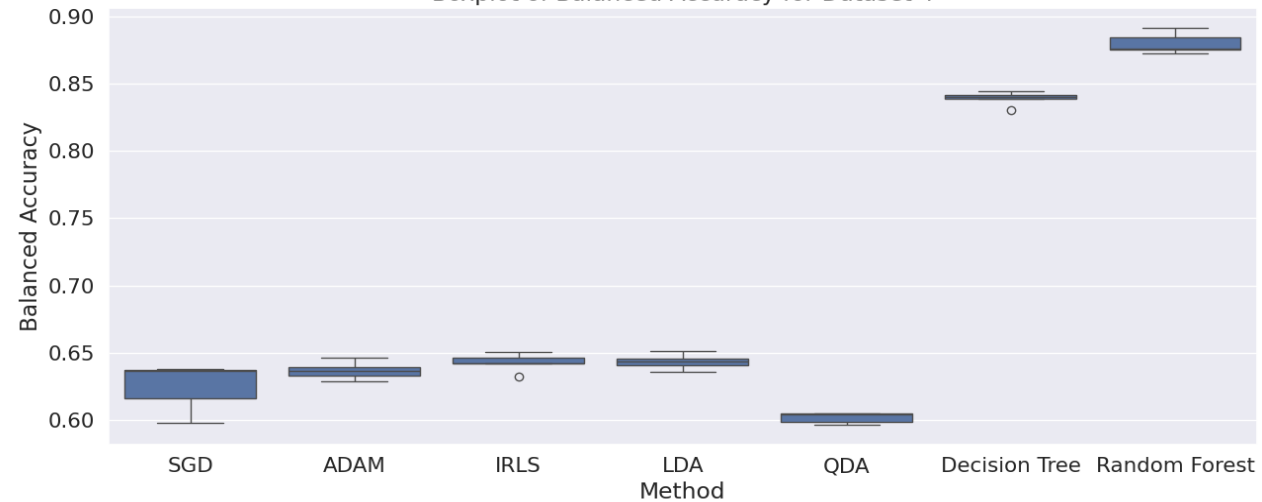Boxplot of Balanced Accuracy for Adam

Methodology

Convergence analysis
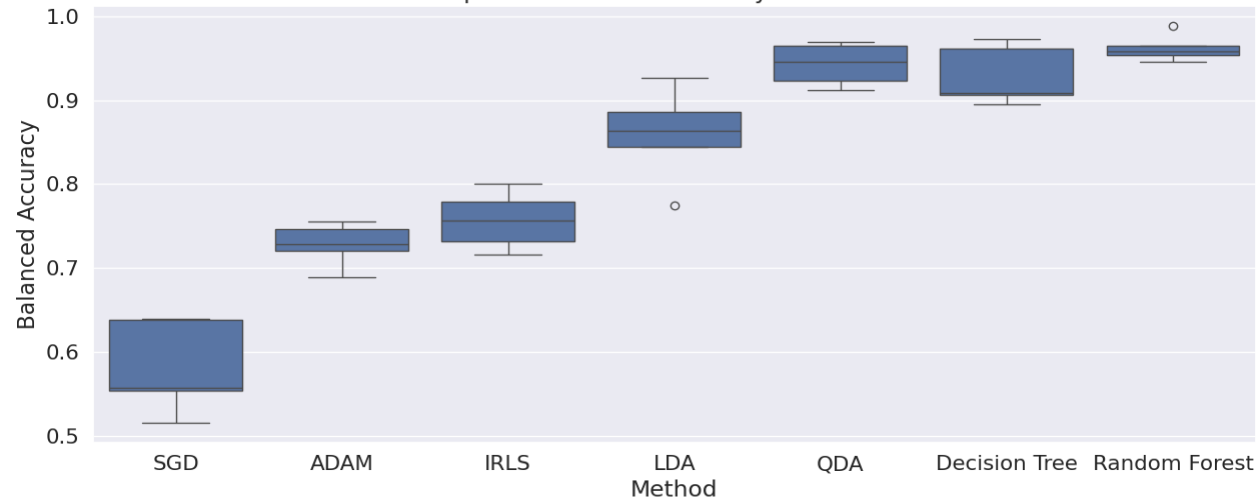
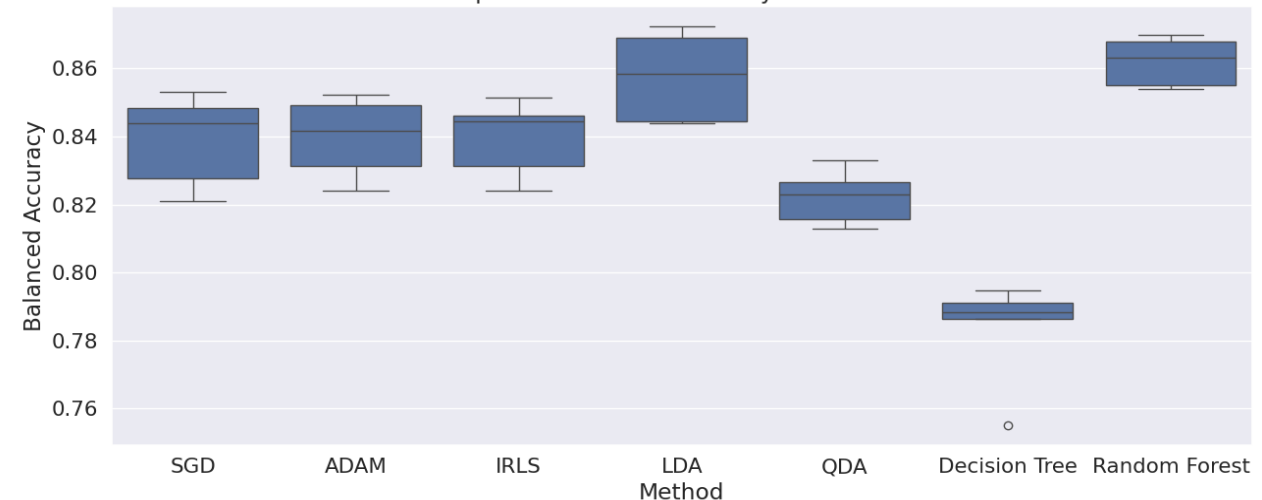# Baseline Comparison

Boxplot of Balanced Accuracy for Dataset 2

Boxplot of Balanced Accuracy for Dataset 4

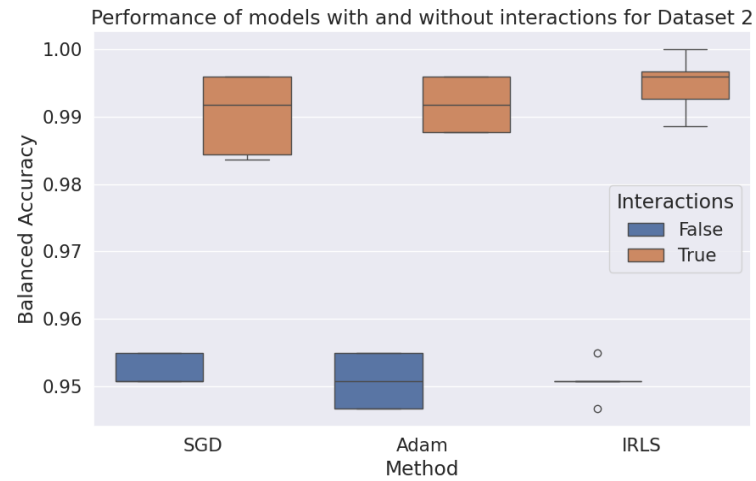Boxplot of Balanced Accuracy for Dataset 6

Boxplot of Balanced Accuracy for Dataset 8

Performance of models with and without interactions for Dataset 1

Performance of models with and without interactions for Dataset 2

Performance of models with and without interactions for Dataset 3

Interactions comparison

Thank you for attention!