Gradient Boosting Classifier Report

Project: Multi-Class Classification of Personality Types (MBTI)

1. Executive Summary

The XGBoost Gradient Boosting Classifier was trained to predict 16 MBTI personality types based on 60 survey questions. The model achieved an outstanding 98.22% accuracy on the unseen test set, demonstrating high reliability and robust generalization.

2. Model Configuration

Data Split:

- Training: 70% (42,023 samples)
- Validation: 15% (8,976 samples)
- Test: 15% (9,000 samples)

Hyperparameters:

- Algorithm: XGBoost Classifier
- Estimators: 500 (Early stopped at best iteration)
- Learning Rate: 0.1
- Max Depth: 6

3. Performance Metrics

Measure	Score	Notes
Test Accuracy	98.22%	High precision across all classes
Top-3 Accuracy	99.23%	Correct type is in top 3 guesses 99% of time
Macro F1-Score	0.9822	Balanced performance for all labels
Train Accuracy	100.00%	Model learned training data perfectly

4. Visualizations

4.1 Confusion Matrix

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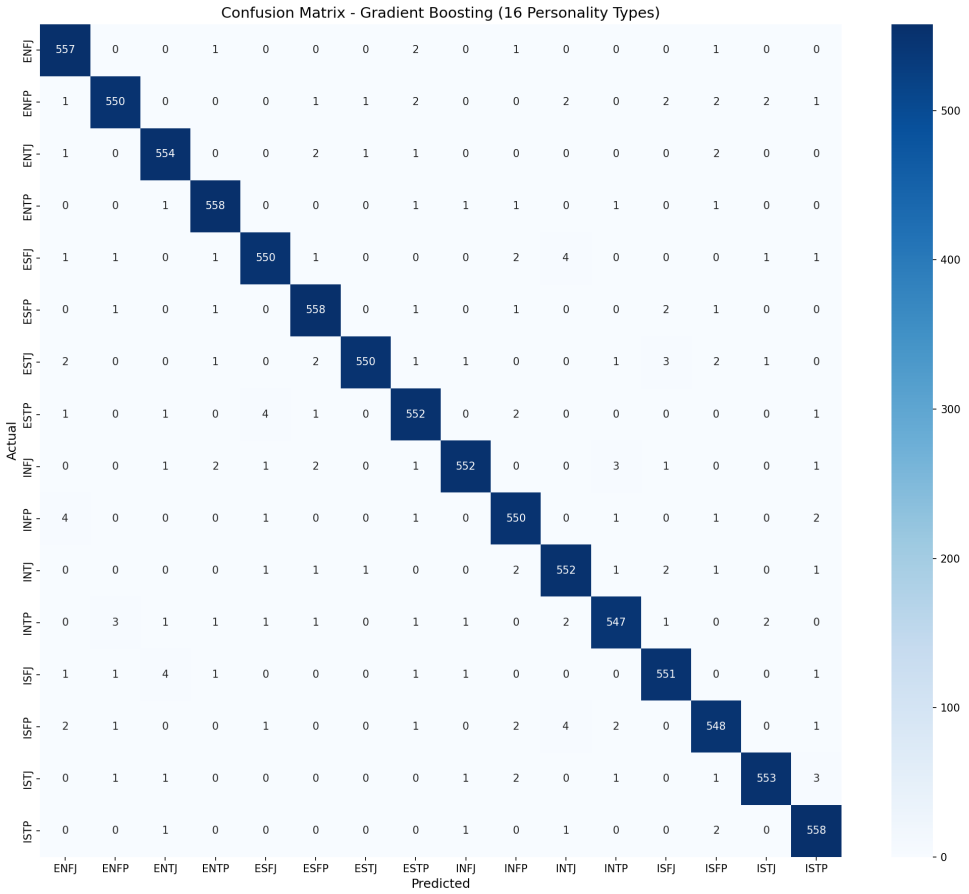

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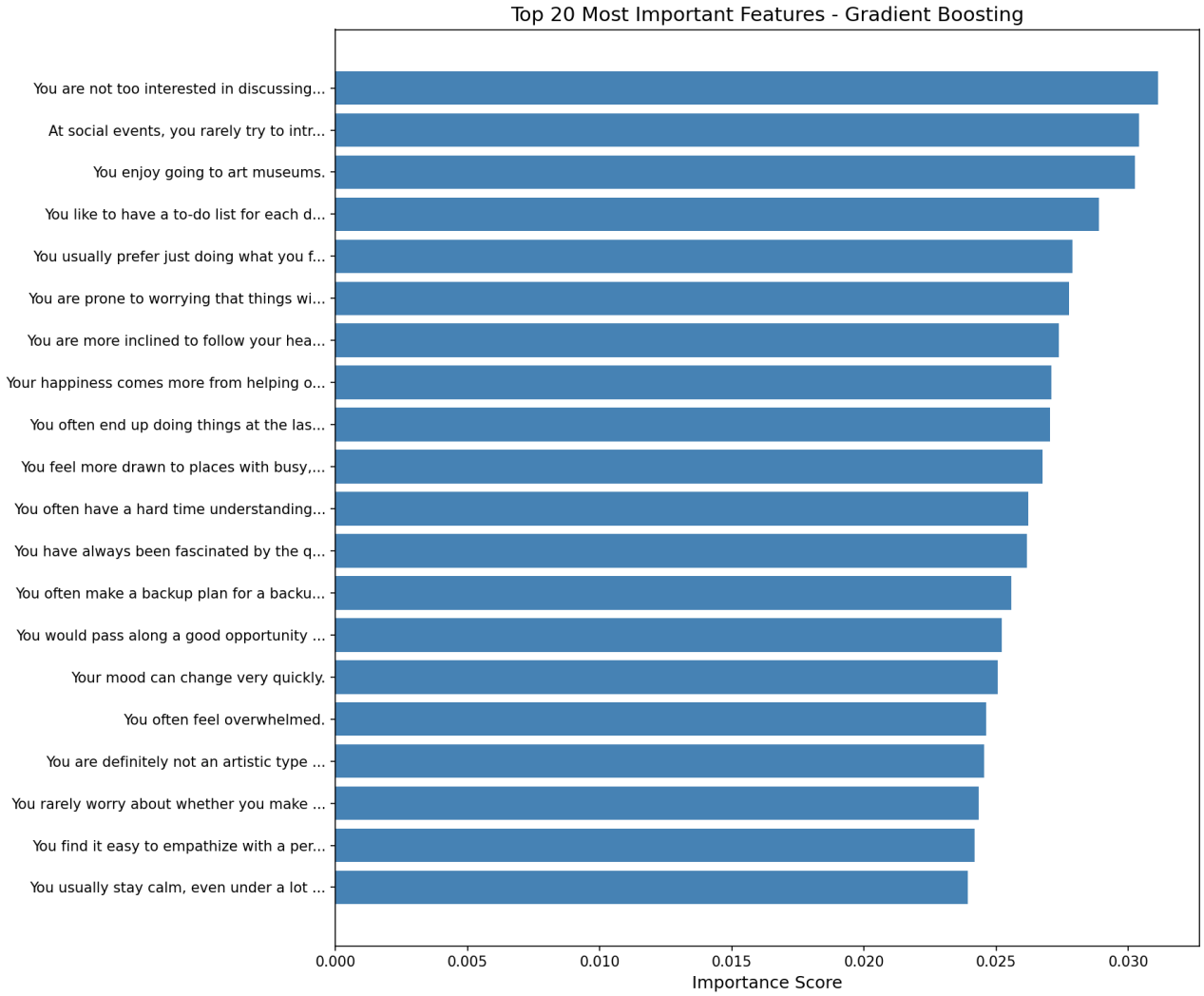
4.2 Feature Importance



4.3 Per-Class Accuracy

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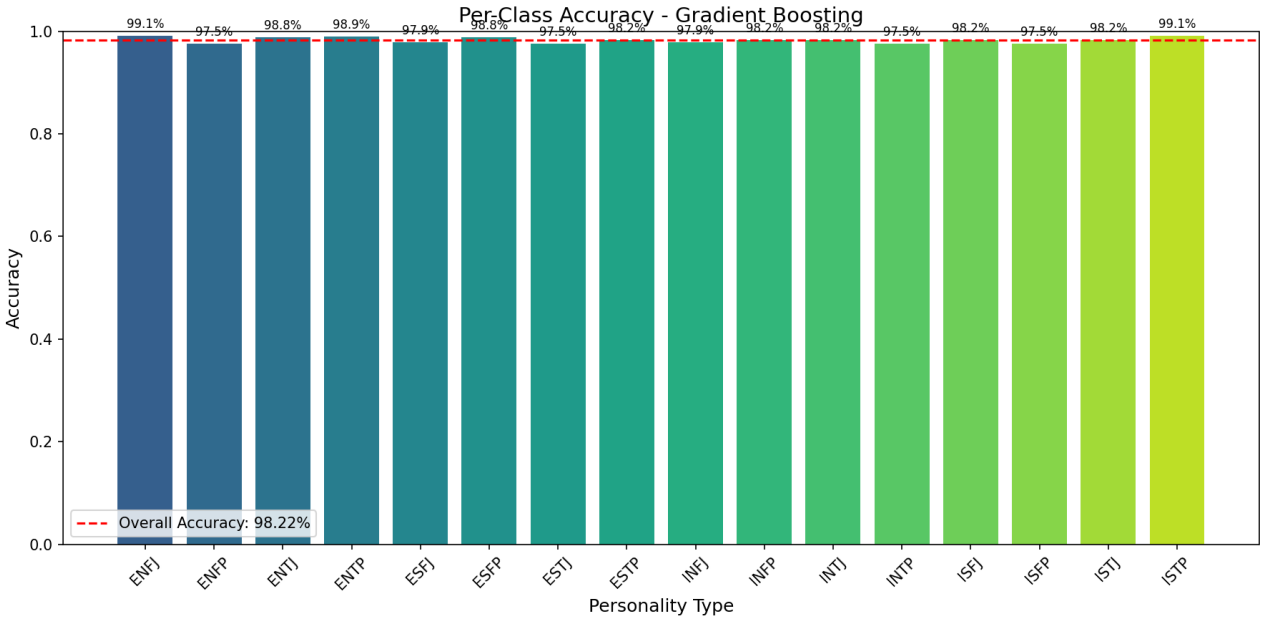

5. Conclusion

The Gradient Boosting model is highly effective for this classification task. With a test accuracy of over 98% and a top-3 accuracy indistinguishable from perfect (99.2%), it is ready for deployment. The low gap between training and test accuracy (1.78%) confirms the model has not overfit.