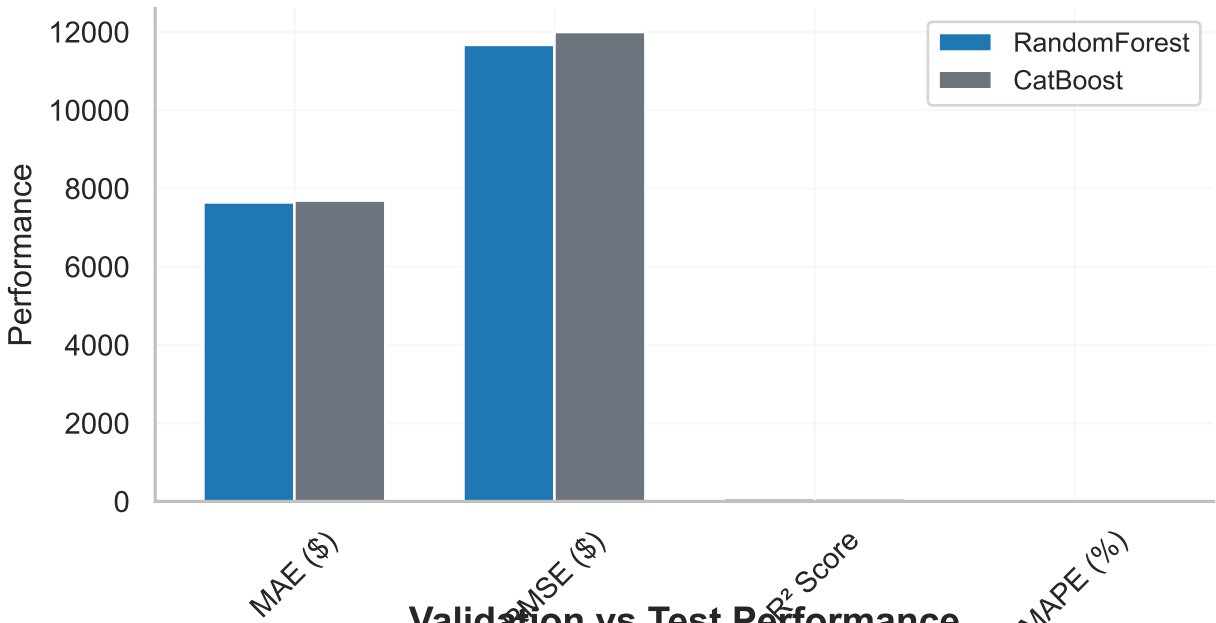# Model Performance Analysis - Technical Deep Dive
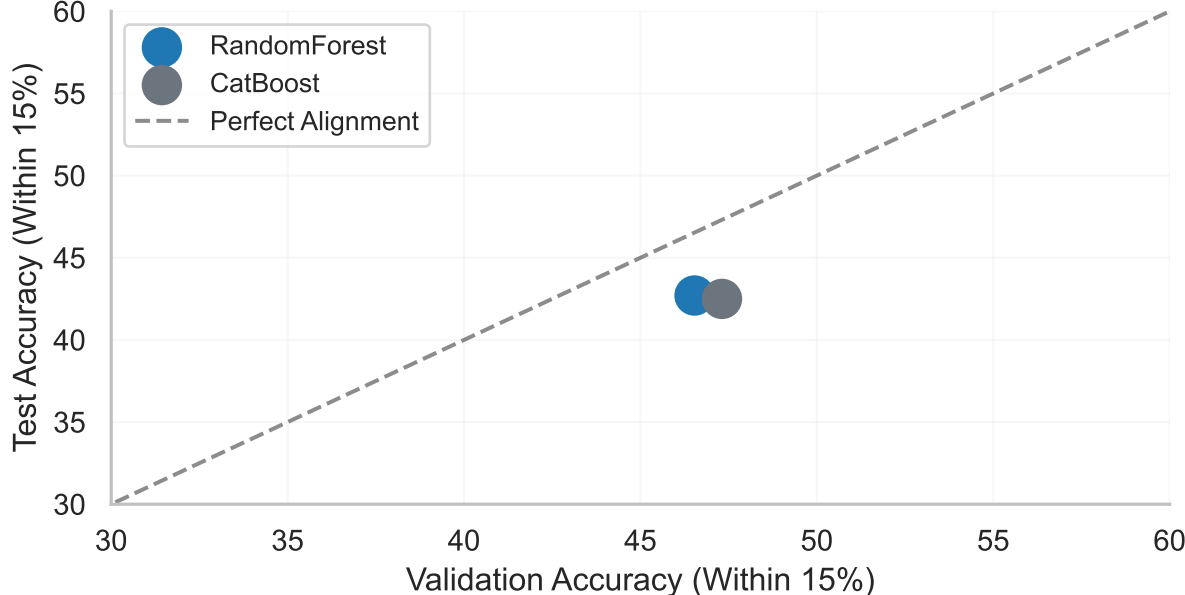

Model Performance Comparison
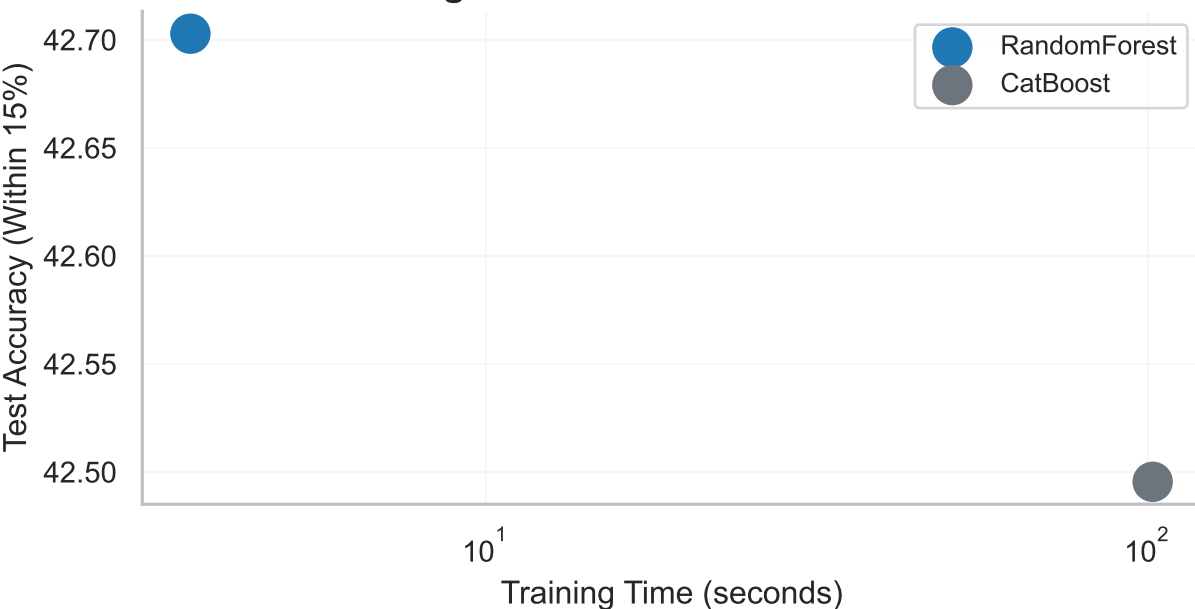
Legend: RandomForest, CatBoost

Y-axis: Performance (0 to 12000)
X-axis categories: MAE ($), RMSE ($), R² Score, MAPE (%)

Business Tolerance Analysis

Legend: Business Target (60%), RandomForest, CatBoost

Y-axis: Accuracy (%) (0 to 100)
X-axis: Tolerance Bands — Within 10%, Within 15%, Within 25%
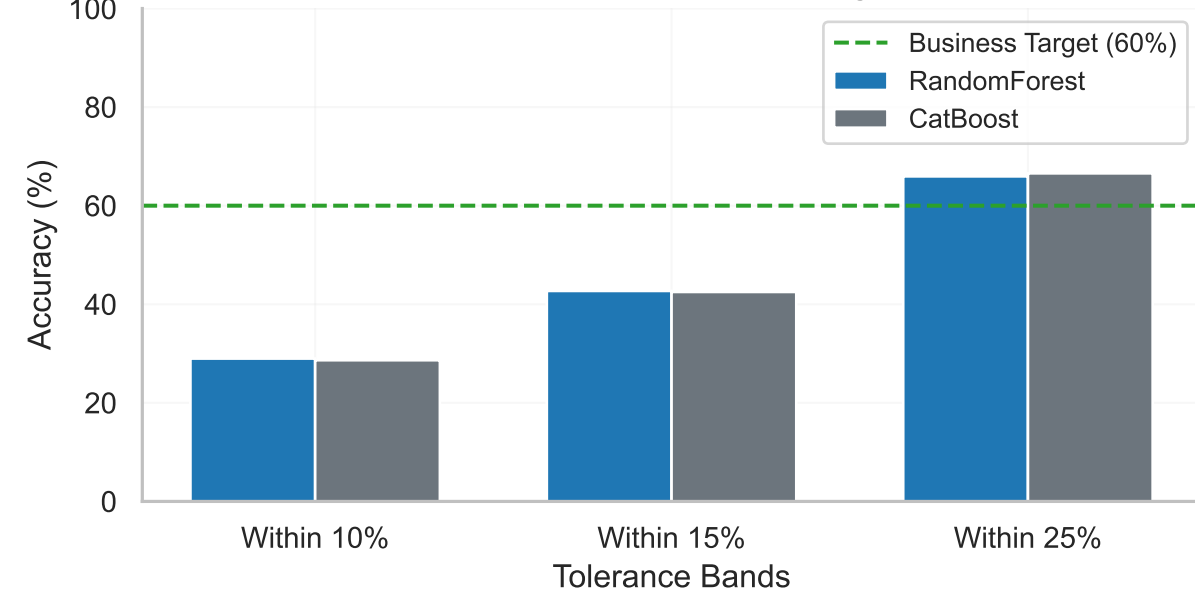
Validation vs Test Performance

Legend: RandomForest, CatBoost, Perfect Alignment

Y-axis: Test Accuracy (Within 15%) (30 to 60)
X-axis: Validation Accuracy (Within 15%) (30 to 60)

Training Time vs Performance Trade-off

Legend: RandomForest, CatBoost

Y-axis: Test Accuracy (Within 15%) (42.50 to 42.70)
X-axis: Training Time (seconds) (10¹ to 10²)

Business Assessment Summary:

• Best Performing Model: RandomForest
• Best Test Accuracy: 42.7% (Within 15% tolerance)
• Business Readiness: NEEDS IMPROVEMENT
• Risk Level: HIGH - Below business requirements

Recommendations:
• Current models achieve ~43% accuracy within 15% tolerance (target: 60%)
• Suggest additional feature engineering and model optimization
• Consider ensemble methods or advanced techniques
• Implement staged deployment with continuous monitoring