Testing Transferability of a Mortality Risk Prediction Model Using Electronic Health Records

External Validation and Model Enhancement

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SafeNET Successfully Transfers Across Health Systems (ROC-AUC 0.81)
Local Optimization Achieves 0.91 ROC-AUC (+12% improvement)

Background

Inter-hospital transfers involve high-risk patients for whom mortality risk stratification at the time of transfer is often unavailable.

SafeNET Solution

Clinical decision support tool to predict in-hospital mortality using data available before or at transfer.

Objective

Evaluate transferability of SafeNET model and compare with locally built models to predict mortality risk using 14 variables.

Methods

14,728
Patient Encounters

- 4 tertiary hospital locations
- Ages 18-90 years
- Study period: Jan-Dec 2023

Data Challenges

- Highly Imbalanced: 3.7% mortality
- 42% missing data (13/14 variables)

Enhancement Strategy

Optimization Methods

Focus on 10 core attributes

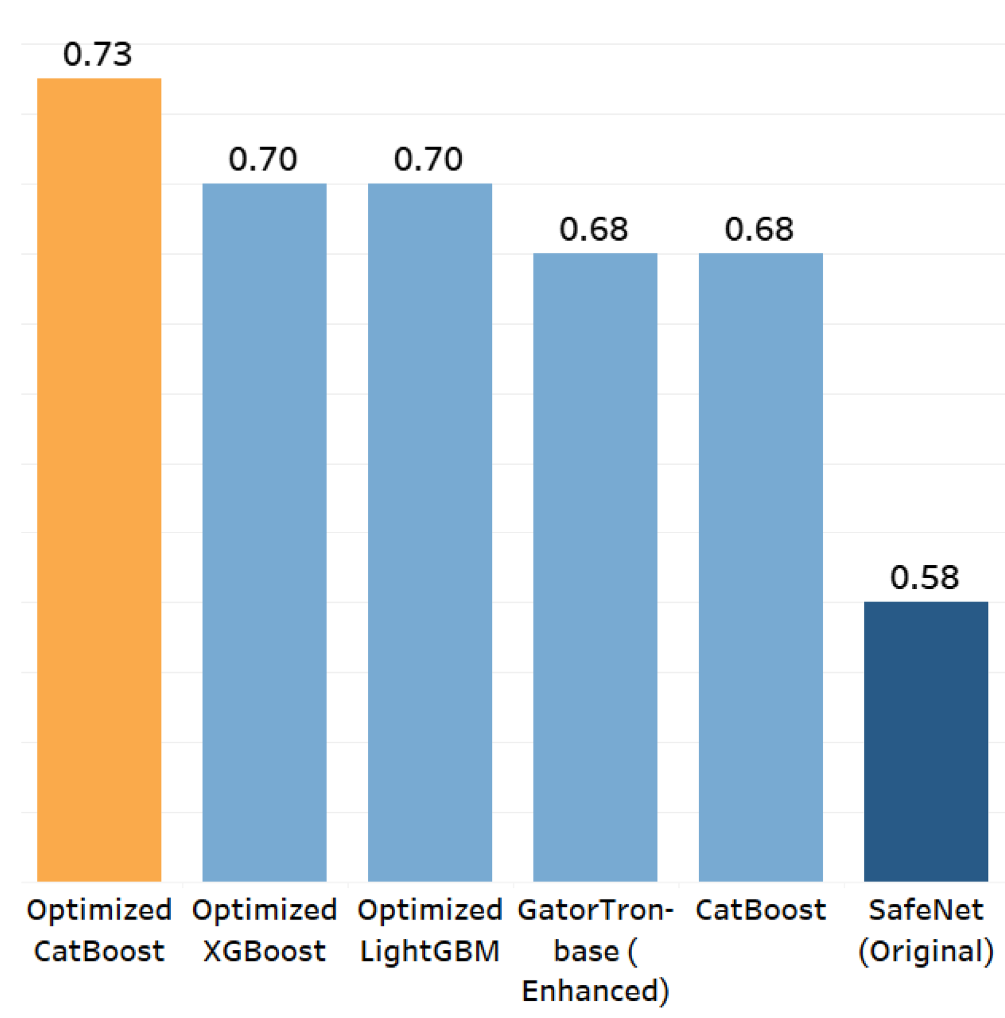
Apply class weighting

Local model tuning

Under-sampling techniques

Performance Results

Inter-hospital transfers involve high-risk patients for whom mortality risk stratification at the time of transfer is often unavailable.



ROC-AUC Performance

SafeNET (external)	CatBoost (Optimized)
0.81	**0.91**
Good performance	Excellent performance

+12% Performance Gain
Through local training, optimization & feature engineering

Key Findings

Transferability Confirmed

SafeNET maintains strong predictive power across different health systems (0.81 ROC-AUC).

Top Predictive Features

- Age
- BUN
- WBC
- Platelets

Patient Type Matters

Inpatient transfers show superior predictability vs. urgent admits—suggesting need for specialized models.

Conclusion

External validation of predictive models involving data from multiple care episodes is feasible. SafeNET has robust transferability, while local optimization improve performance to these models for broader clinical deployment.

Future Directions

Validate at Emory Healthcare to assess AI readiness and guide strategic infrastructure investments.

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