TabTransformer for Credit Risk Assessment

15M Parameters • 5ms Latency • 100 Features (40 Categorical + 60 Continuous)

Categorical Features (40)

Merchant Category	Device Type
Transaction Location	Account Age
Payment Method	Time of Day

+ 34 more categorical features

Continuous Features (60)

Amount	Account Balance
Credit Score	Credit Utilization
Velocity	Recent Patterns

+ 54 more continuous features

Model Performance

AUC Improvement
0.78 → 0.85

Fraud Recall
88%

Prevented Losses
$1.68M/year

Inference Latency
5ms (CPU)

Model Size
15M Parameters

Training Time
2-3 hours

Deployment Strategy
Shadow → 50% A/B → Full
2-4 weeks per phase
Gradual risk management

Embedding Layer
32-Dimensional Embeddings
40 × 32 = 1,280 dimensions

Feed-Forward Network
Dense Layers
60 continuous features

Output and Explainability

Fraud Probability
0.87
High Risk - Flag for Review

SHAP Explanations
Credit Utilization: +0.30
Recent Inquiries: +0.20
Transaction Velocity: +0.40
Device Fingerprint: -0.15

Fairness Constraints
Disparate Impact Ratio
0.85
Meets 80% Rule (>0.80)

Self-Attention Layers
6 Layers × 8 Heads

| L1 | L2 | L3 | L4 | L5 | L6 |

H1 H2 H3 ... H8

Feature Interaction Learning

Fusion Layer
Combine Categorical Embeddings and Continuous Features