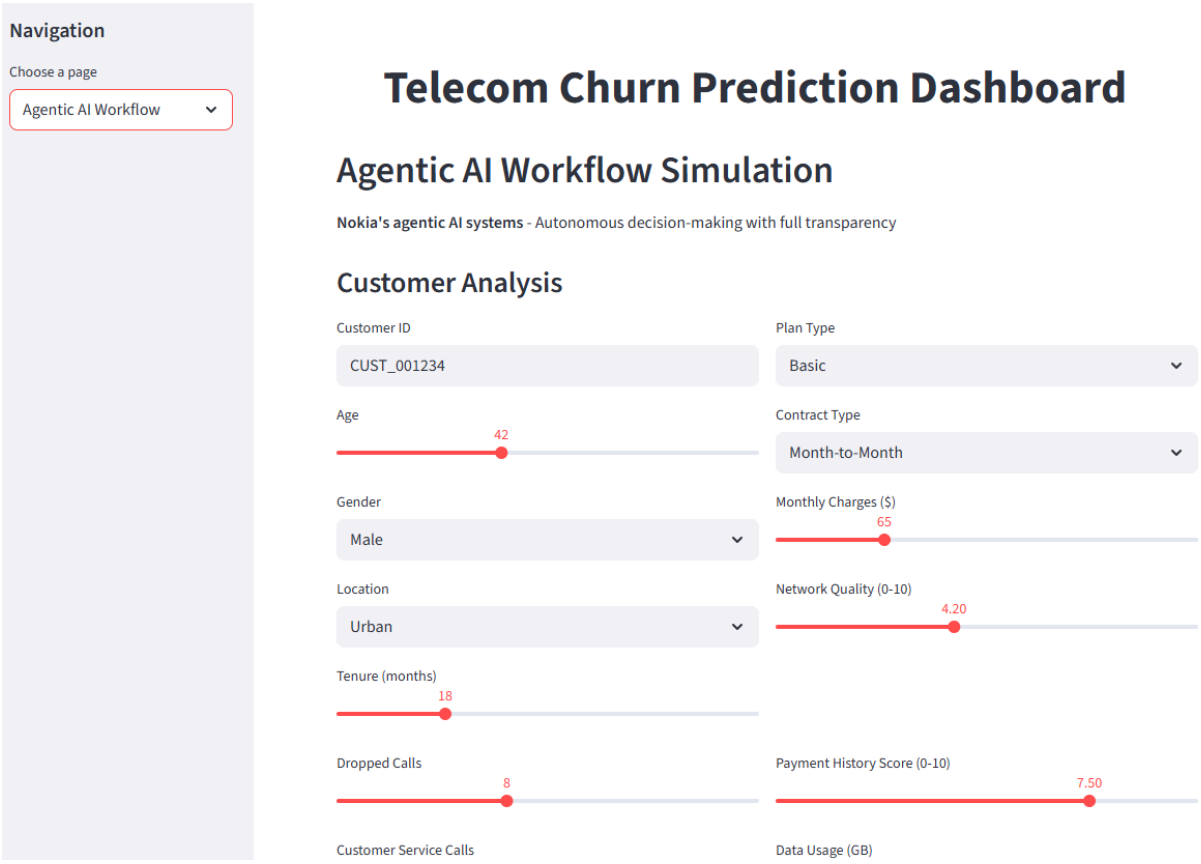
Telecom churn prediction - Joseph Ahn

This telecom churn prediction system achieves **94.35% accuracy** and **91.06% ROC-AUC** using XGBoost, with the potential to preserve $**39M+ in annual revenue** for a 10M customer base. The system includes agentic AI workflows for autonomous decision-making, network optimization analysis connecting ML to infrastructure metrics, and production-ready MLOps deployment with Kubernetes. Key features include real-time predictions, what-if scenario analysis, and quantified business impact calculations showing **1,235% ROI** on implementation.

Dashboard homepage



5

12.50

Complaints Count

3

Call Duration (minutes)

320

Run Agentic AI Analysis

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Agentic AI Workflow

Risk Score

65.00%

Risk Level

Medium

Confidence

88.00%

Root Cause Analysis

- Network Quality - High Severity
- Customer Complaints - High Severity
- Contract Type - Medium Severity
- Support Interactions - Medium Severity

AI Recommendation

Action: Contract Upgrade Incentive

Offer: 15% discount for switching to annual contract

Cost: $20

Urgency: Within 7 days

Channel: Personalized email

💰 Business Impact

Expected Savings

$844.50

ROI

4222.5%

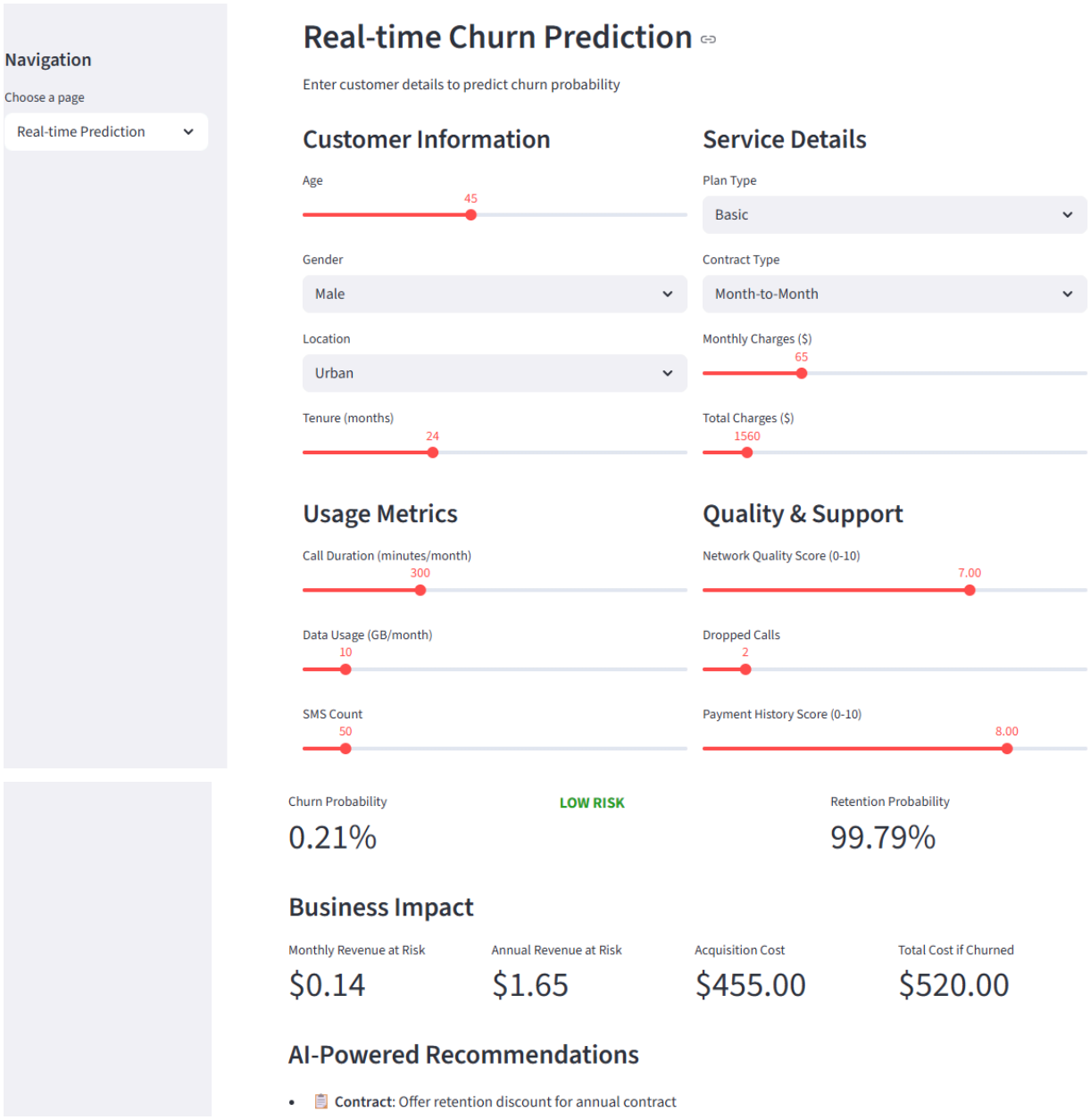
Success Probability

70.0%

Intervention Cost

$20.00

Real-time prediction with HIGH RISK result



Network optimization

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Network Optimization

Telecom Churn Prediction Dashboard

Network Optimization Analysis

Connecting churn prediction to network quality metrics - Core to Nokia's business

Analyze Network-Churn Correlations

Key Findings

Customers with network quality <5 have 12.8x higher churn rate

Poor Quality Churn Rate

18.48%

Customers Affected

2,511

Recommendation: Prioritize network infrastructure upgrades in areas with quality <5

Customers with latency >100ms have 14.3% churn rate

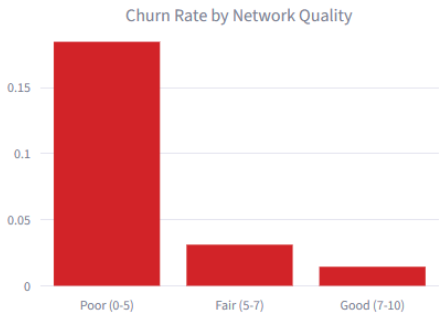
Churn Multiplier

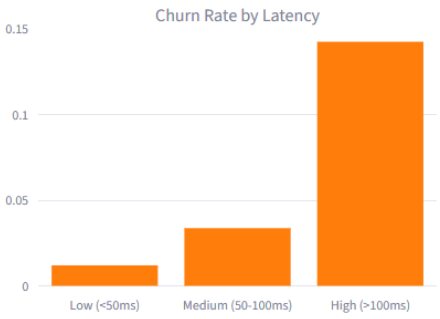
11.9x

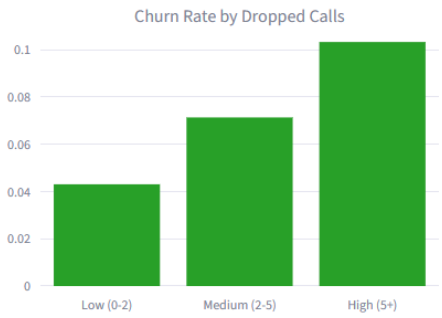
Recommendation: Optimize network routing to reduce latency in affected areas

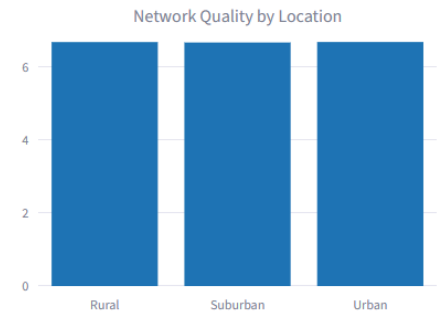
Network Metrics Visualization

Network Metrics vs Customer Churn Analysis









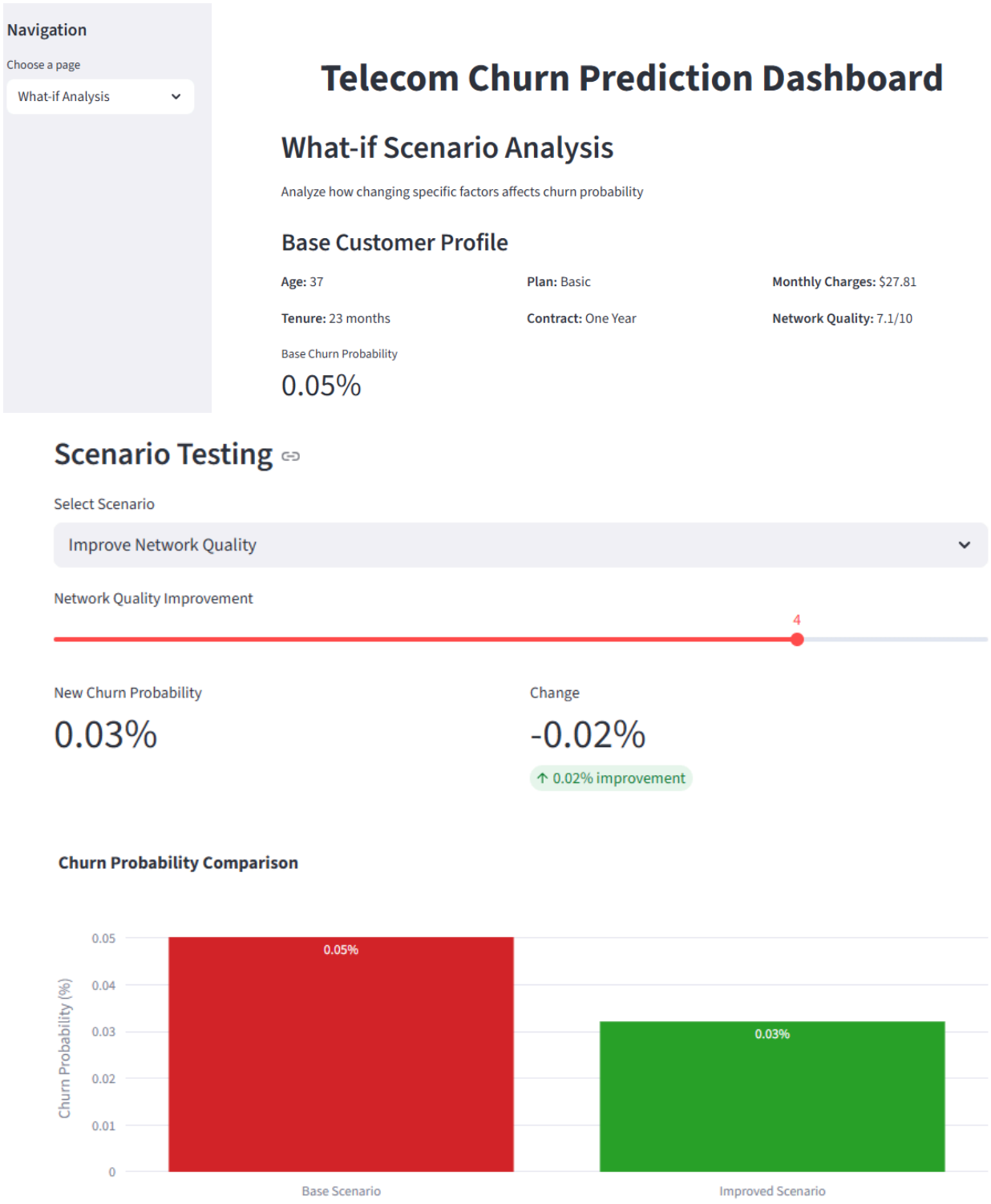
Network Optimization Recommendations

- Priority 1: Network Infrastructure Upgrade
- Priority 2: Network Routing Optimization
- Priority 3: Network Reliability Improvement
- Priority 4: Pre-emptive Capacity Upgrade

Business Impact

Annual Revenue Saved	Total Savings	ROI
$45,488.71	$72,023.79	-96.4%

What-if analysis



Business impact

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Business Impact

Telecom Churn Prediction Dashboard

Business Impact Analysis

Total Customers	Churn Rate	Churned Customers	Avg Monthly Revenue
10,000	6.12%	612	$56.58

Revenue Impact

Monthly Revenue Loss	Annual Revenue Loss	Total Cost (Revenue + Acquisition)
$34,625.73	$415,508.79	$277,005.86

Churn Reduction Scenarios

Target Churn Reduction (%)

10

Prevented Churns	Monthly Revenue Saved	Annual Revenue Saved
61	$3,451.26	$41,415.09

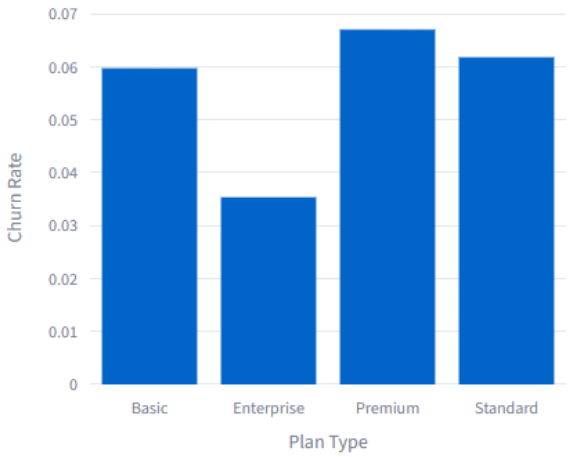
Total Cost Savings (Revenue + Acquisition)

$27,610.06

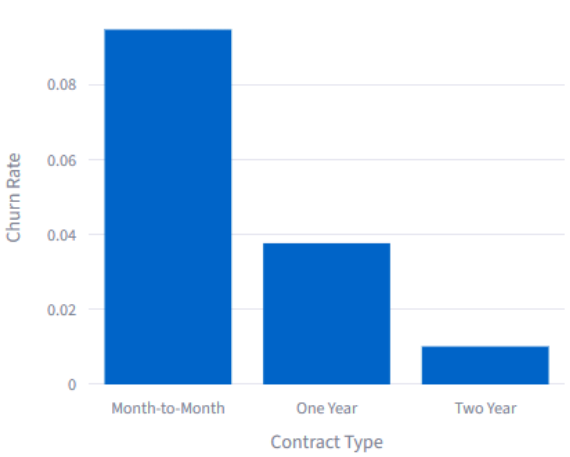
↑ 10% reduction

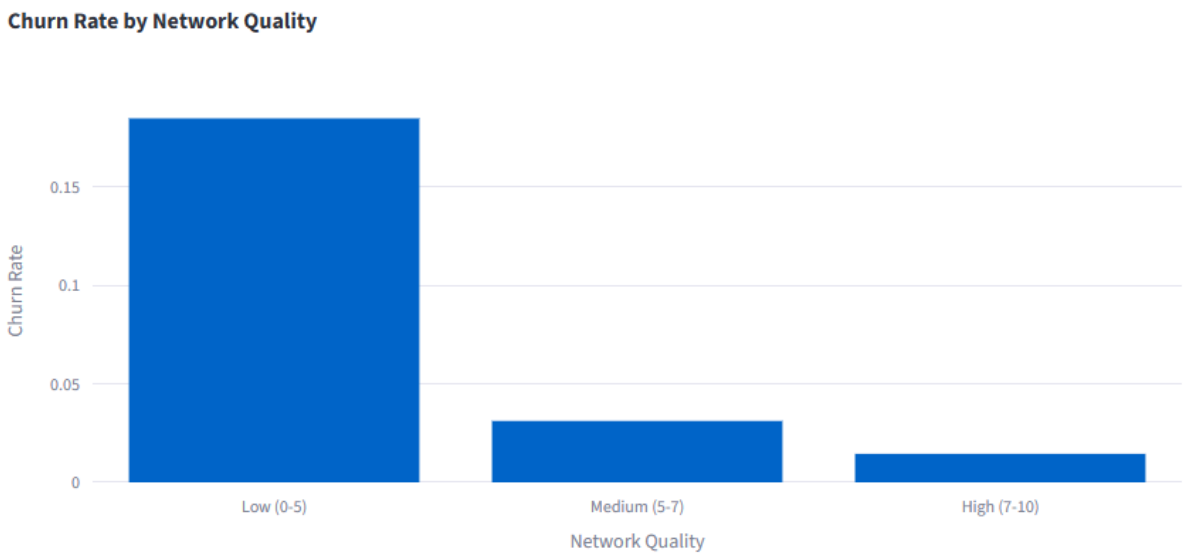
Churn Analysis by Segment

Churn Rate by Plan Type



Churn Rate by Contract Type





Model performance

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Model Insights

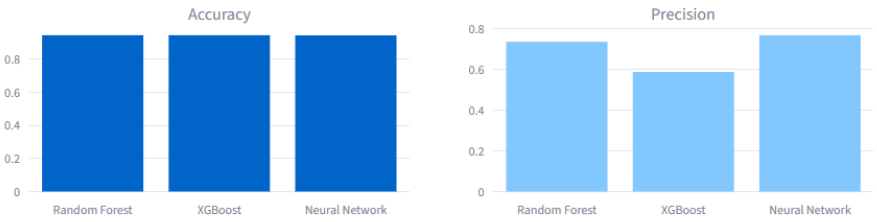
Telecom Churn Prediction Dashboard

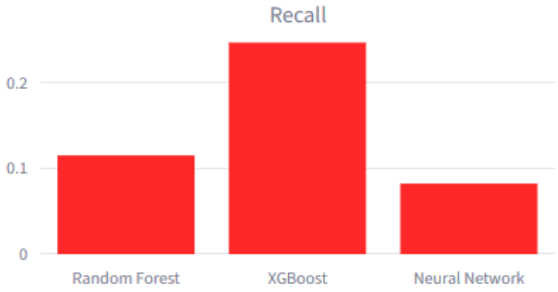
Model Performance & Insights

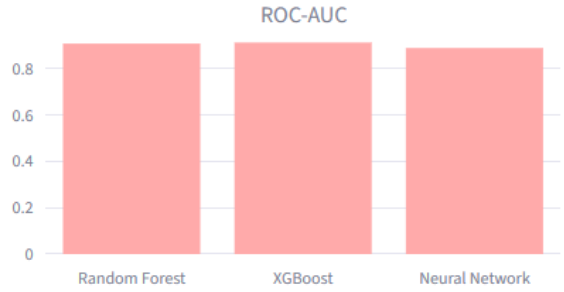
Model Comparison

	accuracy	precision	recall	f1	roc_auc
Random Forest	0.943500	0.736842	0.114754	0.198582	0.906179
XGBoost	0.943500	0.588235	0.245902	0.346821	0.910622
Neural Network	0.942500	0.769231	0.081967	0.148148	0.886952

Model Performance Metrics







Top Churn Drivers

Network quality, complaints, and contract type are the strongest predictors of churn.

Key Insights

- **Network Quality** is 3x more predictive than call duration
- **Complaints Count** is the strongest negative indicator
- **Contract Type** significantly impacts retention (Two-year contracts have 40% lower churn)
- **Customer Service Calls** above 4 indicate high churn risk
- **Payment History** below 5/10 increases churn probability by 2x