CREDIT STRATEGY IMPACT ON LOAN PRODUCTION
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BACKGROUND

About Republic Finance
Republic Finance is a regional consumer lending institution servicing communities throughout the Southeastern United States.

$1.5B+ Annual loans
300,000+ Customer base
200+ Local branches

Problem Description
Republic Finance relies on predictive analytics to drive profitability. After shifting credit strategy to target lower risk and higher value loans, their predictive capabilities were reduced as typical customer behavior patterns also changed.

Significant Pain Points
- High overall forecasting error
- Lacking branch-level prediction method
- Weakened account-level insight

2019 Live Check Cashings Budget vs Actuals

SOLUTION & IMPACT

1. Short-Term Account Level
Machine learning models determine propensity for loan renewal and attrition

2. Mid-Term Branch Level
ML-powered discrete simulation combines time-series analysis with account insights for detailed forecasts

3. Long-Term Portfolio Level
Aggregate loan outcomes forecasted with time series analysis

Total estimated project impact
$15,000,000

PROJECT APPROACH

Our solution integrates machine learning, time-series analysis, and discrete-event simulation.

METHODS

PHASE 1 - September 2019
- Business Analysis
- Account-Level Machine Learning

PHASE 2 - November 2019
- Time Series Forecasting

PHASE 3 - January 2020
- ML-Powered Discrete-Event Simulation

PHASE 4 - March 2020
- Live Check Cashing Forecast Comparison

MACHINE LEARNING

Multiple classifiers predict next-month account behavior:
- XGBoost: Direct loan renewal & live check conversions
- Random Forest: Attrition (early loan closure)

AUC-ROC: Attrition Predictive Model

Simulation

Simulation results are aggregated to create forecasts.

FORECASTING

GOALS

- Predict unit portfolio inflow & outflow
- Accurate annual prediction window

METHODS

- Prophet (open source additive model)
- Branches lacking sufficient historical data – exponential smoothing & moving average

OUTCOMES

- Portfolio & branch-level unit forecasts of each flow type (1200+ fits)

Company Contact
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#Republic Finance
#Machine Learning