TELECOMMUNICATION

CUSTOMER CHURN

SOLUTIONS WITH ANN CLASS

INTRODUCTION

- Churn prediction is a critical area of concern for businesses, particularly in sectors like telecommunications, retail, and subscription-based services.
- Customer churn refers to the phenomenon where customers stop doing business with a company or switch to competitors.
- Accurately predicting churn allows companies to take preventive measures to retain high-value customers, thereby increasing customer lifetime value (CLV) and reducing revenue loss.

In this case study, we explore the use of Artificial Neural Networks (ANNs) for predicting customer churn in a telecommunications company.

The goal is to create an effective churn prediction model that can identify customers at risk of leaving, enabling targeted retention strategies.

PROBLEM STATEMENT

The telecommunications company has a large customer base and seeks to reduce churn by identifying customers who are likely to leave.

The company’s challenge is to predict churn accurately based on historical data of customer interactions, usage patterns, demographics, and service preferences.

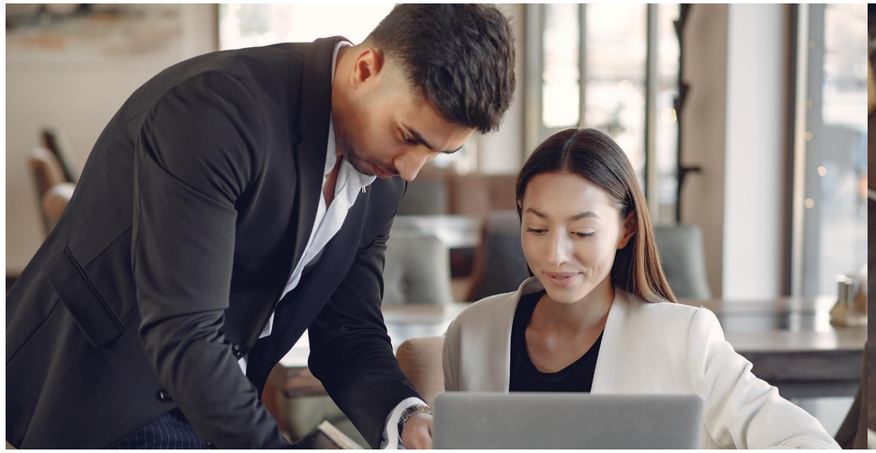
Traditional methods have not provided the predictive accuracy needed for effective intervention.

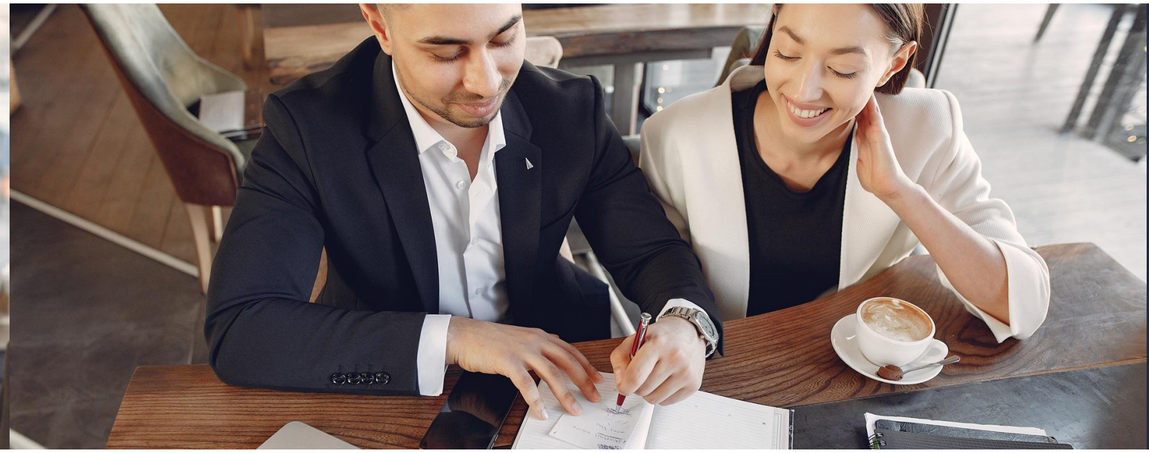
LET'S BUILD A **STRATEGIC MODEL FOR OUR USE CASE**

DATA UNDERSTANDING

The dataset includes several critical features related to customer demographics, account details, financial status, and behavioral patterns, which serve as input for the ANN model. Here's a breakdown of the key data points in the dataset:

- Identifiers (RowNumber, CustomerId, Surname): Excluded from churn prediction.
- CreditScore: Lower scores may indicate higher churn risk.
- Geography: One-hot encoded; reflects market/cultural factors.
- Gender: Encoded binary feature; potential behavioral insights.
- Age: Younger customers may have higher churn risk.
- Tenure: Longer tenure often indicates loyalty.
- Balance: Zero balance may suggest disengagement.
- NumOfProducts: More products usually mean higher loyalty.
- HasCrCard: Credit card presence can reduce churn likelihood.
- IsActiveMember: Active members generally churn less.
- EstimatedSalary: Higher incomes might reduce price sensitivity.
- Exited: Target variable; 1 for churned, 0 for retained.





DATA PREPROCESSING **STEPS**

To prepare this data for input into the ANN, several preprocessing steps were taken:

- Handling Missing Data: There was no missing data.
- Normalization: Numerical features were scaled using Numpy normalization.

MODEL DEVELOPMENT

Neural Network Architecture

- Input layer: Customer features
- Hidden layers: [6,4] neurons
- Output layer: Binary classification (churn/no churn)

Key Functions Implemented

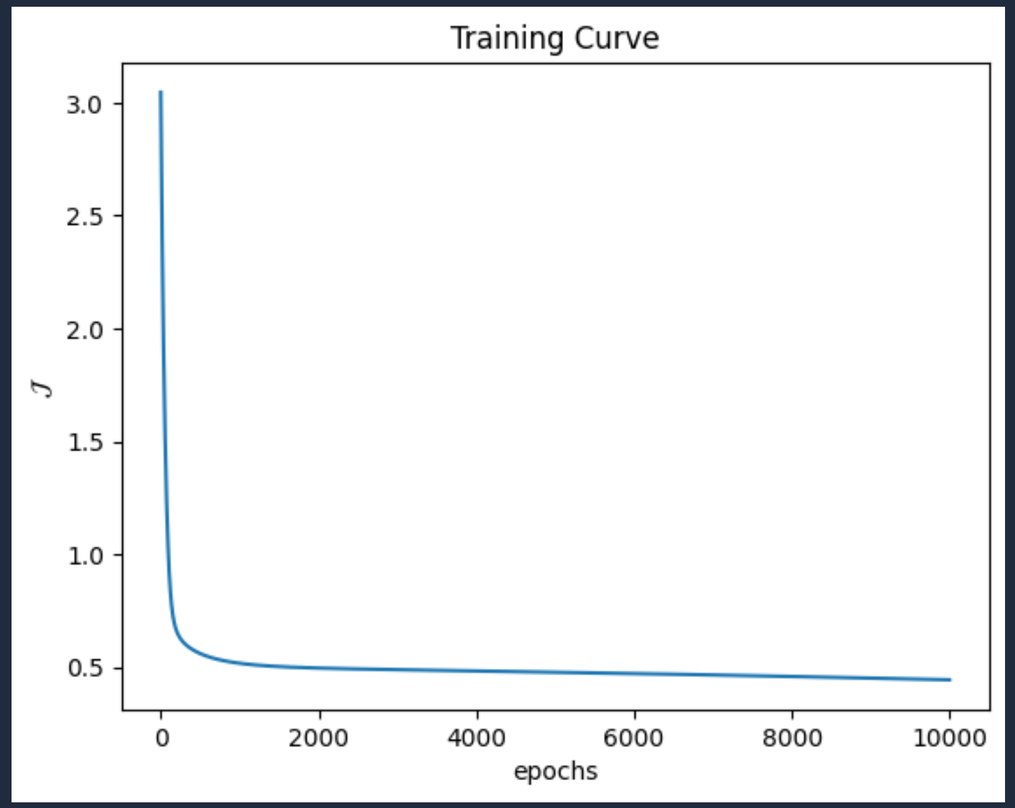
- Activation functions: ReLU, sigmoid, softmax, linear
- Loss functions: Cross-entropy, OLS
- Utility functions: one-hot encoding, accuracy metrics

Data Preprocessing

- Categorical encoding for Geography and Gender
- Feature normalization
- Missing value handling
- Feature scaling

Model Training

- Gradient descent optimization
- Backpropagation for weight updates
- Learning rate: 1e-2
- Epochs: 10,000



ANN CLASSIFICATION

EVALUATION METRICS

01 Epochs is 10,000

02 Training Accuracy is 81.40

INSIGHTS AND INTERPRETATION

Service Usage & Account Balance

Customers with zero or low balances were more likely to churn, suggesting low engagement.

Tenure and Age

Shorter tenures and younger age groups correlated with higher churn rates, possibly due to these customers being more cost-sensitive or open to exploring competitors.

Credit Score

Lower credit scores were found to correlate with a higher likelihood of churn.

IsActiveMember

Customers marked as inactive were more prone to churn, emphasizing the importance of engagement.

RECOMMENDATIONS

Targeted Retention:

- Personalized Offers: Provide tailored discounts or bundles to high-risk customers.
- Proactive Support: Target low-engagement or complaint-prone customers with support.

Enhance Experience:

- Engagement Campaigns: Re-engage inactive members with targeted communication.
- Product Recommendations: Suggest additional products to customers with fewer services.

Monitor Behavior:

- Flexible Payments: Offer flexible terms to customers with low balances.

Competitive Analysis:

- Benchmarking: Regularly assess competitors' offerings and adjust for high-risk customers.

CONCLUSION

By leveraging customer data and using ANN, the churn prediction model offers accurate predictions, actionable insights, and effective strategies for customer retention.

The model's high AUC-ROC score and insights into key features such as Credit Score, Tenure, and IsActiveMember demonstrate its utility in guiding retention efforts.

ultimately enhancing customer satisfaction and profitability for the company.

THANK YOU