

TELECOM CHURN PREDICTION

Business and Technical Insights
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Introduction

Overview of Telecom churn prediction project

- **Telecom Churn Problem:** Churn is a significant challenge in the telecom industry, where retaining high-value customers is crucial for revenue growth and market competitiveness
- **Business Objective:** Predict customer churn using historical data and identify key factors using predictive modelling to implement targeted retention strategies for high-risk customers.
- **Data Overview:** The dataset consists of customer-level data over four months (June to September), including information on recharge amounts, call usage, data usage, and roaming patterns.
- **Predictive Modelling:** A logistic regression model was built to predict churn and identify key predictors that drive strategies to retain customers and reduce churn rates

Data Understanding and Preparation

Dataset Overview:

- The dataset contains customer-level data for four months: June, July, August, and September.
- Key features include recharge amounts, call usage (incoming and outgoing minutes), data usage (2G/3G), and roaming information.

Target Variable:

- The target variable is churn, where customers who did not use voice or data services in September are labeled as churners.

High-Value Customer Segmentation:

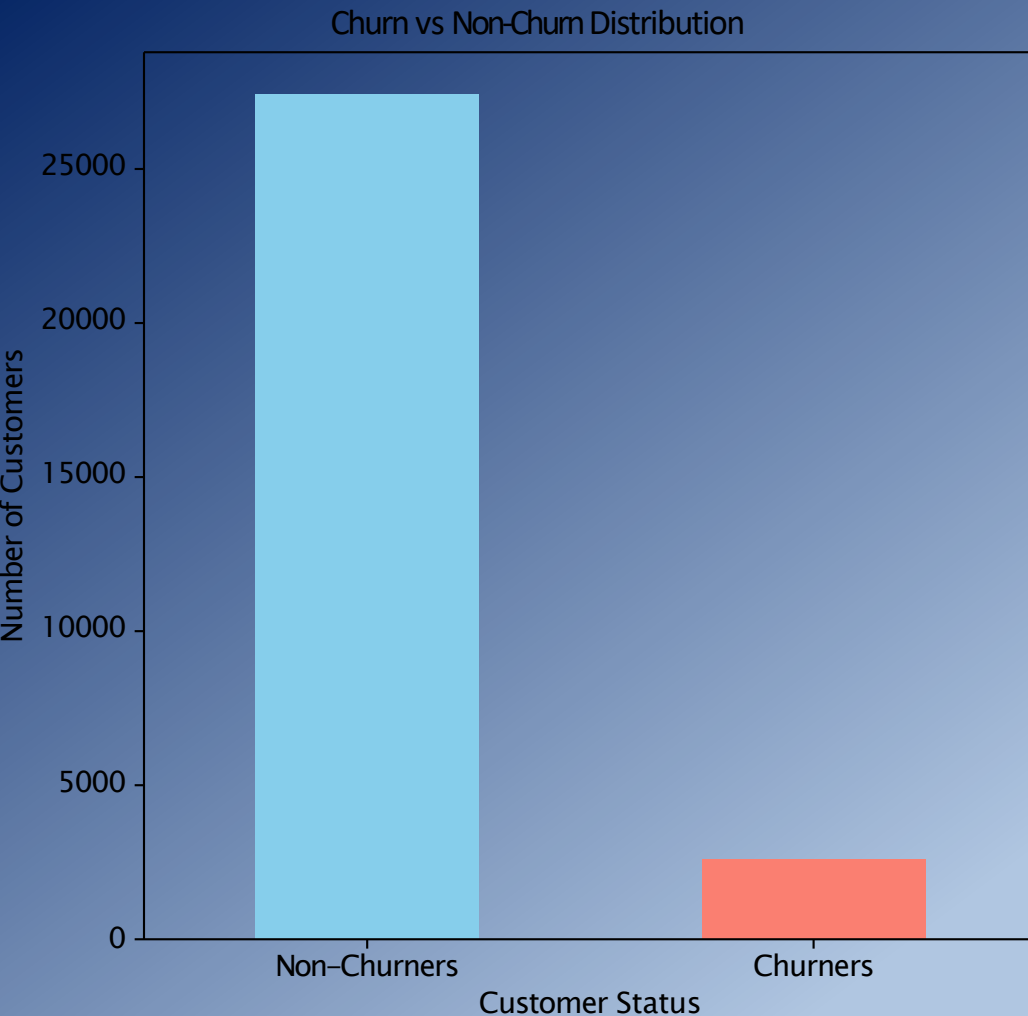
- The analysis focuses on high-value customers, identified by those who recharged above the 70th percentile in June and July.

Data Cleaning:

- Missing values were handled through median imputation for numeric columns.
- Columns corresponding to the churn month (September) were removed to ensure that only pre-churn data was used for prediction.

Feature Engineering:

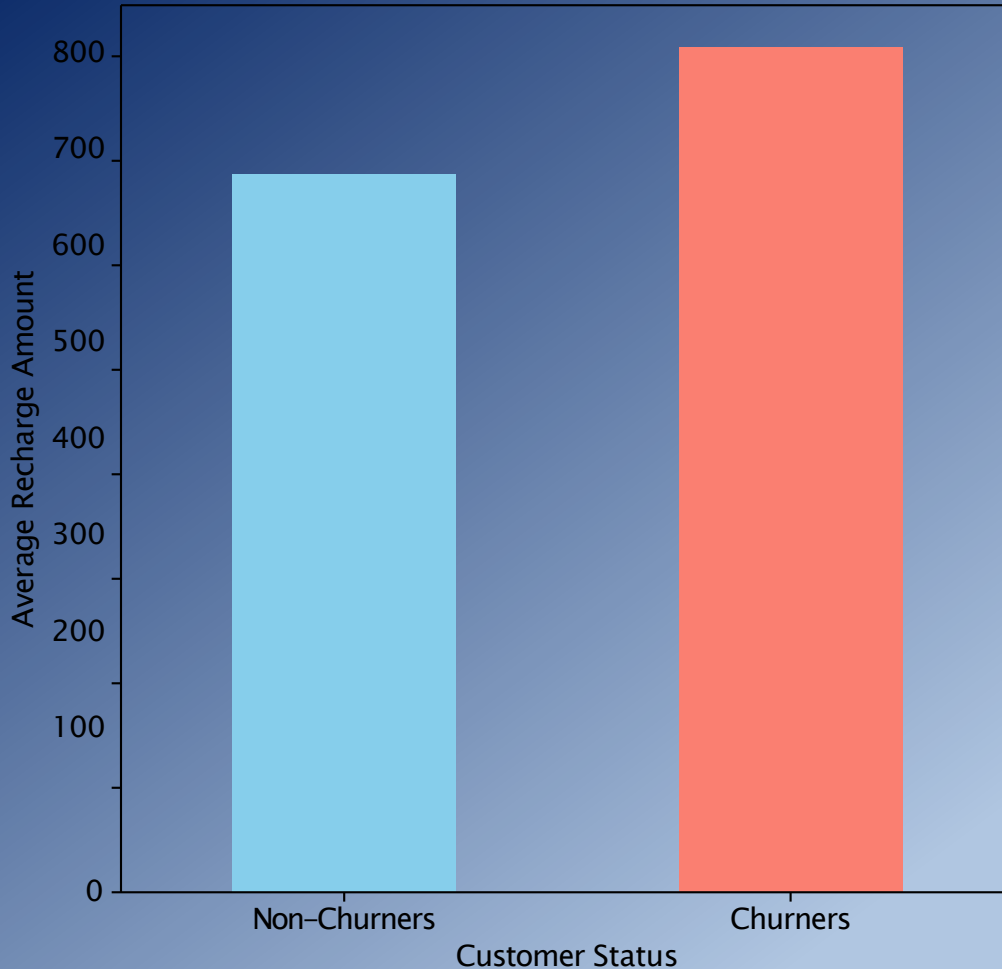
- Created new features like average recharge amounts and call usage trends to enhance model performance.



Insights: The majority of customers are non-churners. However, a significant portion of customers have churned.

Recommendations: Since churn impacts a considerable number of customers, addressing churn through personalized retention strategies should be a priority. The model should focus on these churners only.

Average Recharge Amount in June by Churn

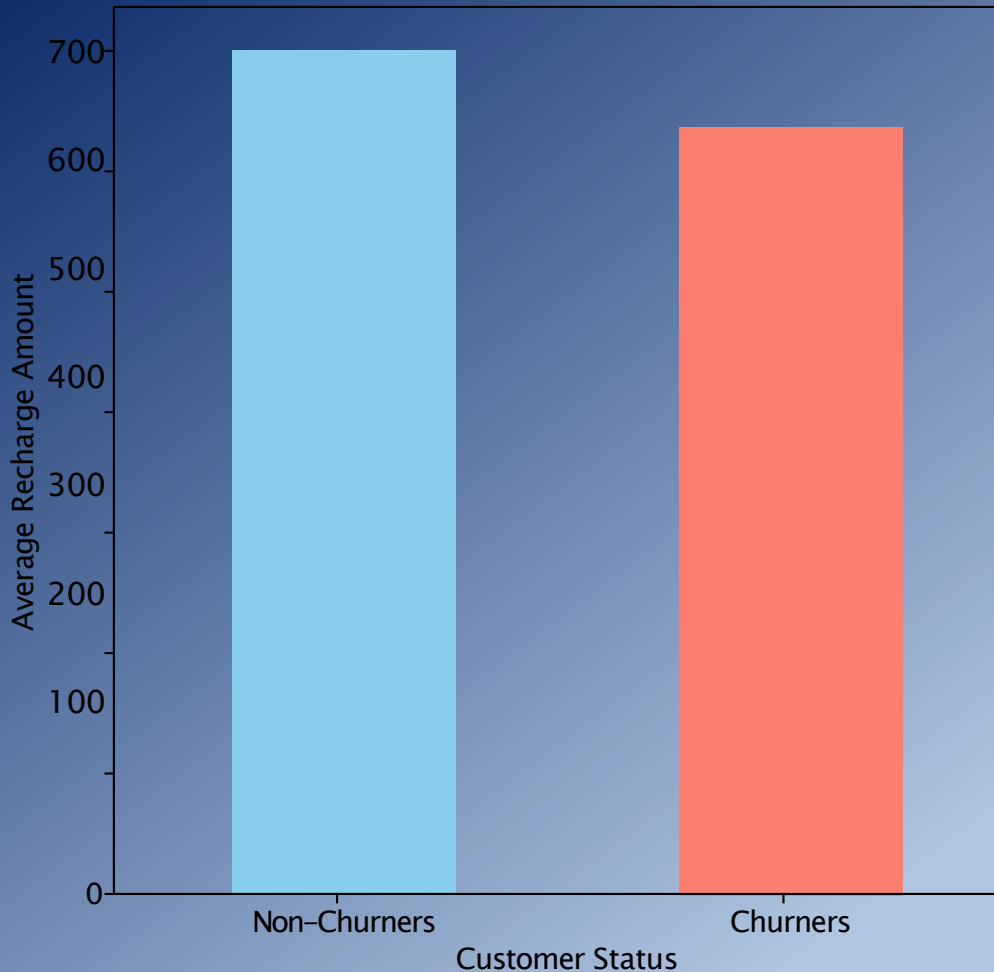


Insights:

June: Churners have much higher average recharge amount compared to non-churners.

Recommendations: Introduce loyalty programs, offerings cashback or bonus credits for customers who recharge consistently, especially targeting customers with declining recharge activity

Average Recharge Amount in July by Churn

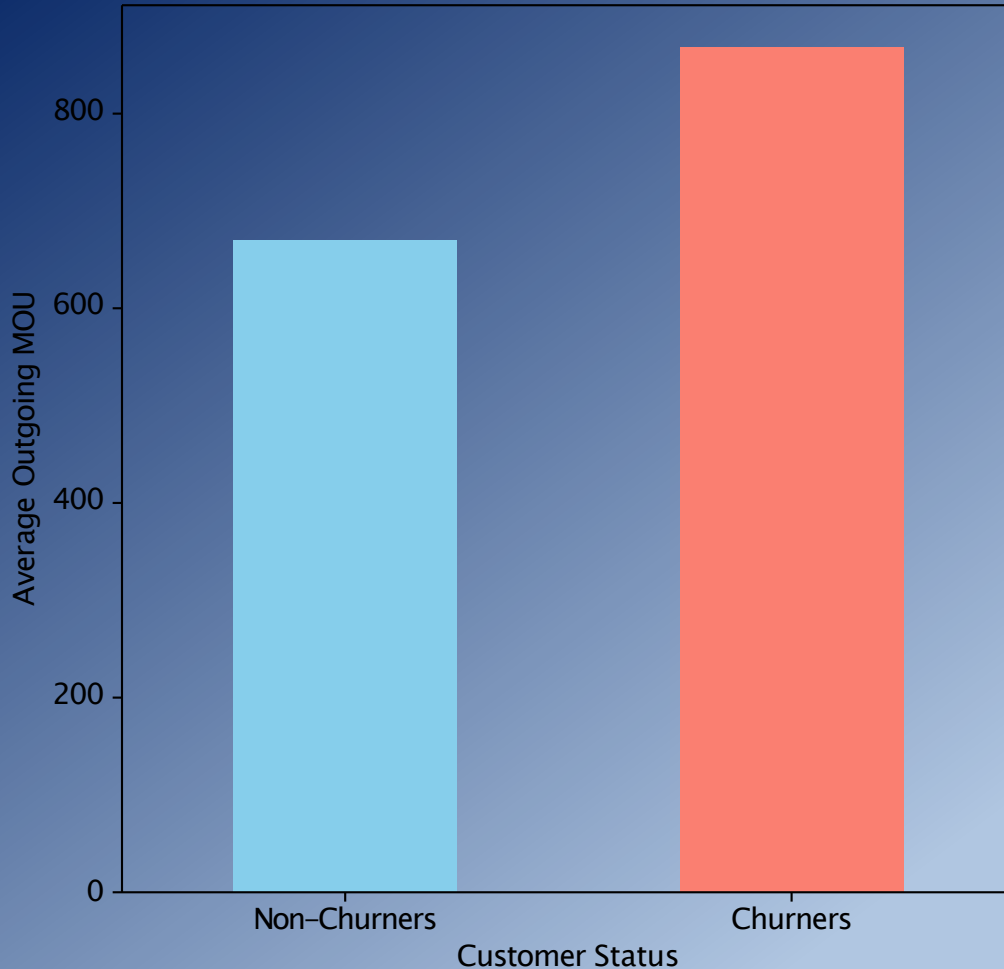


Insights:

July: The churners have much lower average recharge amount compared to non-churners

Recommendations: Introduce loyalty programs, offerings cashback or bonus credits for customers who recharge consistently, especially targeting customers with declining recharge activity

Average Outgoing Minutes of Usage in June by Churn

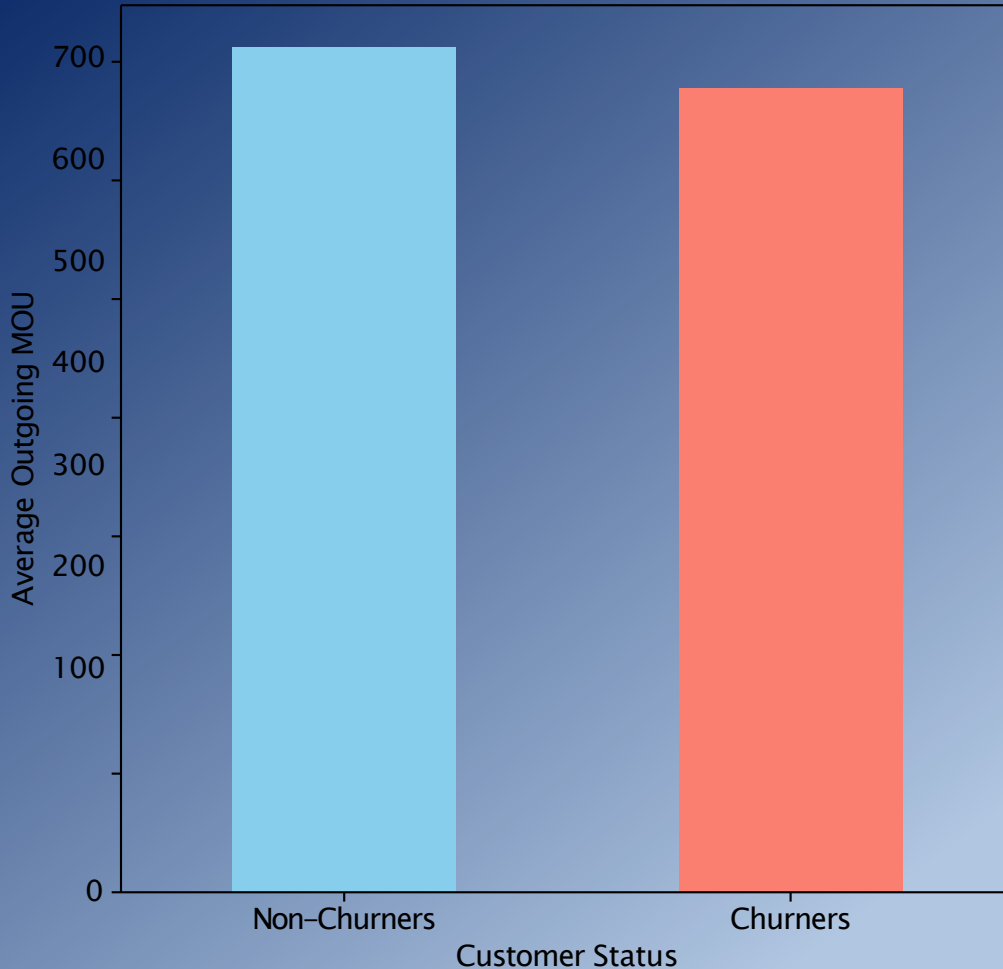


Insights:

June: Outgoing minutes of usage by churn is higher than non-churners

Recommendations: For customers declining call activity, offer special plans with unlimited calls or extra minutes to encourage engagement. Monitor customers with low outgoing usage and re-engage them early

Average Outgoing Minutes of Usage in July by Churn

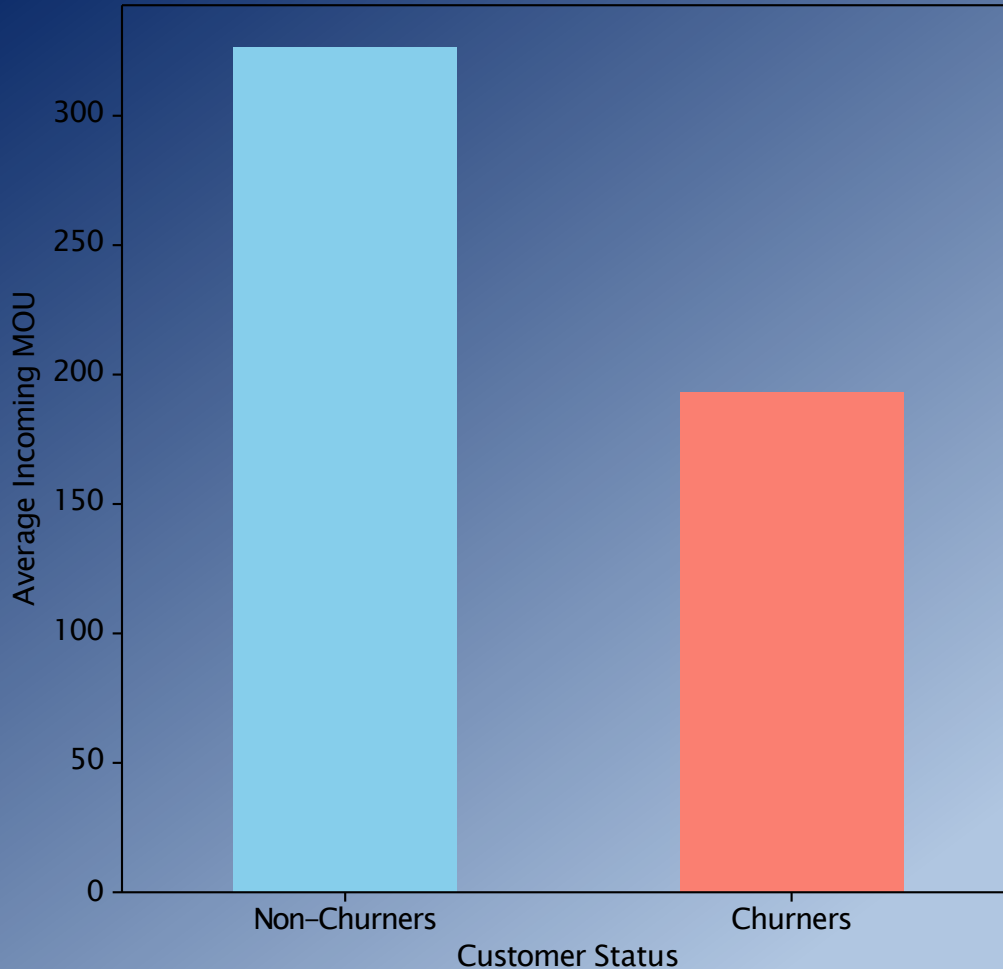


Insights:

June: Outgoing minutes of usage by churn is slightly lower than non-churners

Recommendations: For customers declining call activity, offer special plans with unlimited calls or extra minutes to encourage engagement. Monitor customers with low outgoing usage and re-engage them early

Average Incoming Minutes of Usage in July by Churn



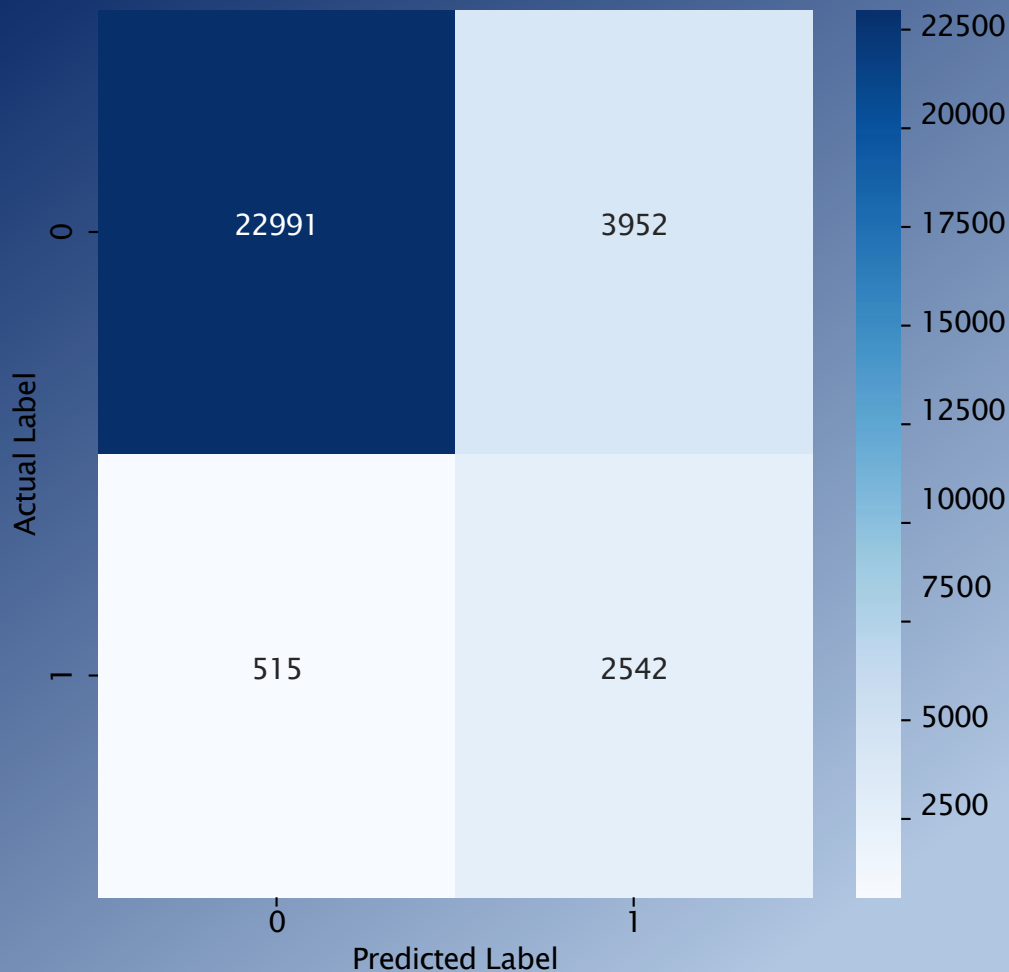
Insights:

July: Churners also have fewer incoming call minutes, indicating less overall interaction with the network

Recommendations:

Implement plans that encourage more incoming calls by offering discounted or bonus call minutes for family members and friend interactions.

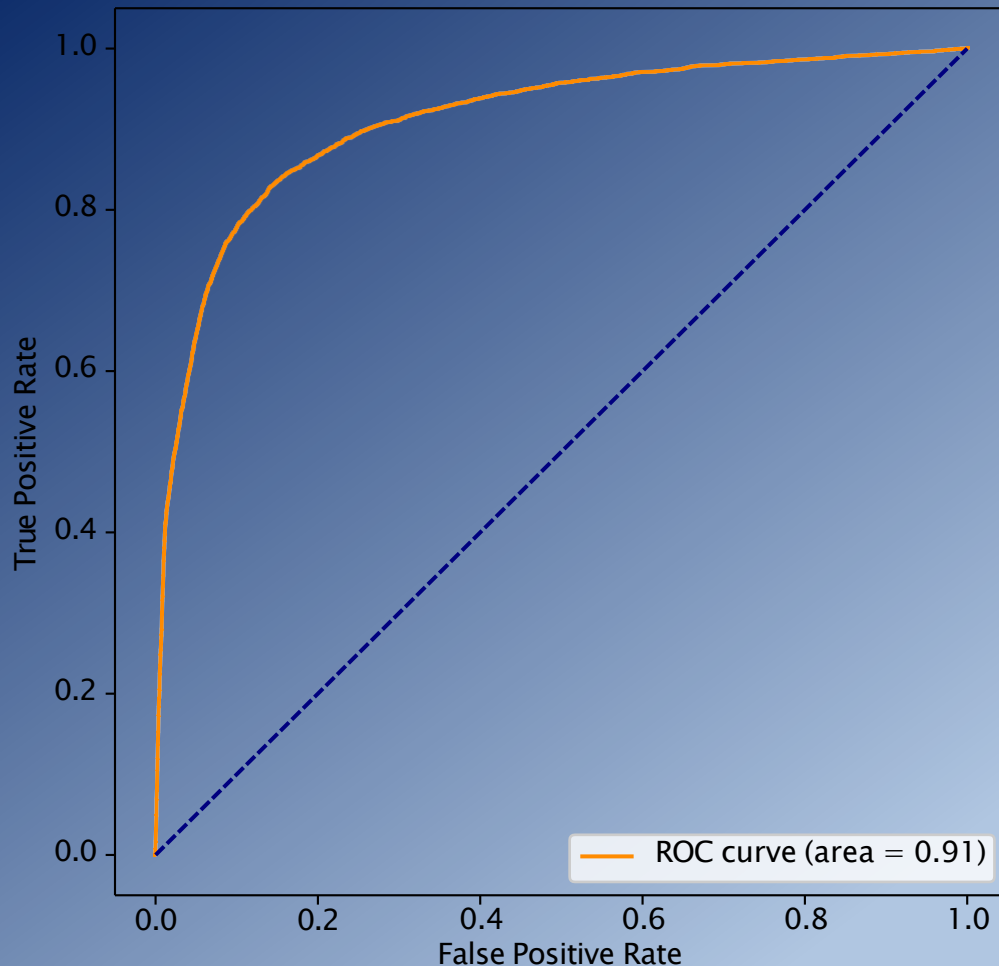
Confusion Matrix



Insights: The confusion matrix shows good performance with the model correctly predicting a large portion of churners. However, there are still some false positives (non-churners predicted as churners) and false negatives (churners predicted as non-churners).

Recommendations: Fine-tune the decision threshold to reduce false positives or false negatives based on business needs. If reducing churn is the primary focus, increasing the threshold slightly may help improve recall.

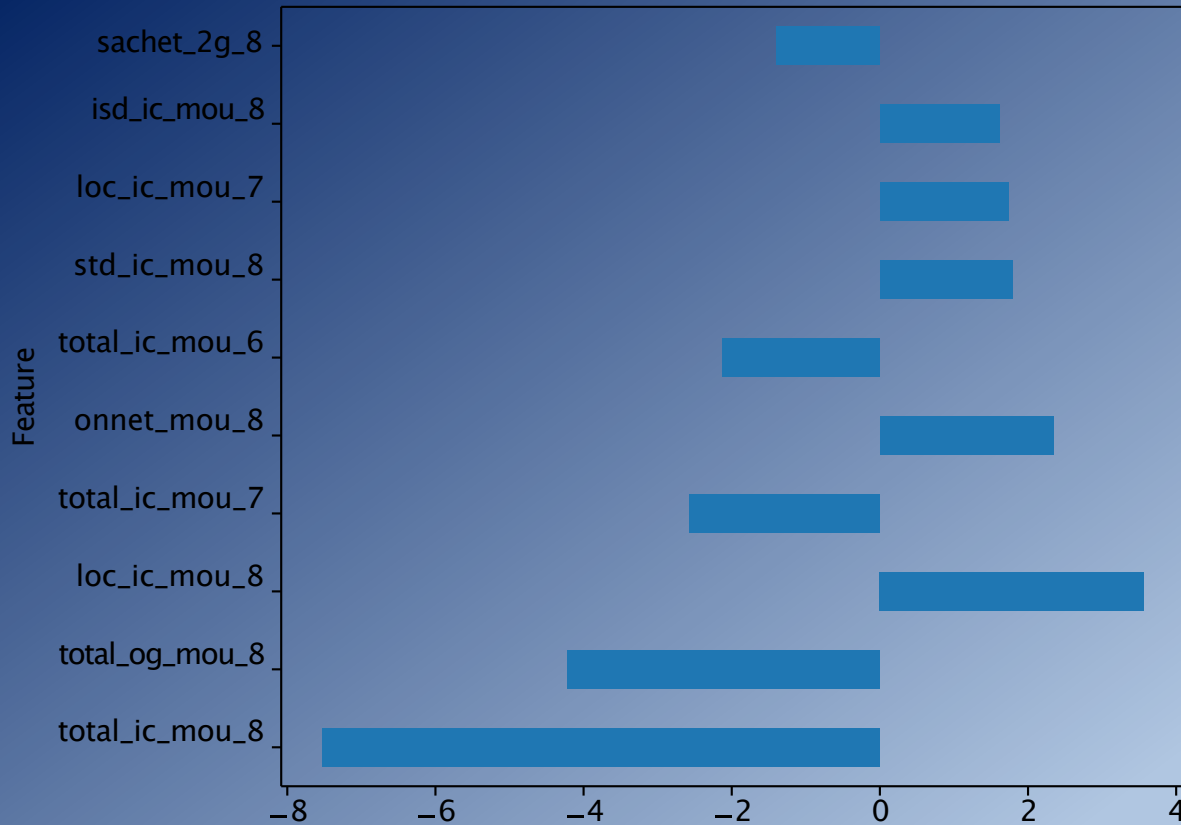
Receiver Operating Characteristic (ROC) Curve



Insights: The ROC-AUC score of 0.91 shows that model has strong predictive power and can effectively distinguish between churners and non-churners.

Recommendations: Continue using this model for early identification of high-risk churners. With high AUC this model can serve as an effective tool for guiding marketing and retention efforts

Top 10 Feature Importance

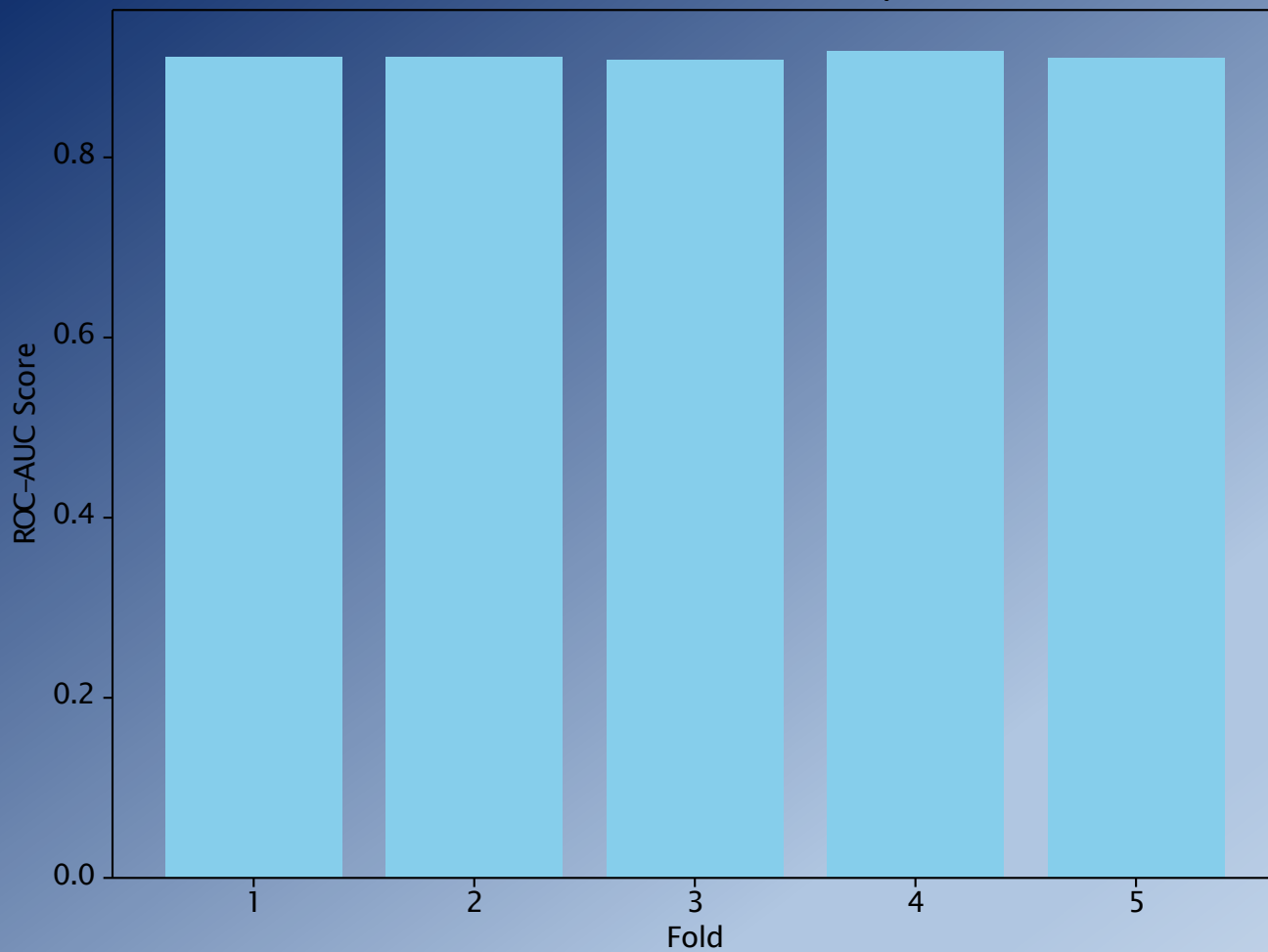


Insights: The top predictors of churn include various types of call minutes(incoming, outgoing), on-net calls, and 2G data usage

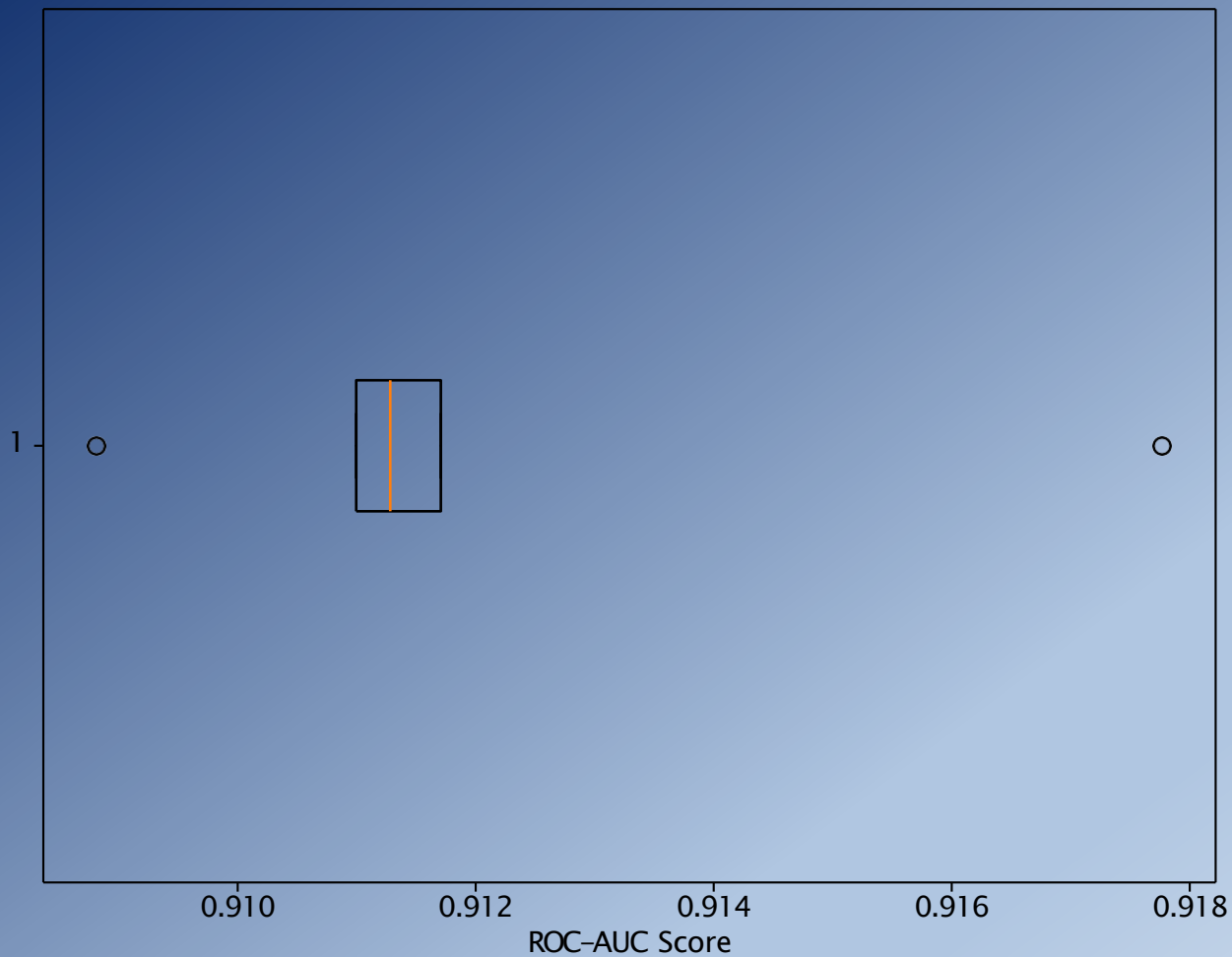
Key Features: total_ic_mou_8, total_og_mou_8, loc_ic_mou_8, total_ic_mou_7

Recommendations: Focus on monitoring and improving the experience of customers who show declining usage of these top features. Offering customized plans based on usage patterns can help reduce churn

Cross-Validation ROC-AUC Scores per Fold



Cross-Validation ROC-AUC Score Distribution



Business Recommendations

- Incentivize regular recharges with loyalty rewards or cashback for declining recharge patterns.
- Offer personalized call and data plans, such as bonus minutes or discounts, to re-engage low-usage customers.
- Provide free data boosts or special packages to encourage data usage, especially among 2G users.
- Introduce customized roaming discounts or packages for customers with high roaming activity.
- Use predictive insights to proactively engage high-risk customers with tailored retention offers.

Conclusion

Insights Summary:

- Recharge amounts and call usage are the strongest predictors of churn.
- The model performs well with an AUC score of **0.91**, making it a reliable tool for identifying high-risk churners.

Business Recommendations:

- Implement targeted promotions based on recharge and call usage patterns.
- Use the model to focus on high-risk customers and provide early intervention with special offers, call plans, and data packages.