PHASE 3 PROJECT

CUSTOMER CHURN PREDICTION USING MACHINE LEARNING MODELS

BUSINESS PROBLEM

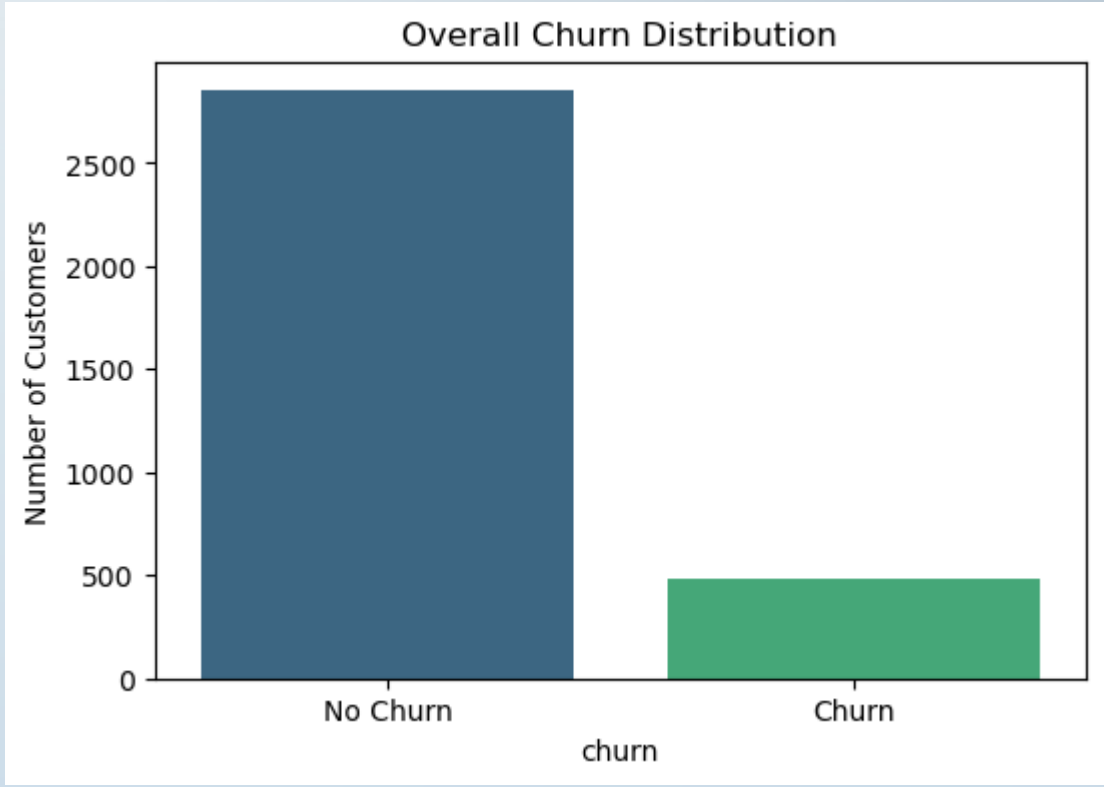
- Rising customer churn reduces recurring revenue
- High acquisition costs strain profitability
- Limited visibility into at-risk customers delays retention action

DATA UNDERSTANDING

- Sample size: 3,333 customers
- Features: 21 columns including demographics, account info, usage, billings
- Data quality: Cleaned and preprocessed

CUSTOMER CHURN OVERVIEW

- Most customers did not churn
- Churners are a smaller minority
- Highlights need for targeted retention



MACHINE LEARNING MODELS AND EVALUATION

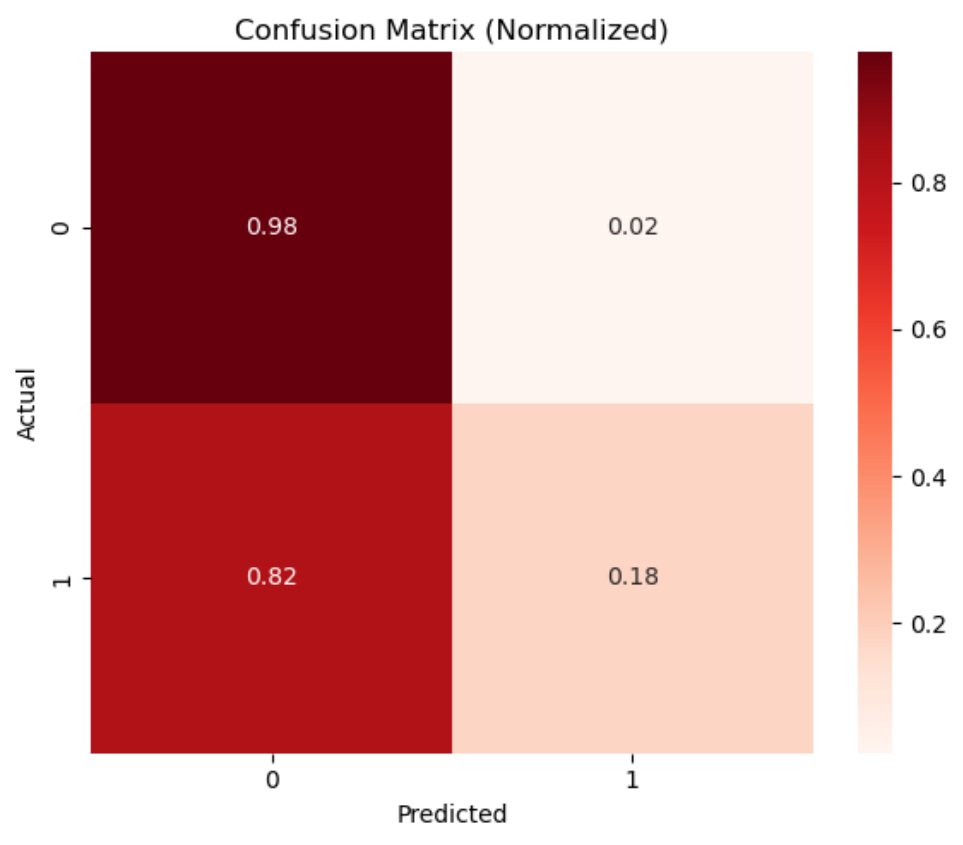
- Models:
- - Logistic Regression
- - Decision Tree (optimized)
- - Random Forest (optimized)

- Evaluation Metrics:
- - Train/Test Split
- - ROC-AUC- Accuracy
- - Precision and Recall

MODEL PERFORMANCE

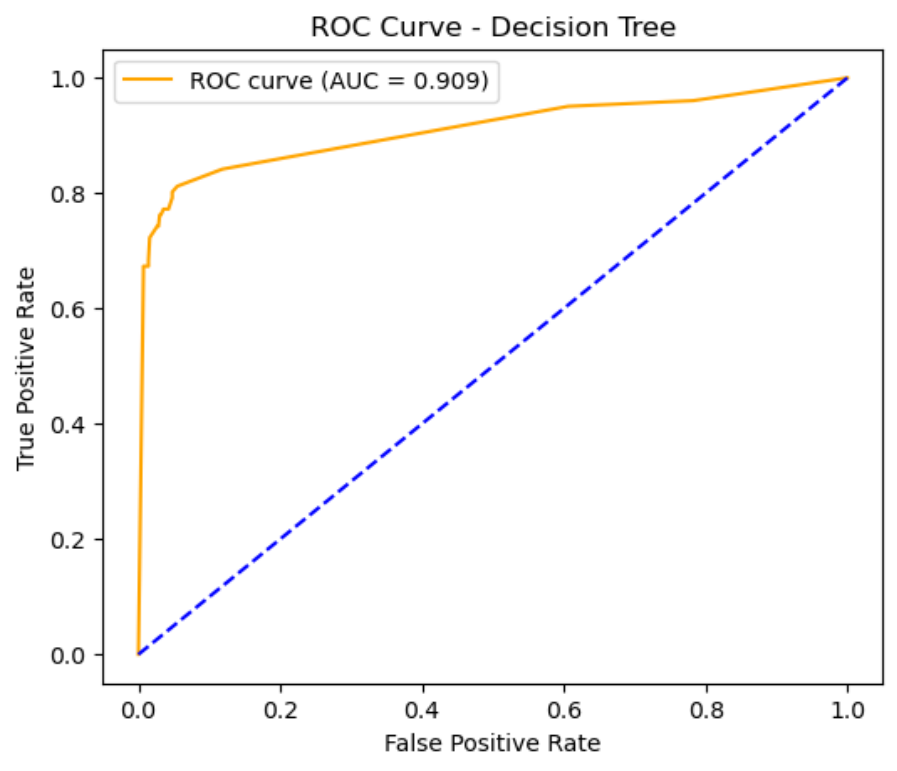
- Logistic Regression: Accuracy 86%, ROC-AUC 0.83, Churner Recall 0.18
- Decision Tree (Optimized): Accuracy 94%, ROC-AUC 0.90, Churner Recall 0.73
- Random Forest (Optimized): Accuracy 95%, ROC-AUC 0.94, Churner Recall 0.78

LOGISTIC REGRESSION



Accuracy: 86%
ROC-AUC: 0.83
Behavior: Predicts non-churn well; misses many churners (low recall)

DECISION TREE

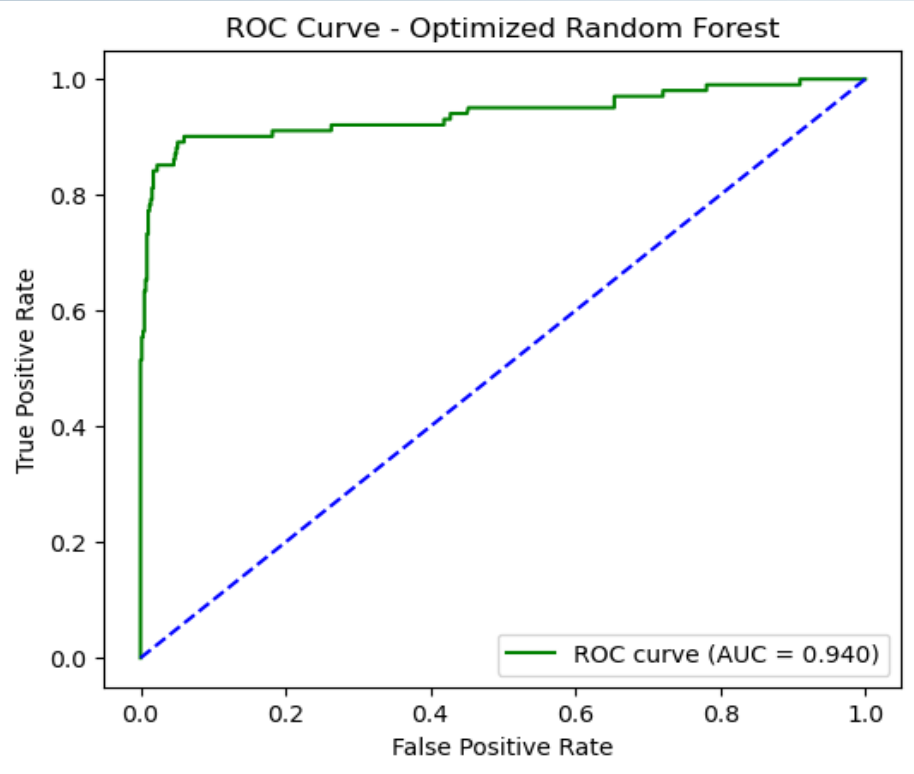


Accuracy: 94%

ROC-AUC: 0.90

Behavior: Strong detection of churners; improved recall over LR

RANDOM FOREST

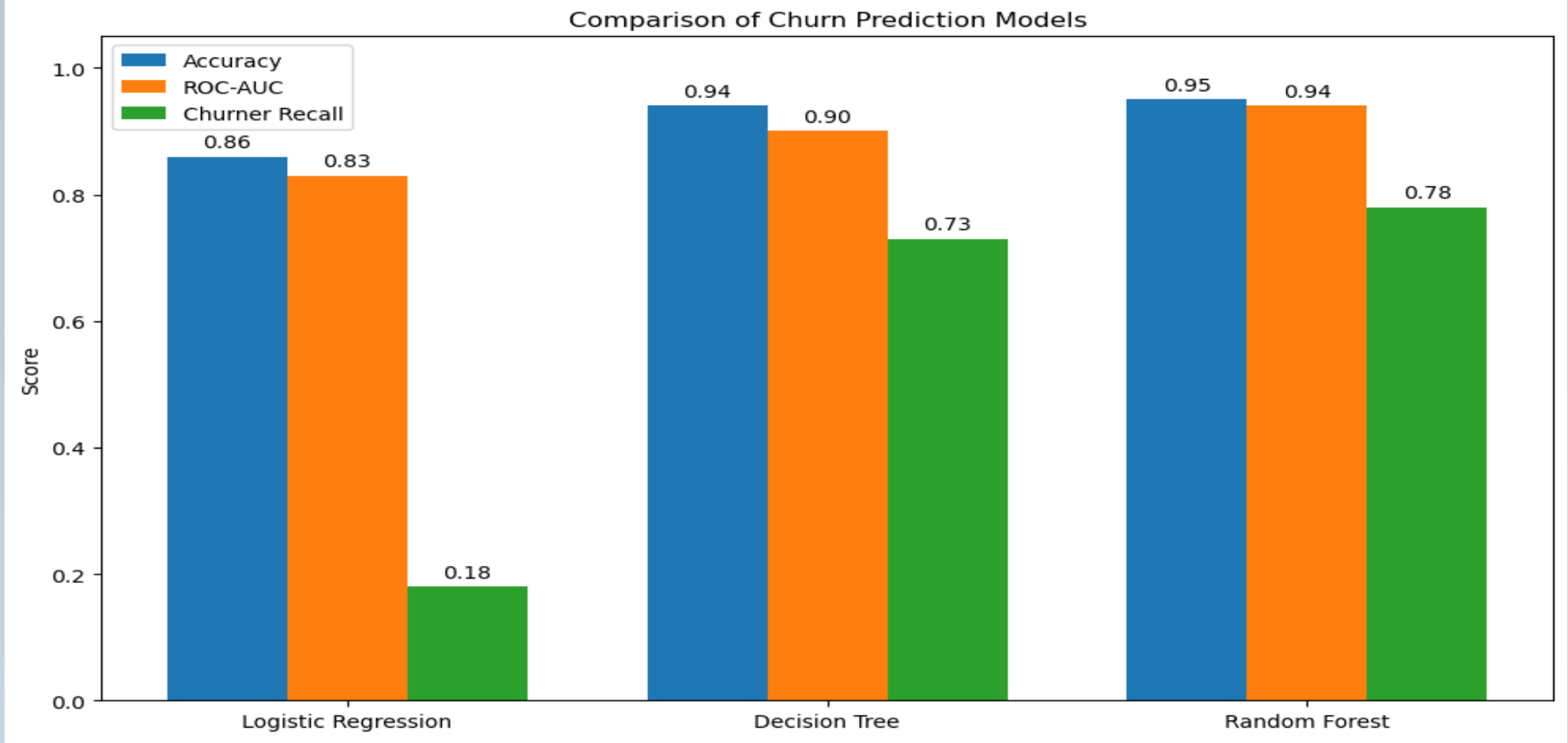


Accuracy: 95%

ROC-AUC: 0.94

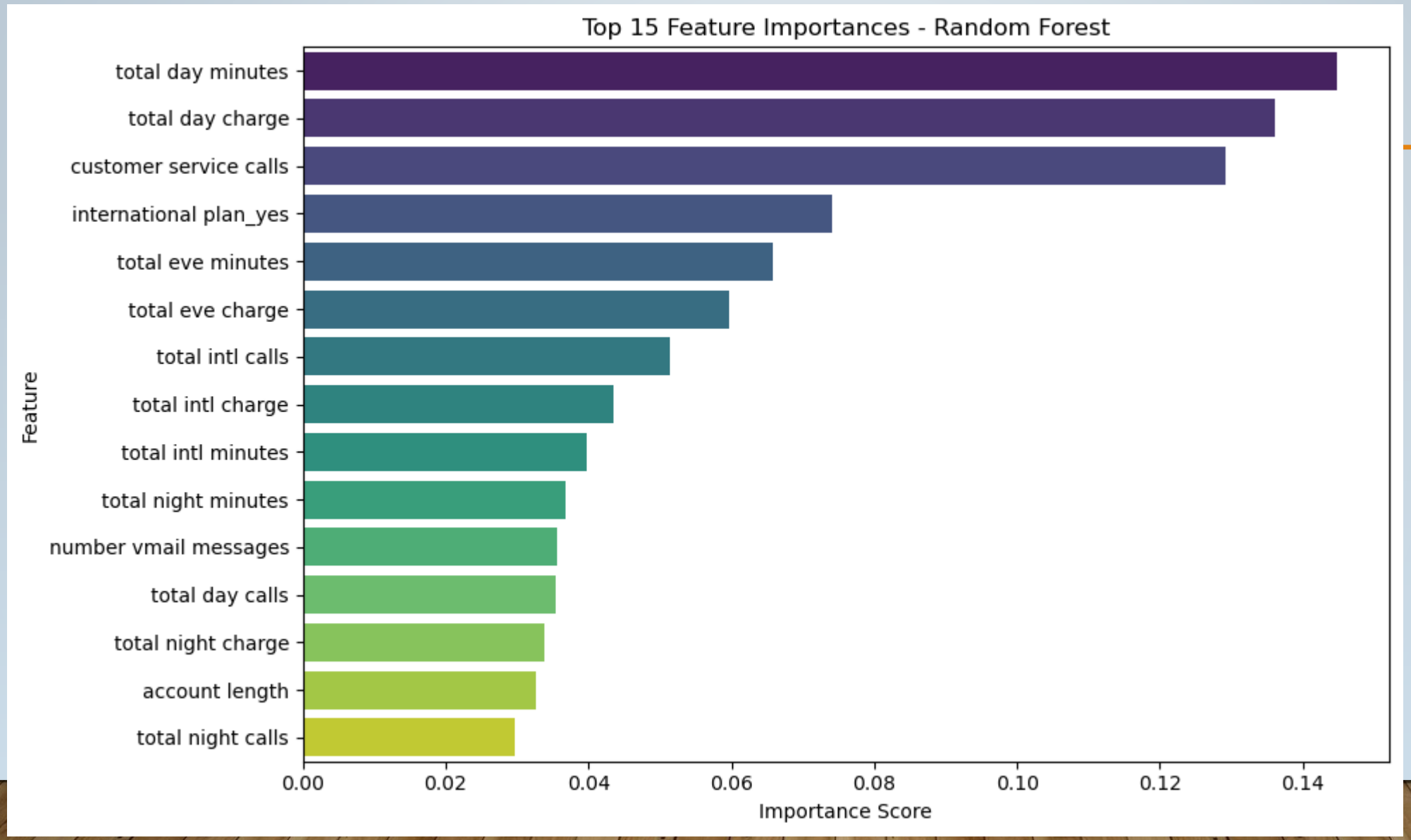
Churner Recall: 0.78

Behavior: Best at identifying at-risk customers while maintaining high overall correctness



The optimized Random Forest model delivered the highest accuracy, strongest ROC-AUC, and best churner recall, enabling effective identification and retention of at-risk customers.

IMPORTANT FEATURES



CONCLUSION

- **Daily usage (minutes & charges)** is the **strongest driver of churn**
- **Customer service calls** and **international plan** are **moderate drivers**, indicating dissatisfaction and plan mismatch
- **Night usage** and **account length** have **low impact** on churn

BUSINESS RECOMMENDATION

- **Monitor daily usage patterns** and offer targeted cost-management and retention offers
- **Reduce repeat customer service calls** by improving issue resolution quality
- **Optimize international plans** to better match customer needs
- **De-prioritize night usage and tenure** when designing churn interventions

NEXT STEP

- Launch churn prediction model
- Execute retention campaigns
- Pilot personalized offers & service actions
- Track churn metrics & model accuracy
- Continuously refine and improve the model

CONTACT

- Feel free to ask any question
- E-MAIL:ngetichshan2025@gmail.com
- THANKYOU