

TELECOM CUSTOMER CHURN ANALYSIS

PwC Consulting Case Study

Background

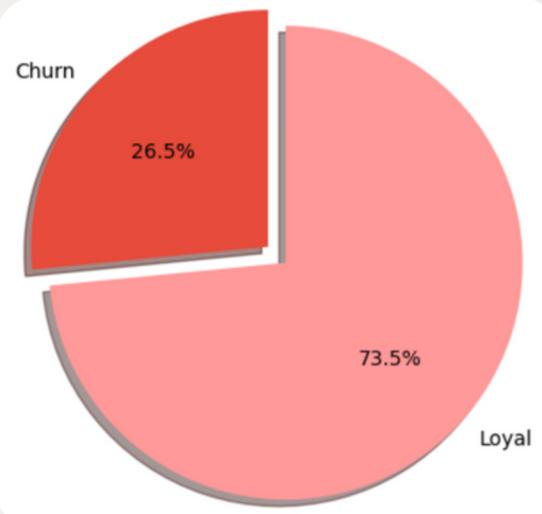
PwC's Data & Analytics Consulting Division has operated a project for a telecom company that is bad situation of having high customer churn rate. Therefore, the report aims to analyze the provided data to identify key factors affecting customer loyalty, and propose viable solutions to reduce churn. The project involves exploratory data analysis (EDA), predictive modeling, and model evaluation.

Summary Executive

This report analyses customer engagement trends and identifies key factors influencing churn. Customers using electric checks tend to have a higher churn rate, possibly due to payment failures or a lack of financial control. Similarly, paperless billing users show higher churn, suggesting the need for better engagement between customers and providers. Another key factor in detecting churned customers is their month-to-month contract. While this contract allows the flexibility for customers, it often indicates that customers will soon discontinue the service. To better manage customers, the Logistic Regression model can be utilised to predict customer churn based on specific categories.

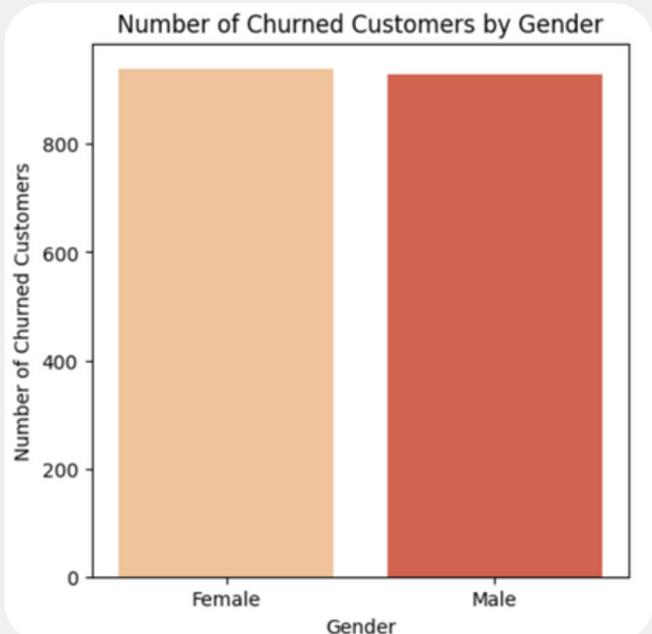
Several viable recommendations have been proposed to enhance customer retention. Using predictive analytics can be used to identify at-risk customers and provide exclusives offers to drive long-term engagement. Another solution is to allow customers to change payment methods flexibly based on their need. Additionally, investing in network upgrades, offering speed guarantees and providing compensation for outages are ideal recommendations.

Understand the Customer Base

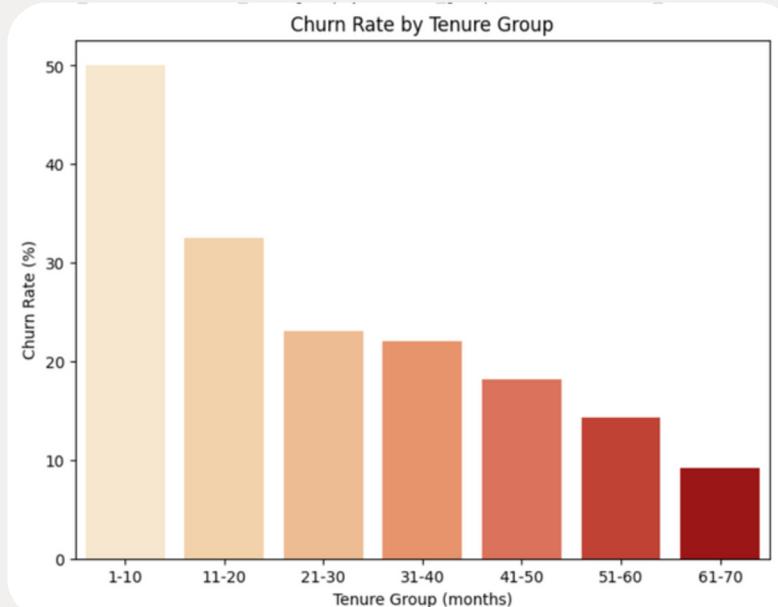


over $\frac{1}{4}$

of customers are churn, which put the company at risk of gradually losing the potential customers.



Surprisingly the number of **Female and Male customer churn is relatively the same**. It indicate that female or male can be churn, but it does not affect much to the churn rate.

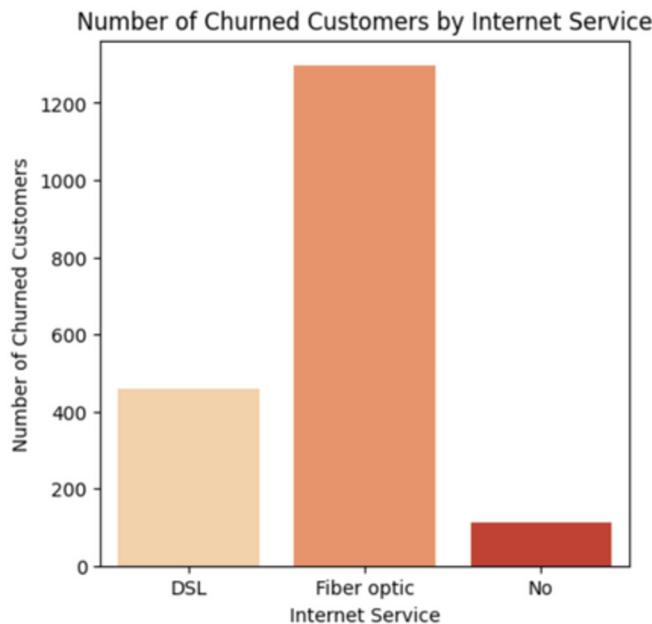


50%

of customer stopped using the service **within 1-10 months**.

>10%

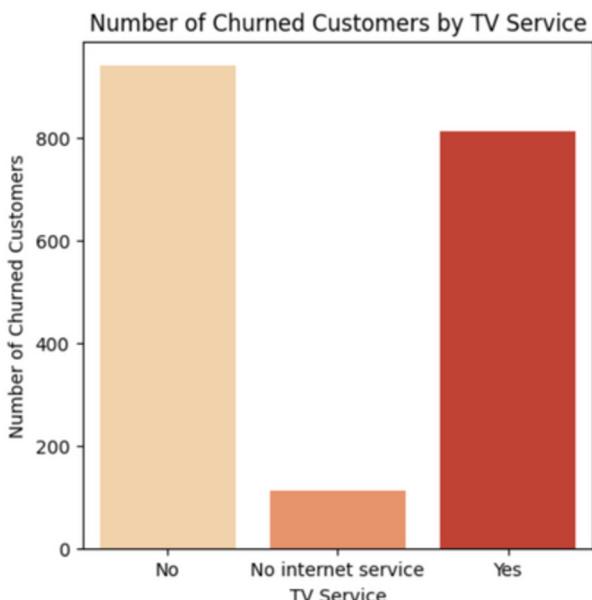
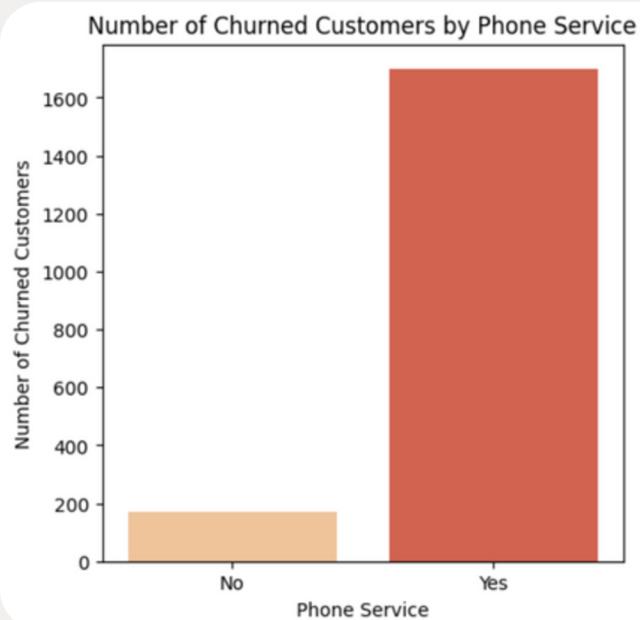
of customer stayed for the service **within 61-70 months**. Their leaves suggest that they may find better providers or the existing service were not good enough.



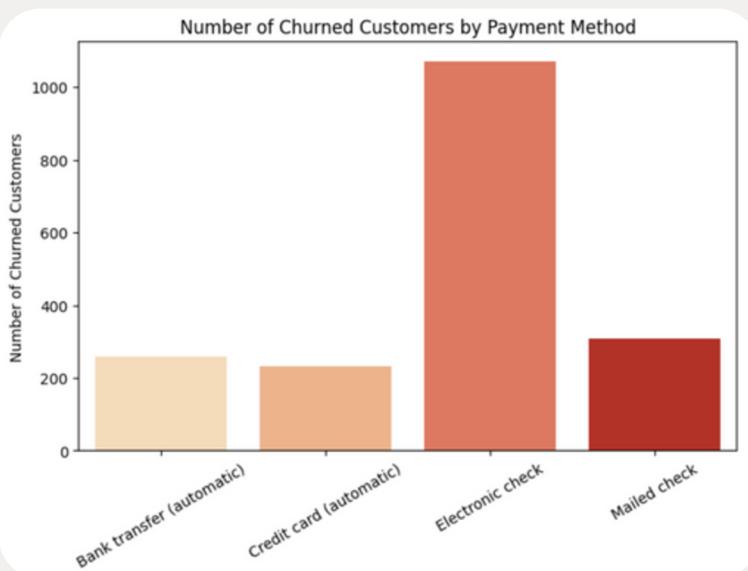
Most of churned customers used Fiber optic, at over 1200 individuals, indicating that there was some problems within this internet service, **such as expensive price or poor internet connection.**

The **majority of churned customers had phone service.**

However, due to their low loyalty, there might be **issue with the phone service, such as high price, poor connection, few discounts.**



In terms of TV service, most of churned customers have low demand of TV service, up to nearly **900 people did not sign up for it.** Although around **800 individuals registered for TV service**, they still left the company. It suggests that company should review their TV service

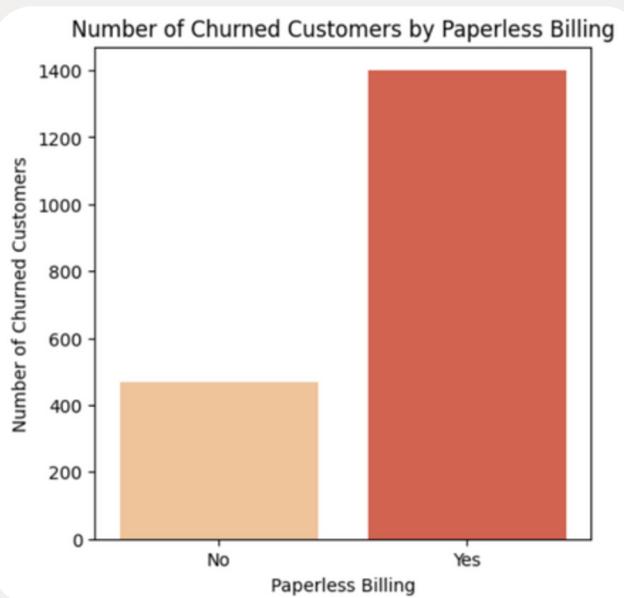


>1000

customers using **electric check** are **more likely to be churned**. It indicates that customers may encounter **issues with eCheck, such as money hacking**. The statistics of the other 3 payment methods do not substantially far apart.

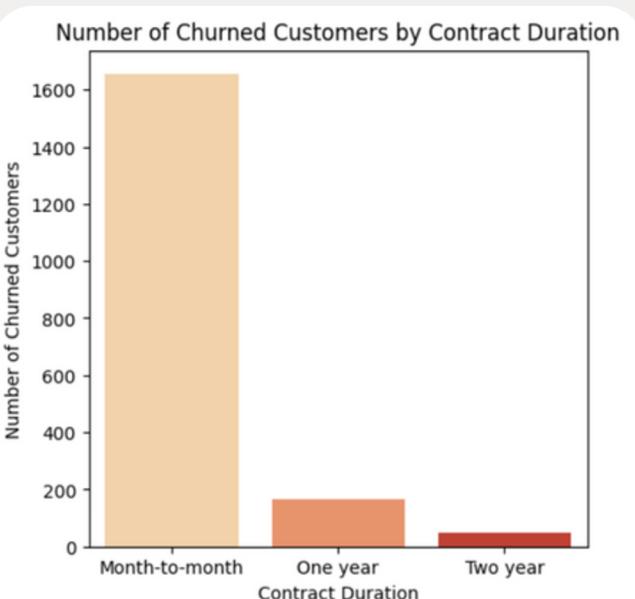
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churned customers chose the option of paperless billing. This option seemed to be convenient for customers to check invoice online; however, it lacked of the engagement of customers with the company.



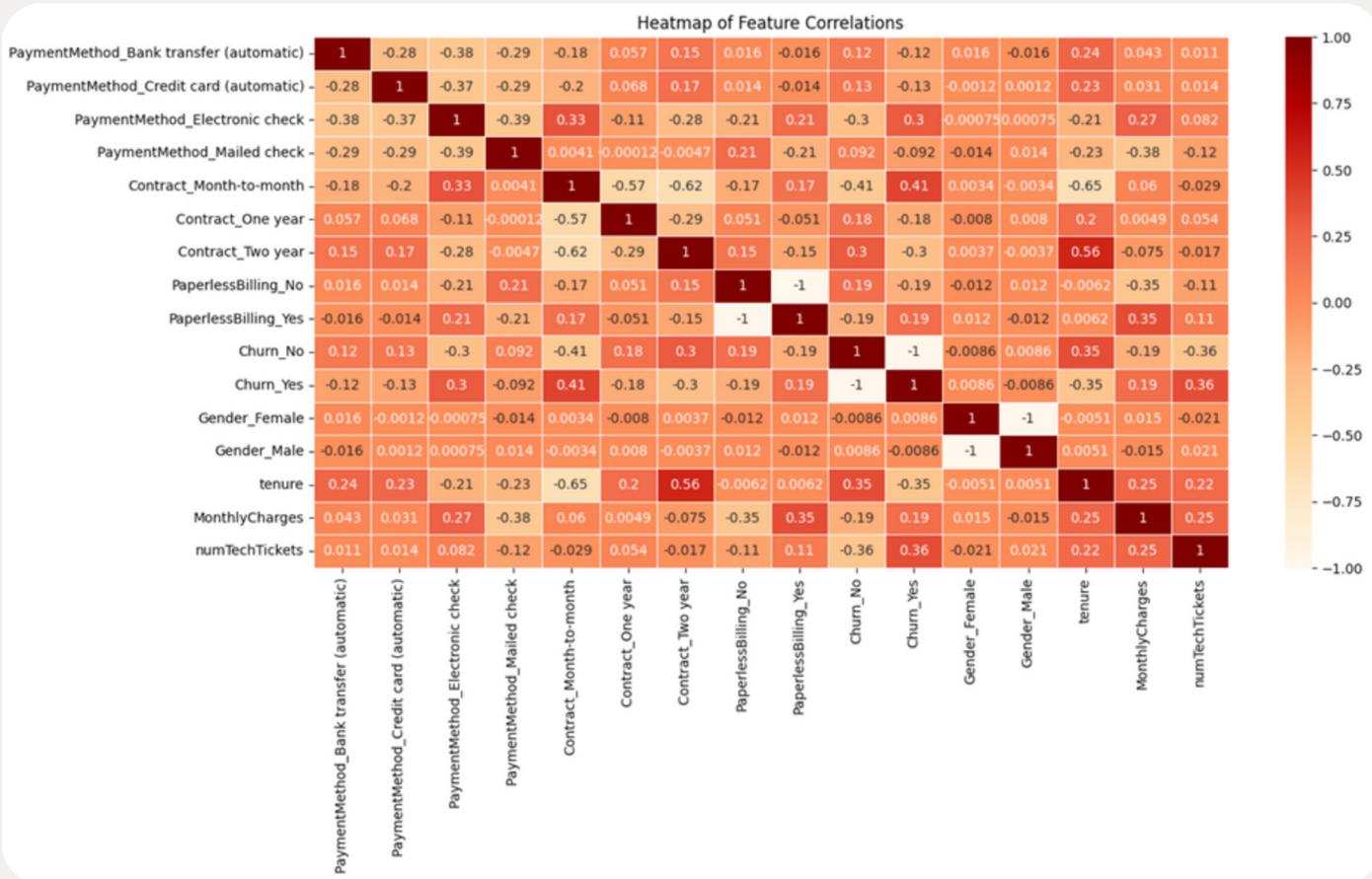
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churned customers adopted **month-to-month contract**, which means that they did not have any constraints with the company. Therefore, it can be predicted that a customer is churned if they go with month-to-month contract.



More than 1000 churned customers selected Electronic Check, Paperless Billing, and Month-to-month contract. The feature of these selections are that of their convenience to the customer. However, it reflects that customers have the intend to not stay long with the company.

Feature Engineering



Positive Correlations with Churn Customer

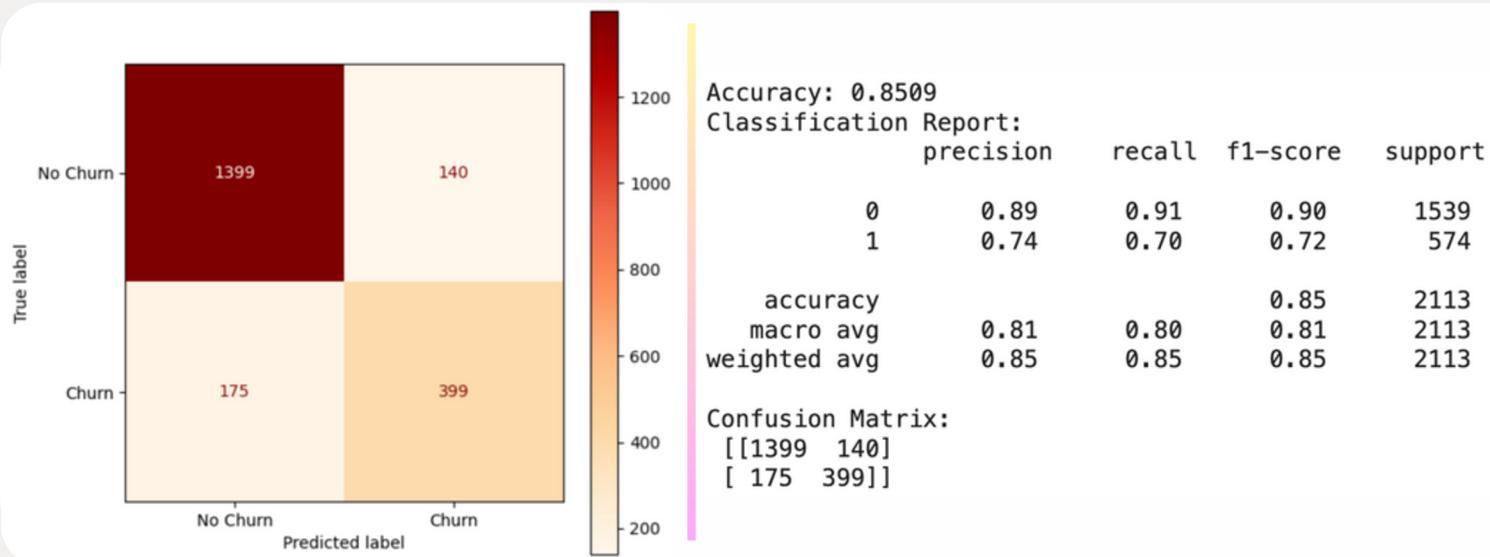
- Contract_Month-to-Month (0.41):** a high positive correlation suggests that customers signed month-to-month contract are usually churned.
- numTechTickets (0.36):** the higher number of technical tickets, the higher probability of customer churn.
- PaymentMethod_Electric check (0.3):** customer are likely to be churned if they choose to pay through e-check.
- MonthlyCharges (0.19):** a high monthly charges can also consistently affect the loyalty of customers.

Negative Correlations with Churn Customer

- Tenure (-0.35):** a moderate negative relationship indicates customers who have been with the company longer is less likely to leave.
- Contract_Two year (-0.30):** customers staying with company for a long period do not have tendency to leave.
- PaperlessBilling_No (-0.19):** this means that customers who do not use paperless billing are slightly less likely to churn.

Modelling Training and Evaluation

• Logistic Regression



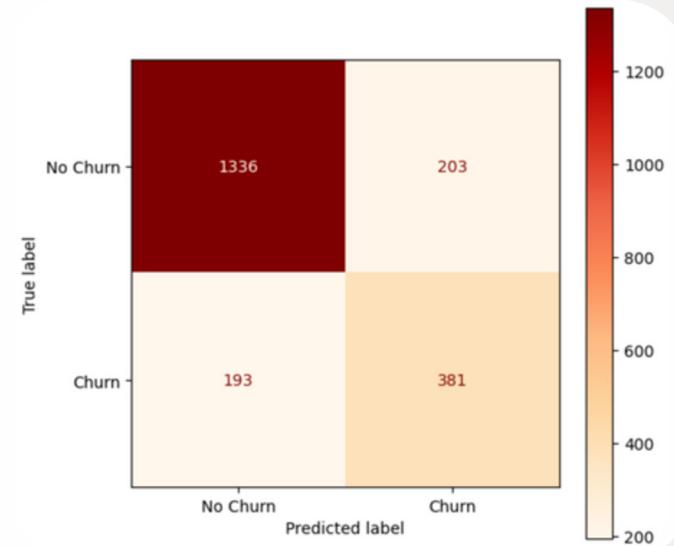
• Decision Tree

Decision Tree Accuracy: 0.8126
Decision Tree Classification Report:

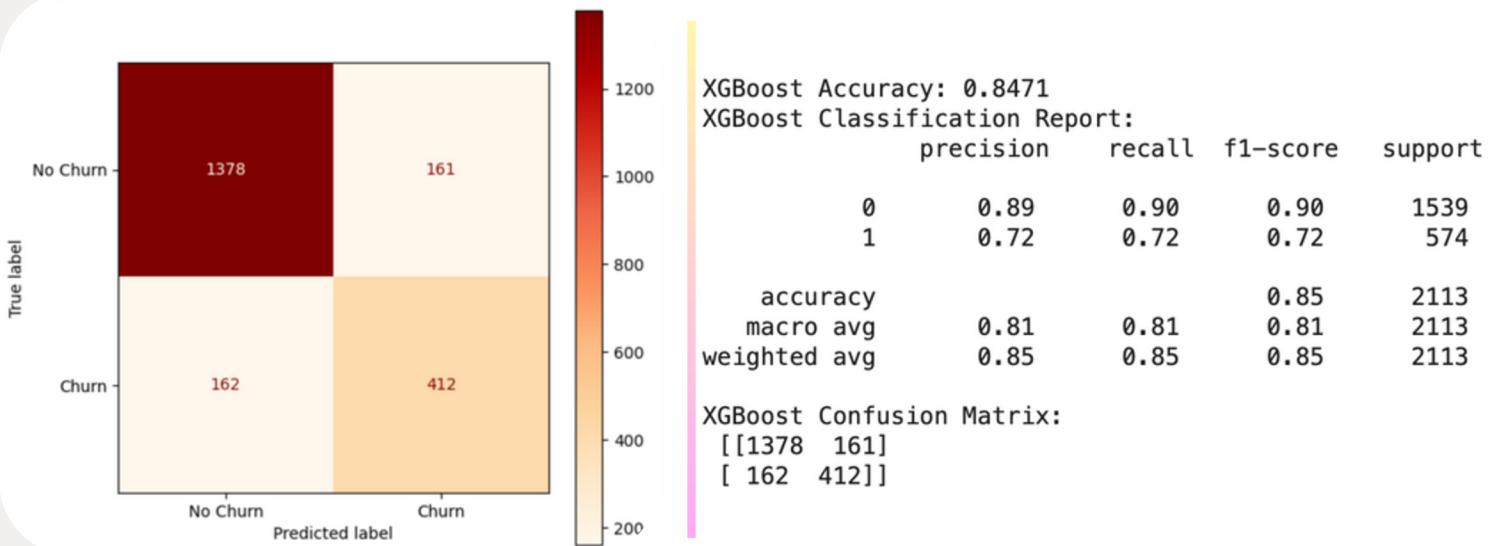
	precision	recall	f1-score	support
0	0.87	0.87	0.87	1539
1	0.65	0.66	0.66	574
accuracy	0.76	0.77	0.76	2113
macro avg	0.76	0.77	0.76	2113
weighted avg	0.81	0.81	0.81	2113

Decision Tree Confusion Matrix:

		No Churn	Churn
No Churn	1336	203	
Churn	193	381	



• XGBoost



	Logistic Regression	Decision Tree	XGBoost
Accuracy	85.09%	81.26%	84.71%
Precision	0.74	0.65	0.72
Recall	0.70	0.66	0.72
F1-score	0.72	0.66	0.72

Logistic Regression is the most appropriate model

**85%
of accuracy**

Logistic Regression has higher accuracy rate than Decision Tree and relatively equal to XGBoost (~84.71%).

**74%
of precision**

Logistic Regression has a precision of 0.74, indicating that 74% of customers predicted as “churn” as actually churned. This value is higher than Decision Tree and XGBoost, at 0.65 and 0.72, respectively.

**Less
overfitting**

While complex models like XGBoost require large datasets to perform well, Logistic Regression works well with moderate-sized datasets like within this project, reducing the risk of overfitting

Recommendation

Customer Rentation Program

- **Provide targeted discounts to high-risk customers** based on their usage patterns. For example: offer a 10% discount for the next 3 months if a customer is at risk of leaving. This program should concentrate on customers staying within from 1-10 months.
- **Reward long-term customers with points** that can be redeemed for discounts, gifts, or exclusive perks. For example: earn points for every internet bill paid on time and redeem them for service upgrades.
- **Offer long-term contract discounts**, which means customers receive significant discounts for committing to an extended contract (e.g., 36 months) and receive free monthly mobile plan. If they cancel early, they must pay a penalty or the remaining balance.

Billing and Payment Flexibility

- **Encourage auto-pay with rewards**, like offering small discounts or loyalty points for auto-pay setups (e.g., via credit card or direct debit).
- **Offer flexible payment options**, allowing split payments, due date flexibility, or alternative payment methods (e.g., Paypal, Afterpay, Apple Wallet).
- **Allow customers to flexibly change payment method by themselves** on the website or mobile app.
- **Sending interactive billing emails** with usage insights, due date reminders, and quick payment options, such as BPay.

Recommendation

Service Quality Improvement

- **Prioritise to fix problems** for customers having high number of numTechTickets.
- **Review and enhance the infrastructure or facilitation of Fiber optic** as most of churned customers use it.
- **Ensure to provide minimum internet speed commitments** to customers.
- Notify customers about any **planned service** improvements
- **Compensate for outages**, offering credits or discounts for service failures.
- **Regularly collect customer feedback** and organise clear strategy to improve existing issues.

Proactive Customer Engagement

- **Build and utilise the churn customer prediction model** to identify customers who have a high rate to become churn.
- **Notice customers with late payments or fail transactions** may be struggling financially and could churn soon.
- Multiple complaints about the speed, outages or billing issues suggest frustration, making customer become churn.
- **When customers cancel, ask why and offer tailored solutions** to keep them stay back.