

# Churnonomics:

## Decoding Customer Departure in Banking with Machine Learning

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**Objective: Identify key churn indicators and engage with clients who are likely to leave, persuading them to stay.**



## Problem

Our customer growth is staggering.

We aim to retain customers by making targeted marketing calls.

The call capacity is **300 calls/month**.



## Solution

**Identify** the key indicators of churning.

**Prioritize** the calls for customers with high churn risk.

**Executive summary: Connect with recent payroll cancellations and activity drops for a potential \$503K profit per year retention.**

**Key identifiers of churning:**



**Payroll  
Cancelled**



**FUA balance  
Dropped**



**Transactions  
Reduced**

**Expected profit from retaining the selected 300 customers:**

**\$ 503K / year\***

\* Estimated based on the 2021 annual profit per service report from the finance department.

# Assess the effects of changes in banking activities on discontinuing business with us, starting next month.

## Data

Monthly status of over 10K Customers from Jan 2018 to Dec 2021:

- Active (8,776), Inactive (1,575; Make 0 transactions for 12 months), Closed (51)

## 'Churning'

'Stops doing business with us starting next month':

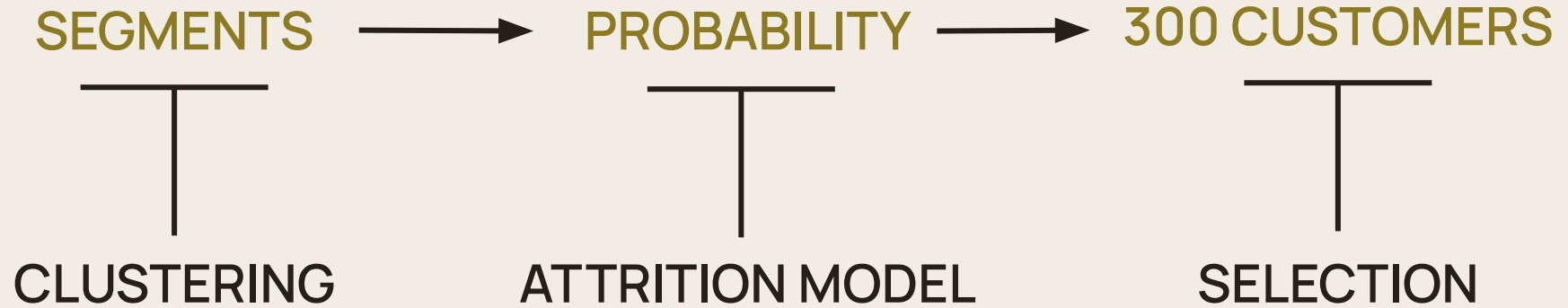
- **Make 0 transactions** for the next 12 consecutive months (and then go 'Inactive'), or **Close** the account next month.

## Features for modeling

Changes from the previous month in balance & activities:

- Funds under administration (FUA) balance, Payroll service status, Transaction volume, Tenure in months, Number of services, etc.,

Conduct ML-based methods to identify the key churn indicators and select 300 customers most likely to churn.



# ML-based clustering\* unveiled 4 customer groups with distinct characteristics.



## Established (G1)

- High FUA balance.
- Moderate transaction frequency
- Limited investments.
- Good credit score.



## High Engagement (G2)

- High transaction frequency, diverse use of services.
- Moderate FUA balance.
- Older demographic, good credit.



## Low Engagement (G3)

- Lowest FUA & transaction activity.
- Limited use of services.
- Younger demographic with slightly lower credit score.

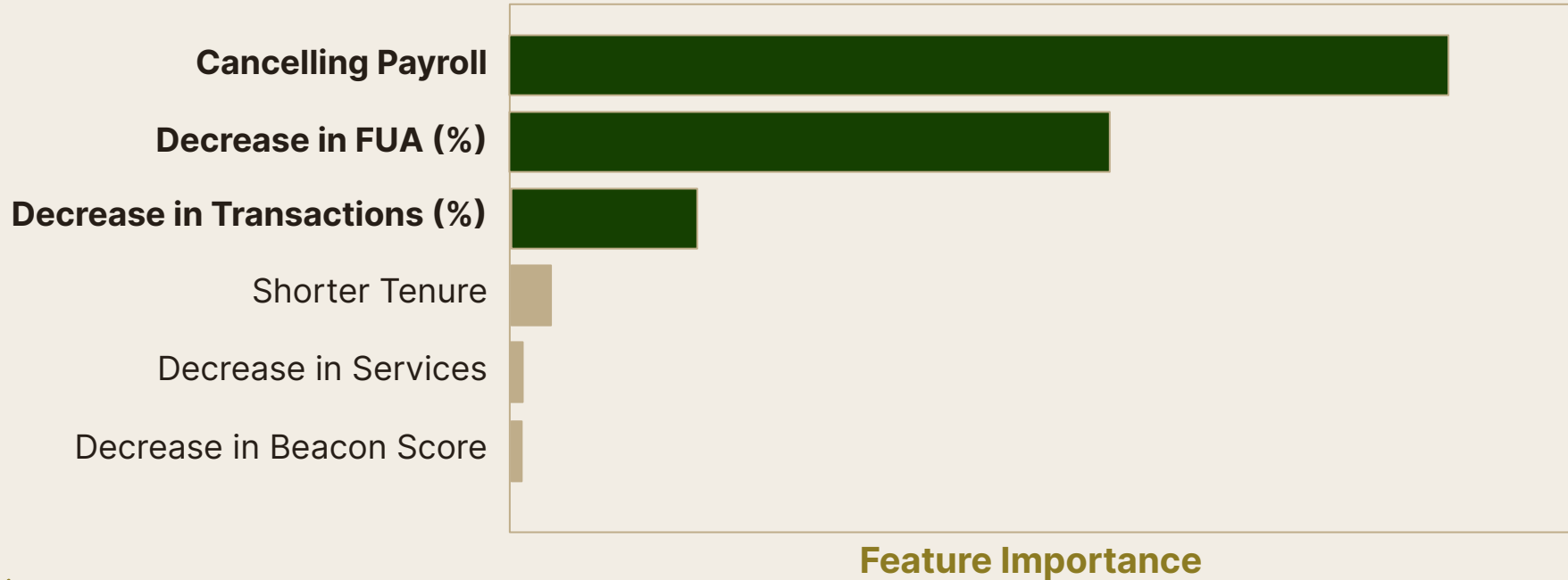


## Cautious (G4)

- Recently cancelled payroll service.
- Moderate FUA balance and transaction frequency.
- High credit score.

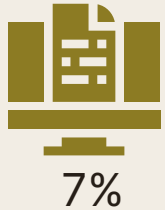
\* K-means clustering.

**Attrition model\* identified key indicators of churning:  
Negative changes in the Payroll service, FUA balance, and Transactions.**



\* LightGBM classifier with 99% precision and 99% recall rates.

# Cautious Group exhibits the highest mean churn probability.



## Established (G1)

- High FUA balance.
- Moderate transaction frequency
- Limited investments.
- Good credit score.
- 3,220 customers



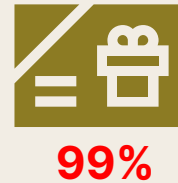
## High Engagement (G2)

- High transaction frequency, diverse use of services.
- Moderate FUA balance.
- Older demographic, good credit.
- 2,725 customers



## Low Engagement (G3)

- Lowest FUA & transaction activity.
- Limited use of services.
- Younger demographic with slightly lower credit score.
- 1,397 customers



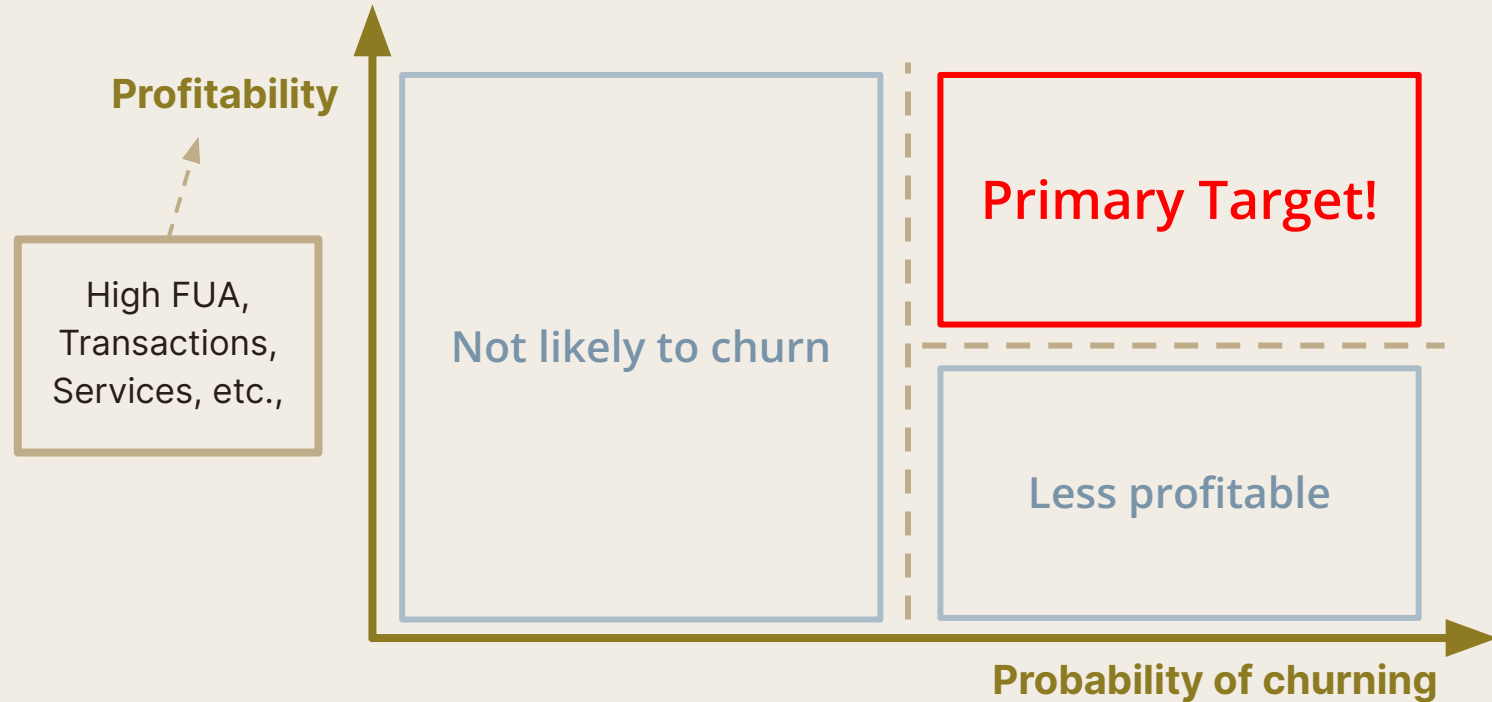
## Cautious (G4)

- Recently cancelled payroll service.
- Moderate FUA balance and transaction frequency.
- High credit score.
- **219 customers**

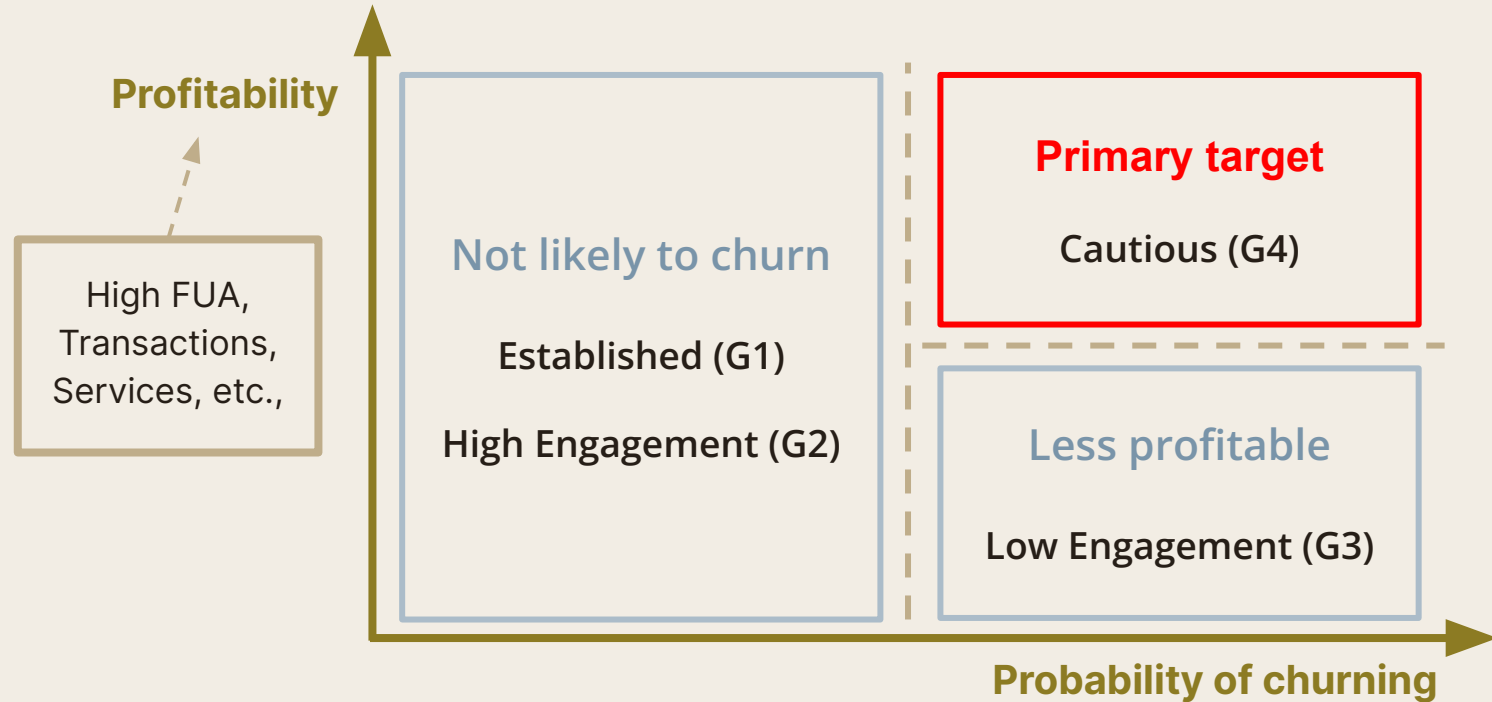
\* K-means clustering.



**Cautious Group, exhibiting high probability of churning and profitability, are our primary targets for calls.**



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300 call targets consist of the cautious, and some low engagement customers with high churning probabilities.



**300 Call Targets**

= 219 Cautious

+ 81 Low Engagements




Retain up to **\$503K/year\*** profit!

\* Estimated based on 2021 annual profit per service report from the finance department.



**Simply Free Plus: In addition to Simply Free, offer tailored benefits based on key identifiers revealed by the attrition model.**

Re-sign up for Payroll	A cash bonus for setting up direct deposit of their paycheck to their account.
Increase FUA Balance	Customize saving plans, tailored to the financial situation with attractive interest rates.
Boost Transaction Volumes	Discounts or rewards on frequent / large transactions.





Future work involves collecting and evaluating the retention profitability to fine-tune the marketing strategy.

01

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- Inspect the actual profit from retention efforts.

02

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- Collect retention data from the targeted reach outs.

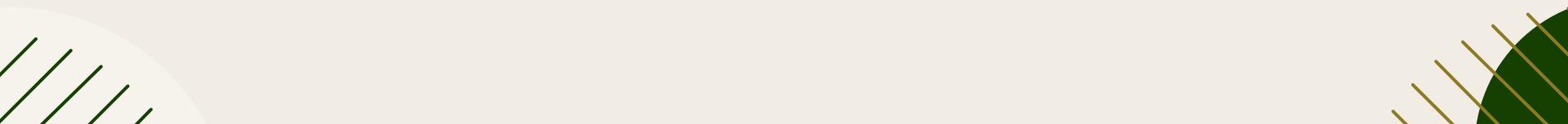
03

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- Re-evaluate important features for customer churning.

04

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- Adapt to changing market conditions and customer preferences.
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## Summary: Target the calls on the customers in the Cautious group to effectively retain \$503K profit per year.



**Objective:** Select 300 customers to make targeted marketing calls.



ML-based methods revealed the target customers based on the key indicators of churning



**Key indicators:** Cancellation of Payroll, drops in FUA & transactions.

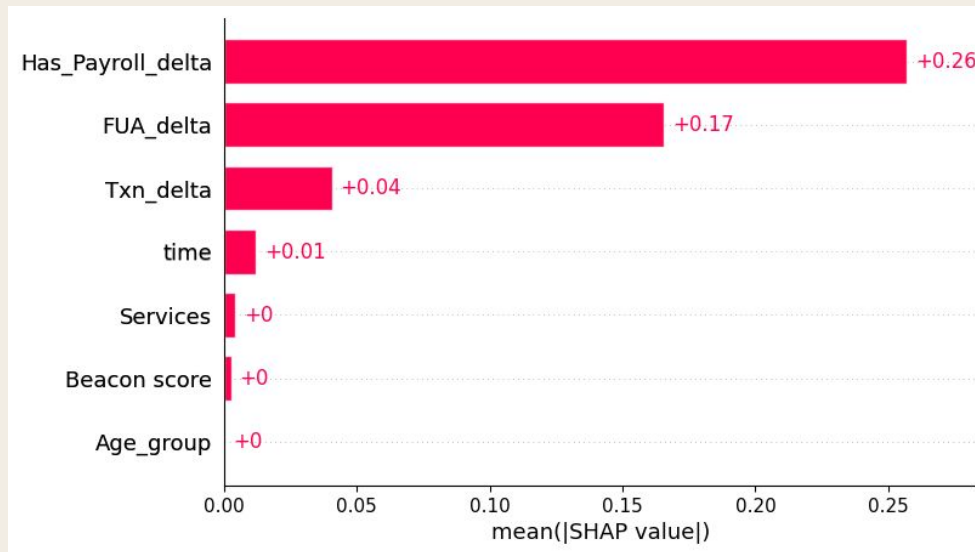


**Retention strategy:** Offer Simply Free Plus, tailored benefits based on key identifiers revealed by the attrition model.

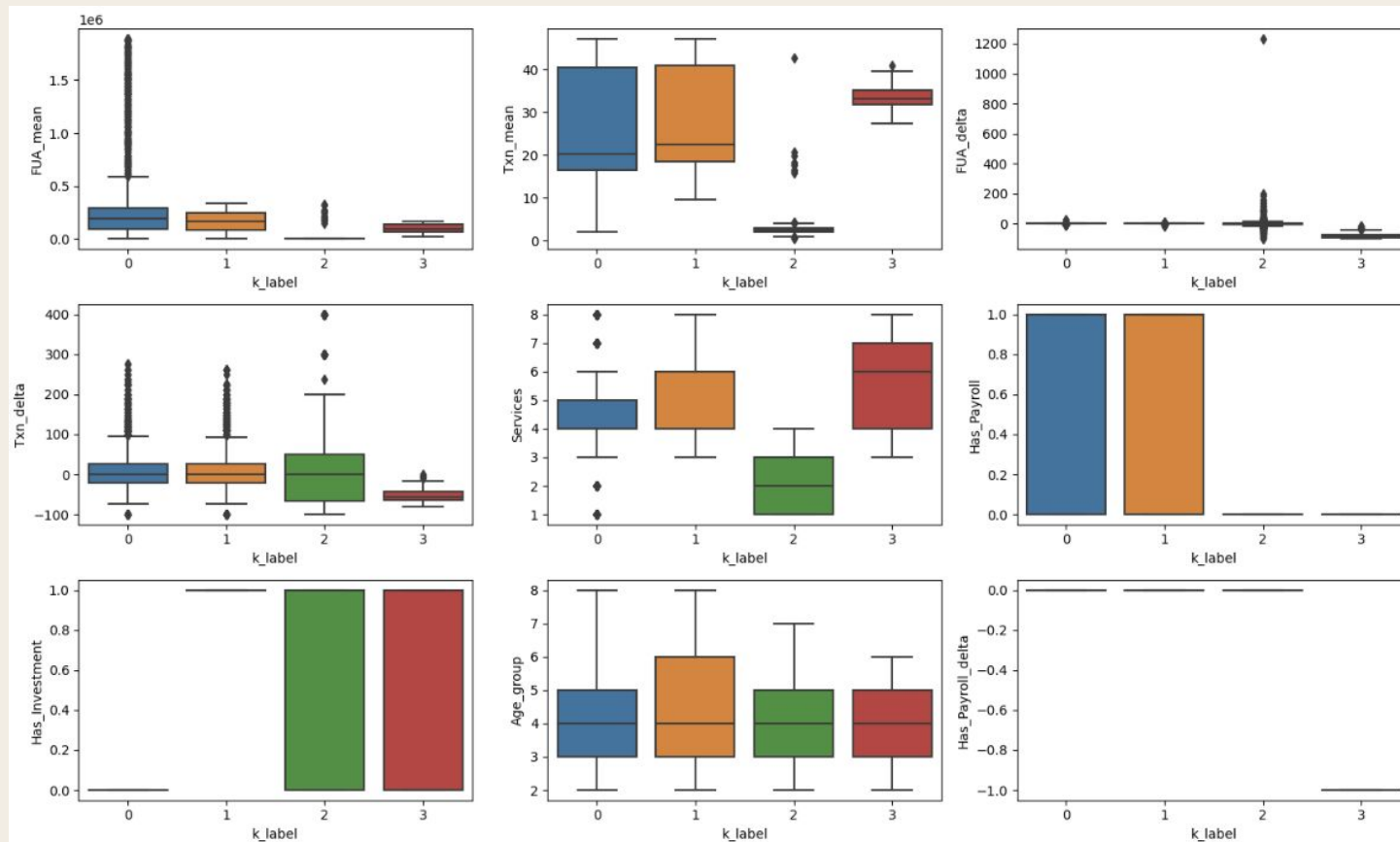


**Profit:** We expect to retain **\$503K profit per year.**

## Appendix: Feature importance by SHAP



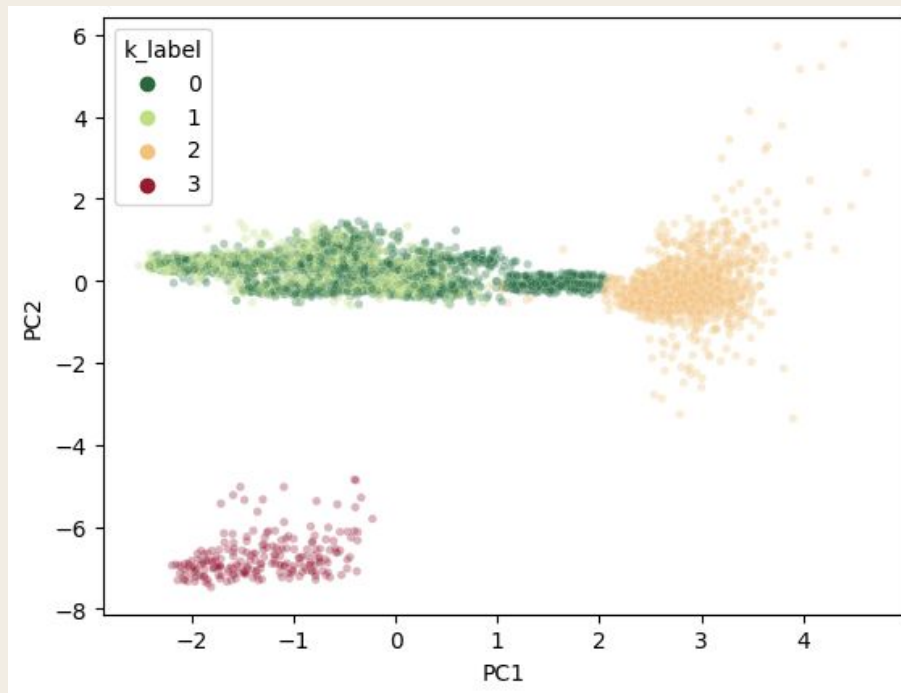
# Appendix: K-means clustering results



k_label	New_ID
0	3220
1	2725
2	1397
3	219



## Appendix: Scatter Plot of PC1 vs. PC2

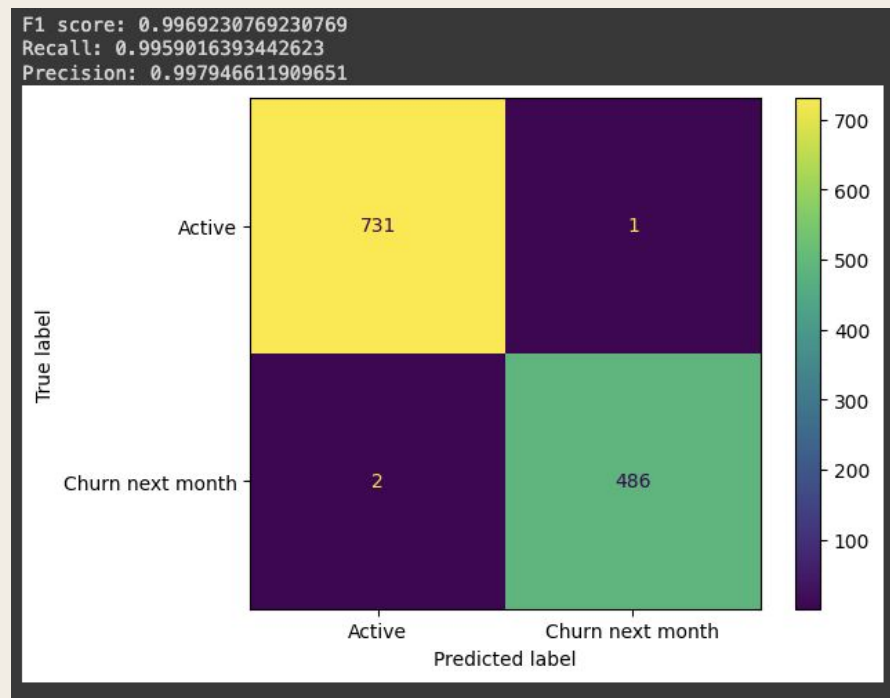


k_label	New_ID
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## Appendix: LightGBM confusion matrix

**Precision** = True positive / (True positive + False positive)  
= True positive / All predicted positives

**Recall** = True positive / (True positive + False negative)  
= True positive / All actual positives



# Participation

- **Sonny:** Problem statement, attrition modeling, clustering, visualization, actionable items.
- **Inderjeet:** Attrition modeling, clustering, customer profiling, visualization.
- **Freya:** Attrition modeling, clustering, visualization, actionable items.