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User retention analysis

## Introduction:

**This App** provides a spending account targeted at teens and young adults, enabling them to perform financial transactions such as sending/receiving money and making purchases through UPI and card transactions.

The goal is to increase **user retention**. Retention is defined as users making at least one transaction in all three months of the observation period. To achieve this, we aim to identify the **habit-forming behavior** of retained users, which can then be reinforced and nudged to the broader user base.

## Objectives:

1. Analyze user behavior to identify patterns or combinations of actions (e.g., transaction types, frequency, amounts) that are strongly correlated with retention.
2. Suggest nudges or interventions that can be implemented to drive habit formation among all users.

## Data Overview:

The data set contains two tables named User\_Details and Transactions.

## Data Analysis Procedure:

1. Loaded data onto Jupyter notebook and used pandas to check for any discrepancies in the data (Null values, Missing values and data info).
2. Imported Data to MySQL workbench and changed datatypes to minimize error during analysis.
3. Extracted table with retained user, later to use in excel to differentiate between retained and non-retained users.
4. Joined both tables to further carry out analysis in excel.
5. Used table with retained users to classify the users as Retained users and Not-Retained users.
6. Utilized pivot table for further evaluation and chart preparation.
7. Built Dashboard for better visualization with required slicers.

(P.S. Tried to extract more insights using SQL however later realized to work with excel for better visualization and ease of operation. And the excel attached contains many worksheets which were used for experimentation please ignore them)

**Note**: Please check Excel file attached for detailed analysis.

## **Insights, Nudges and Improvements Suggestion:**

### **User Age and Retention Rate:**

1. In users group aged 24 and 25 have higher retention rate, is also related to their transaction success rate i.e. 57% and 54.8%.

* Incentivizing them to refer others such as friends and family with rewards and coupons.
* Priority customer service and exclusive deals on transactions to keep them engaged.
* Utilizing their transaction data to increase success rate of transaction for all users.
* Sending personalised recommendations, rewards for each transaction, and discounts help in increasing the retention.
* Provide them with items such as badges, hoodies as loyalty reward, as they are mostly in peer groups it helps in word of mouth and retention.

1. Users aged 24 have a higher retention rate at 50% where transaction success rate is highest too (53%), and users aged 18 have the lowest retention rate.

* Improving transaction success rate translates to more retention in higher age groups.
* Users in age group 18 are mostly in college, by providing them with items such as badges, hoodies as loyalty reward will help in advertising and retention.

1. Highest number of users are aged 19 yet the retention rate stands at 27%, they also faced the highest number of failed transactions.

* Help with tips to avoid transaction failure through notifications.
* Conduct reward-based survey to understand reasons for poor retention rate.

1. Group of users aged 23 has lowest count, however has a fairly well retention rate at 44.4%.

### **Spending pattern and Retention Rate:**

1. Retained users have most of their transaction method as **Debit to Merchant group**. In case of non- retained users most transaction type falls under – **Credit** category. But when considering this relation with status of transaction (success/ Fail) it varies.

* Offer targeted discounts for specific merchant transactions and establish partnerships with those merchants to promote the application.
* For non-retained customers, most failed transactions fall under the **Credit** category, highlighting the need for improvements in credit options.

1. Transaction type **Debit to Merchant** has highest average spending followed by **Credit** category.
2. Average transaction amount stays relatively similar with slight variation, except for the group of users aged 18 where **Debit to merchant** has a spike in spending. (nudge)
3. **Card** and **Debit to personal account** transactions is fairly consistent across all the age group.
4. Users who spend a higher average amount with failed transactions status tend to have a lower retention rate.

* Offer discount/ cashback on their next transaction to retain the customer.
* Warning to minimize the transaction failure.
* Priority customer service for failed transactions of high value to make them feel prioritized.
* Rewarding them with coins for retrying the transaction.

### **Status of Transaction and Age group:**

#### Transaction status- Success:

1. User group aged 23 has lowest financial activity.

* Offer incentives such as rewards, cashback, or exclusive coupons for completing a transaction.

1. Users aged 20 have higher activity across all type of transaction except for **Debit to personal** account type of transaction.
2. Count of **Debit to merchant** type of transaction is seen having downward trend from age 18 to 25. (nudge)
3. Count of **Debit to personal** type of transaction is seen having upward trend from age 18 to 25. (Nudge)

* Incentivising them by exclusive offers by studying their usage to increase the retention rate.

#### Transaction status- Failed:

1. The user group aged 18 has the highest average amount for failed transactions in the 'Debit to Merchant Account' category.
2. The user group aged 22 has the highest average amount for failed transactions in the Credit category

* Minimizing the transaction failure by suggesting alternative methods.
* Providing tailored solutions to failed transactions, and reward for completing the same.

### **SQL queries:**

**-- changing data datatype**

update transactions

set date\_of\_transaction = 'YYYY-MM-DD'

where STR\_TO\_DATE(date\_of\_transaction, '%Y-%m-%d') is null;

update transactions

set date\_of\_transaction = STR\_TO\_DATE(date\_of\_transaction, '%d-%m-%Y')

where STR\_TO\_DATE(date\_of\_transaction, '%d-%m-%Y') is not null;

alter table transactions

modify date\_of\_transaction date;

alter table transactions

modify user\_id int,

modify txn\_id int,

modify type\_of\_transaction varchar(30),

MODIFY date\_of\_transaction date,

modify status varchar(10),

modify amount decimal(10,2);

update users

set activation\_date = STR\_TO\_DATE(activation\_date, '%d-%m-%Y')

where STR\_TO\_DATE(activation\_date, '%d-%m-%Y') is not null;

alter table users

modify user\_id int,

modify activation\_date date,

modify age int,

modify name varchar(10);

**-- Check for retained users who have transacted in all the 3 months**

select user\_id from transactions

where month(date\_of\_transaction) in (09,10,11)

group by user\_id

having count(distinct month(date\_of\_transaction)) = 3;

**-- What is the transaction frequency of the retained users?**

select user\_id, count(\*) as total\_transactions, avg(count(\*)) over () as average\_transaction\_per\_user

from transactions

where user\_id in (

select user\_id from transactions

where month(date\_of\_transaction) in (09,10,11)

group by user\_id

having count(distinct month(date\_of\_transaction)) = 3

)

group by user\_id;

**-- What is the most common type of transaction among those retained**

select type\_of\_transaction,

count(\*) AS total\_transactions,

round(100.0 \* count(\*) / sum(count(\*)) over (), 2) as percentage\_of\_total

from transactions

where user\_id in (

select user\_id from transactions

where month(date\_of\_transaction) in (09,10,11)

group by user\_id

having count(distinct month(date\_of\_transaction)) = 3

)

group by type\_of\_transaction

order by total\_transactions desc;

-- **Amonut spend by retained user**

select user\_id, avg(amount) as avg\_amount, sum(amount) as total\_amount

from transactions

where user\_id in (select user\_id from transactions

where month(date\_of\_transaction) in (09,10,11)

group by user\_id

having count(distinct month(date\_of\_transaction)) = 3)

group by user\_id

order by total\_amount desc;

**-- spending pattern in different age group**

with retained\_users as (

select user\_id from transactions

where month(date\_of\_transaction) in (09,10,11)

group by user\_id

having count(distinct month(date\_of\_transaction)) = 3)

select

case

when user\_id in (select user\_id from retained\_users) then 'Retained'

else 'Non Retained'

end as retention\_status,

avg(age) as avg\_age

from users

group by retention\_status

**-- Joining both tables**

select \* from transactions t

join users u on u.user\_id = t.user\_id

Thank you.