How to measure if e-commerce operation is healthy?

Website: https://github.com/qiqi-luo/Order-Report.git

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Introduction

The Goal

The report is to oversee if operation is healthy in April by comparing key indicators in Mar and Apr

Time Period

From 2016/3/1 to 2016/5/1. 461804 Records.
Data_Mar: 2016/3/1 – 2016/3/30 (to compare with April, 3/31 excluded)
Data_Apr: 2016/4/1 – 2016/4/30

The data sample:

order_id	user_id	amount	paytime	day
539420	11211	657.0	2016/5/1	1
539421	11211	472.0	2016/4/30	30
539422	101208	767.0	2016/5/1	1
539423	11211	1036.0	2016/5/1	1
539425	11211	801.0	2016/4/30	30

Field Description:

order_id: unique ID for orders

user_id: unique ID for clients

amount: price of each order

paytime: payment date of each order

day: the day of the month

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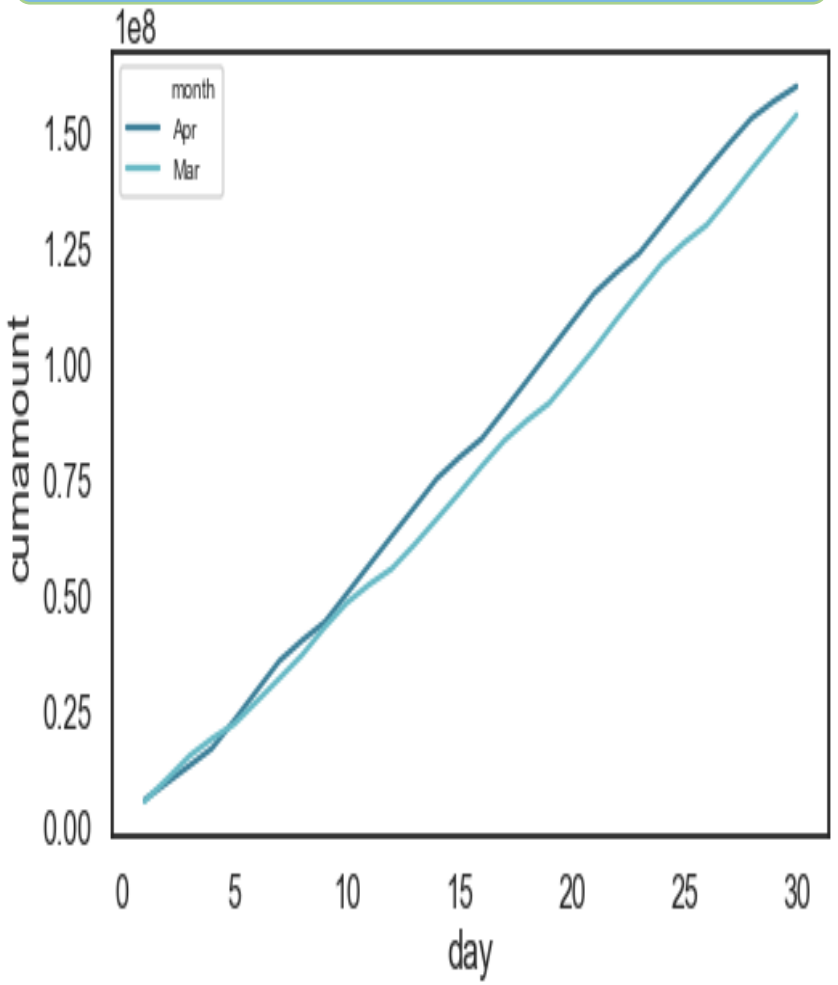
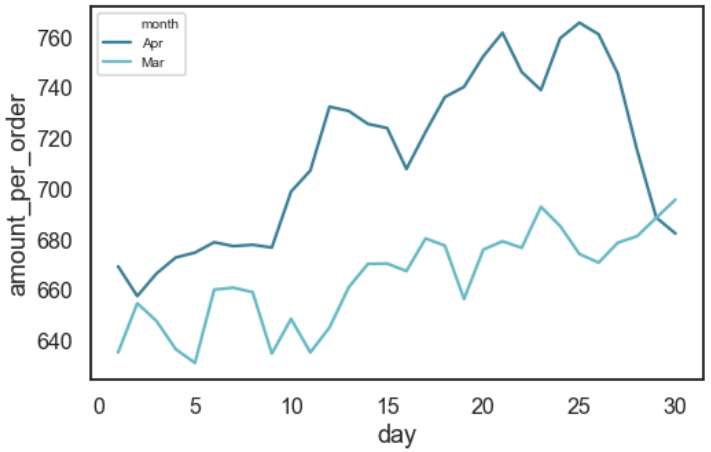
Overall Trend

Overall Trend -- Revenue = Price * Orders

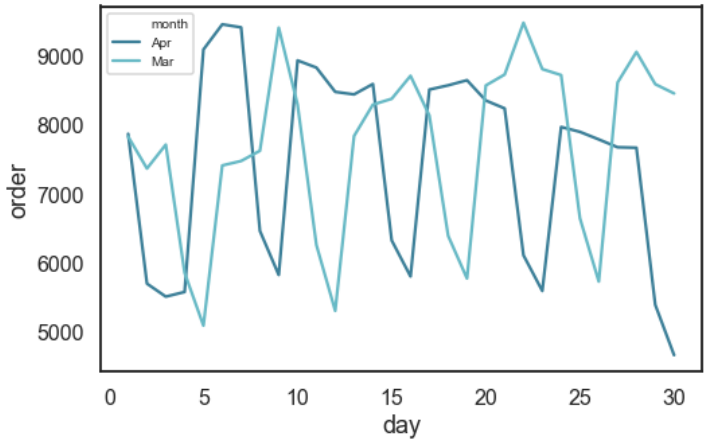
Cumulative Revenue in Apr is beyond Mar



Average Price increases by 48 in Apr



Orders declined in Apr and tend to continue



Revenue:

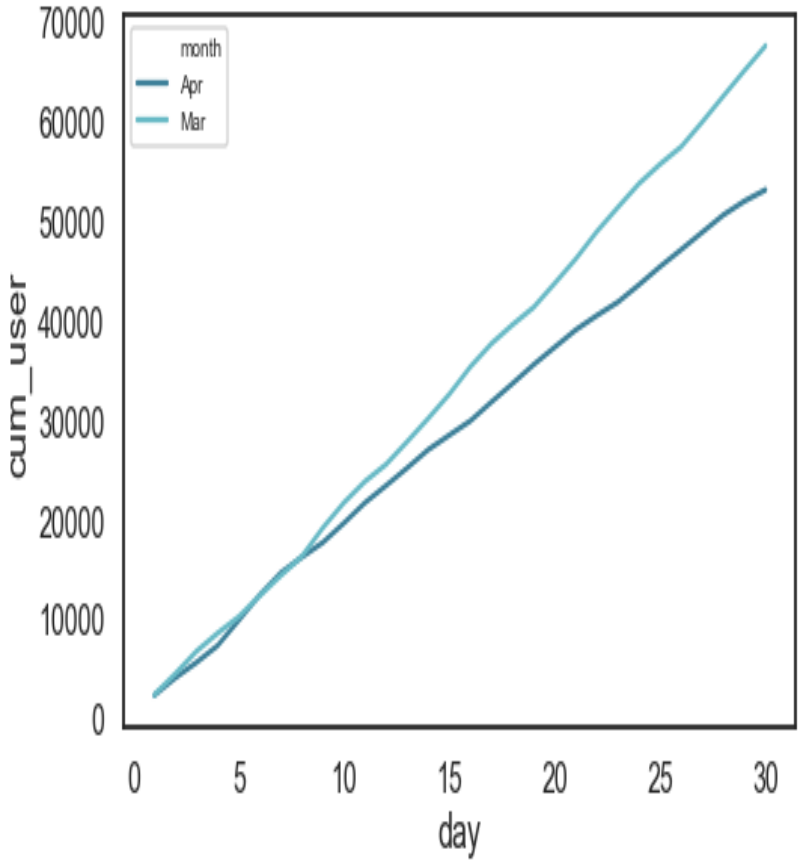
Mar:153.45 M Apr: 159.63 M

- An effort to increase price since around 3/15, and the trend continued in April.
- Accordingly, 240 less orders were made every day on average. And the trend is still going down.
- But overall, the revenue increased by 6M in Apr.

User Behavior

User Behavior – Active User, consumption level and frequency

9K less users in Apr

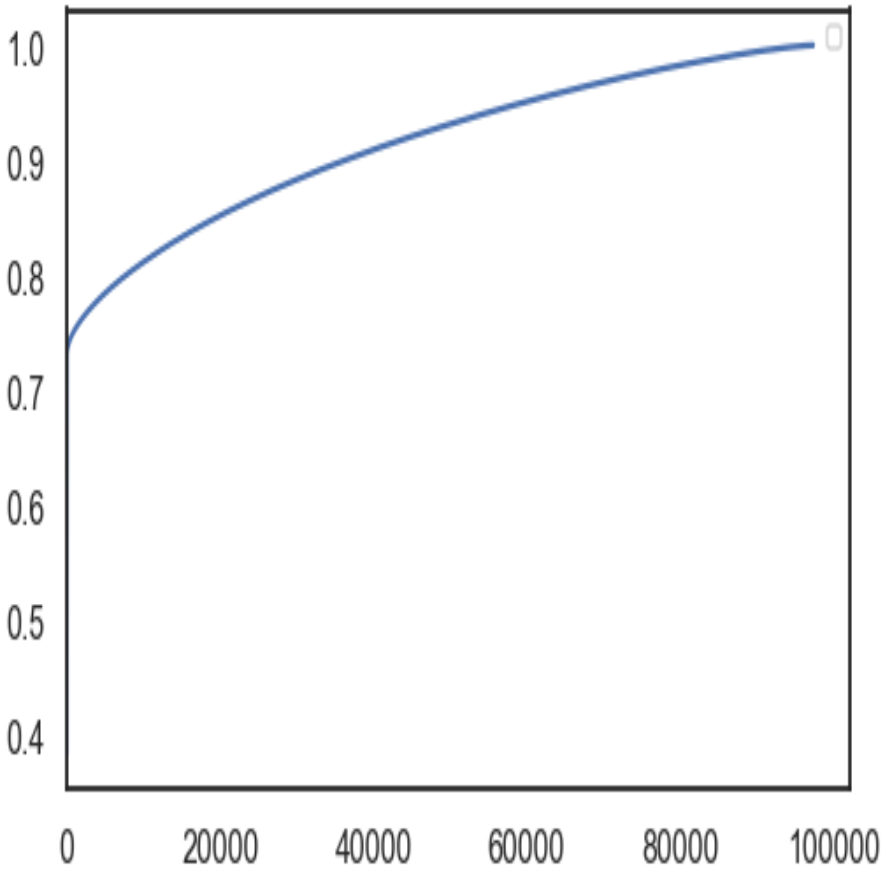


- The data is highly skewed and there are super high value users who contributed over 70% revenue.
- Most users consumed just once and 75% of them spent less than 1000.

	amount_Mar	orders_Mar	amount_Apr	orders_Apr
count	53394	53394	43967	43967
mean	2874	4.3	3631	5.1
std	463,759	655	573,054	772
min	18	1	-2	1
25%	456	1	497	1
50%	651	1	670	1
75%	995	2	987	1
max	107.16M	151,362	120.16M	161,973

User Behavior – Did 20% users contribute 80% revenue

8.5% users contribute to 80% revenue



- There is one super high value user (id=11211), who contributed over 70% revenue. And the average price for this user is 741 in Apr, 667 in Mar, which are not too high, so this user made huge amount of orders at a high-level price.
- The list showed part of high value users..

user_id	amount	month	contribution
11211	1.201601e+08	Apr	0.383794
11211	1.071615e+08	Mar	0.726070
57282	2.338080e+05	Mar	0.726817
57282	2.191870e+05	Apr	0.727517
68226	1.624153e+05	Mar	0.728036
62590	1.344430e+05	Apr	0.728465
14427	1.152400e+05	Mar	0.728833
53616	1.072430e+05	Mar	0.729176
14427	1.023990e+05	Apr	0.729503
14271	9.679000e+04	Mar	0.729812

User Behavior – Consumption level and frequency of different groups

Super user contribute less revenue in Apr

	Mar	Apr
Users:	52	26
Avg amount:	58192	41607
Avg orders:	89.9	54.8
Avg price:	647	759
Revenue:	1.44M	1.08M

- Super high value users are users who spent over 150k
  (user 11211 excluded)
- Half of super high value users churned in Apr
- Super high value users spent 16k less in Apr and made 35 less orders
- The Avg price in Apr is 100 more than in Mar

User Behavior – Consumption level and frequency of different groups

High value user contribute less revenue in Apr

	Mar	Apr
Users:	2492	2287
Avg amount:	3206	3237
Avg orders:	4.04	3.91
Avg price:	793	827
Revenue:	7.99M	7.40M

- High value users are users who spent over 2k (user 11211 excluded)
- High value users spent 30 more in Apr and made 0.13 less orders
- The price in Apr is 35 more than in Mar

User Behavior – Consumption level and frequency of different groups

Normal value user contribute less revenue in Apr

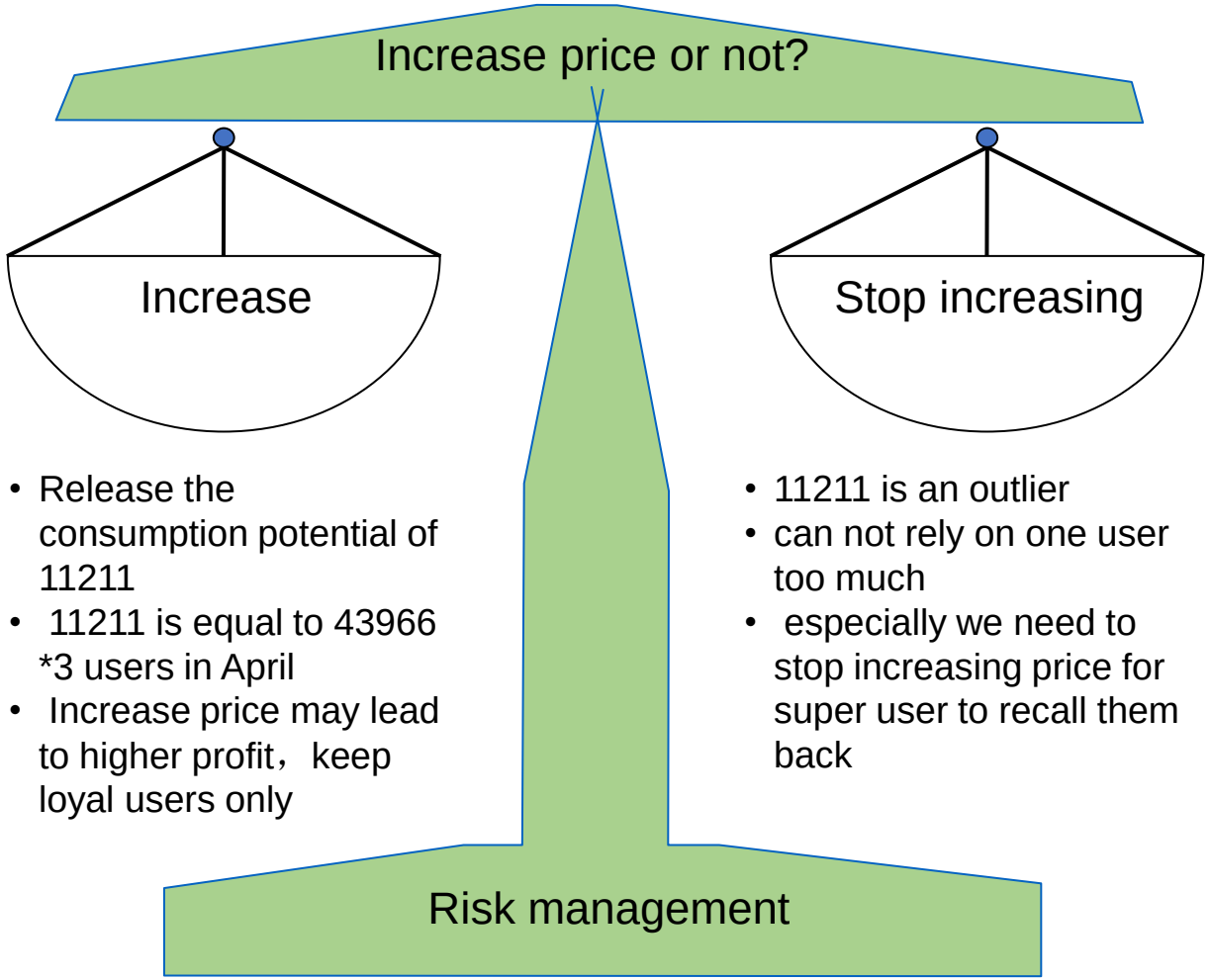
	Mar	Apr
Users:	50877	41653
Avg amount:	724	743
Avg orders:	1.31	1.22
Avg price:	552	609
Revenue:	36.87M	30.98M

- Normal value users are users who spent less than 2k
  (user 11211 excluded)
- Near 10k normal value users churned in Apr
- Normal value users spent 10 more in Apr and made 0.1 less orders
- The price in Apr is 57 more than in Mar

User Behavior – Increase price or not?

User 11211 reversed Apr's revenue

	Mar	Apr
Super:	1.44M	1.08M
High:	7.99M	7.40M
Normal:	36.87M	30.98M
Subtotal:	46.29M	39.47M
Plus 11211:	107.16M	120.16M
Total:	153.45M	159.63M



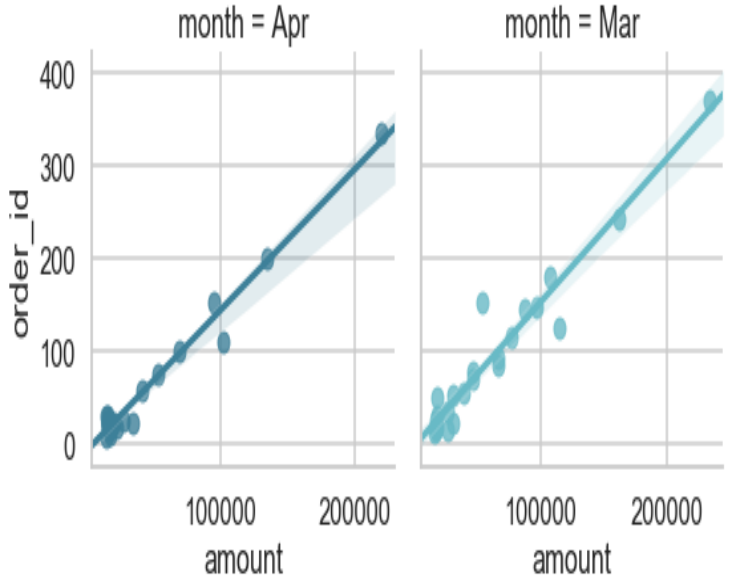
- Release the consumption potential of 11211
- 11211 is equal to 43966 *3 users in April
- Increase price may lead to higher profit，keep loyal users only

- 11211 is an outlier
- can not rely on one user too much
- especially we need to stop increasing price for super user to recall them back

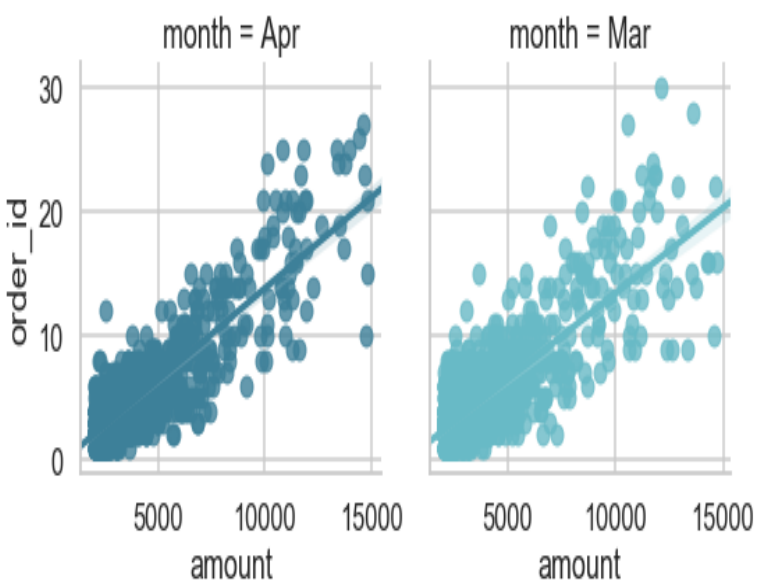
User Behavior – Relationship between amount and frequency

There is linear relationship between amount and frequency for users who spent over 2k.
For the majority normal users, they often made less than 5 orders at totally different price.

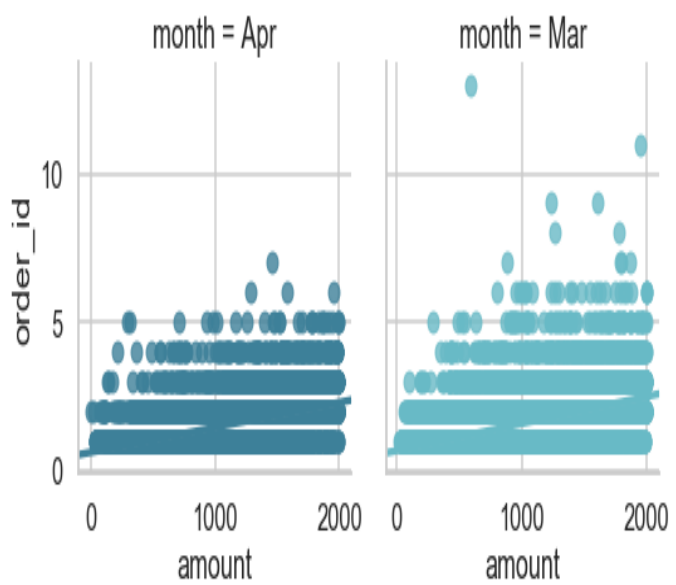
Super user' price is stable



High value user' price is stable



Normal value user' price varies a lot

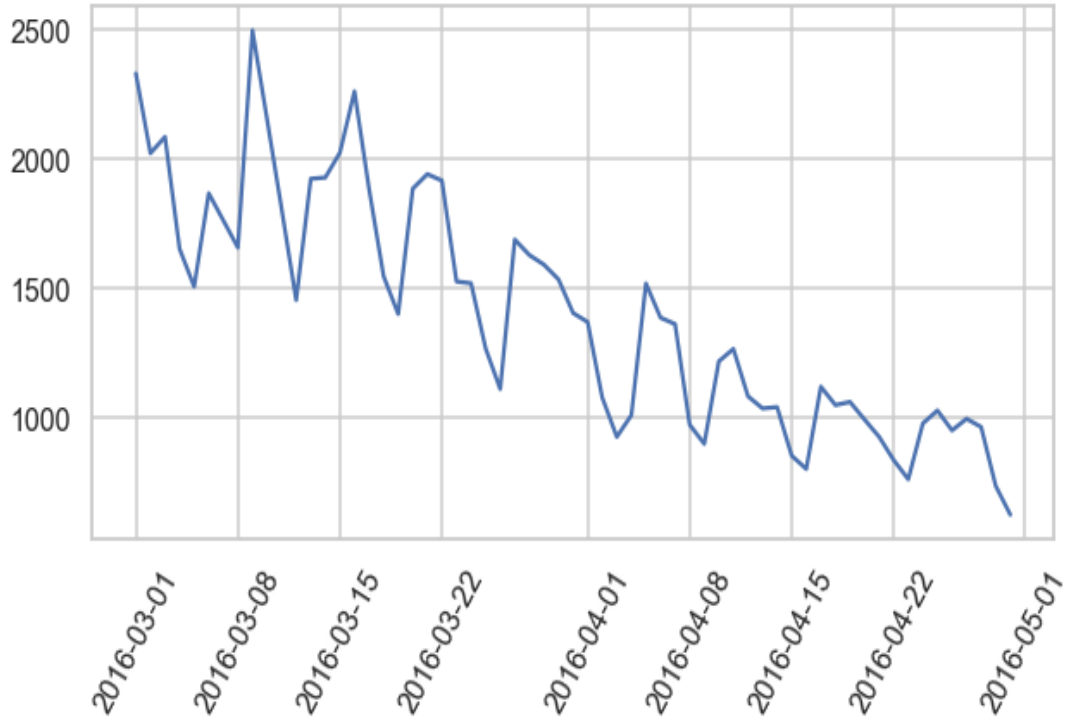


User Label

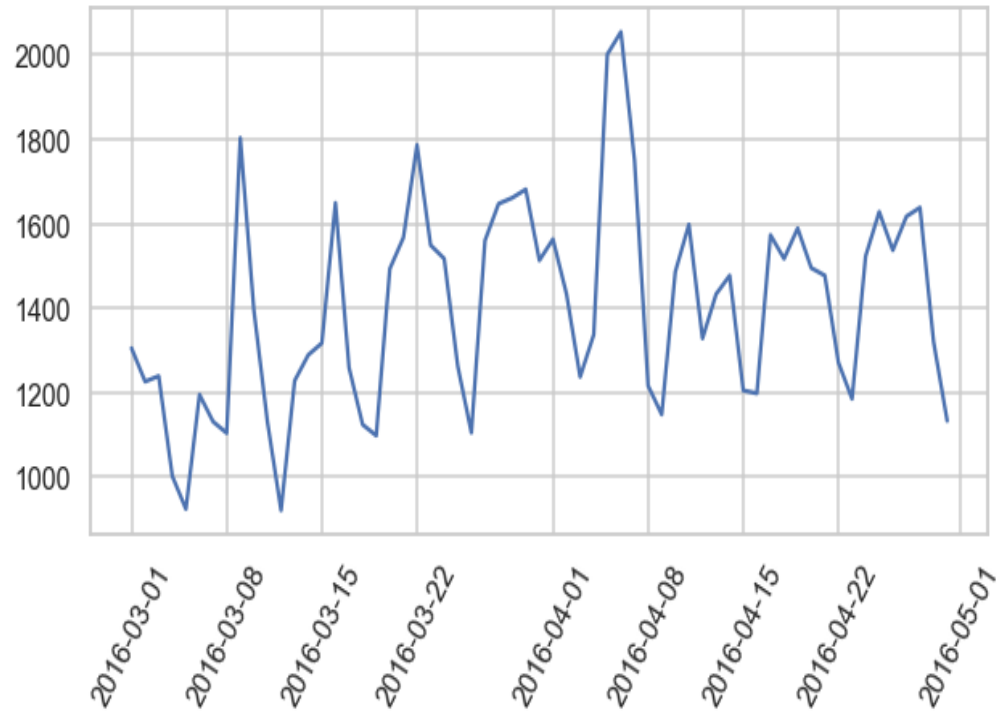
User Label – User acquisition and churn

Acquisition becomes hard when increase price.
Around between 1300 and 1400 users churn per day from March to April.

User acquisition shows declining trend



Churn rate is stable

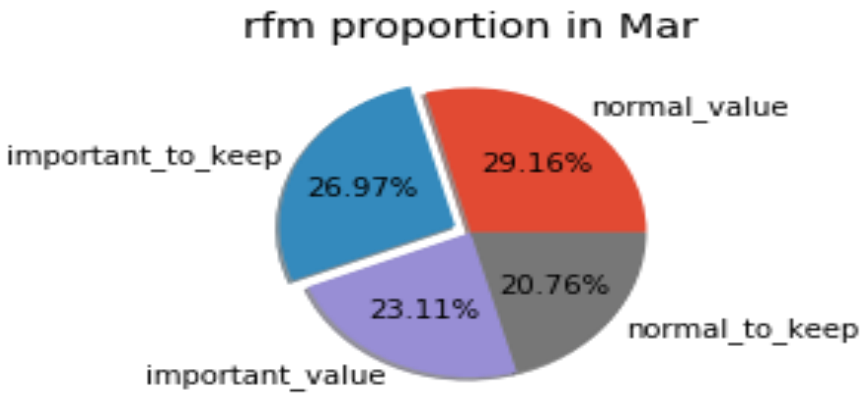


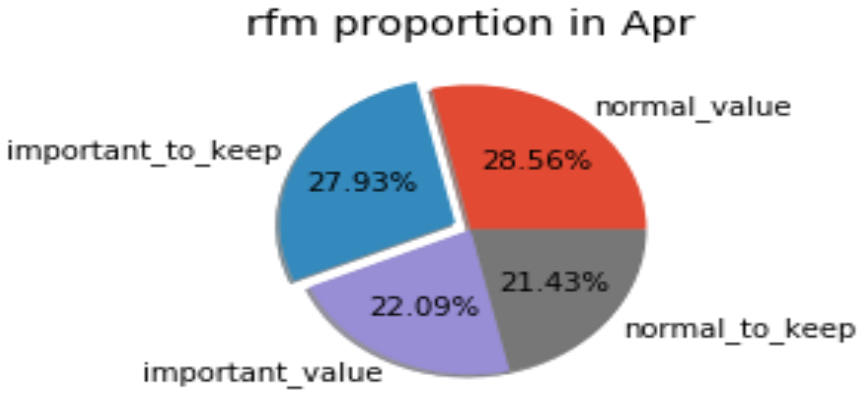
User Label – User acquisition and churn

Less users purchase more than once in April

User Label – RFM structure

No big change in user structure in terms of RFM model





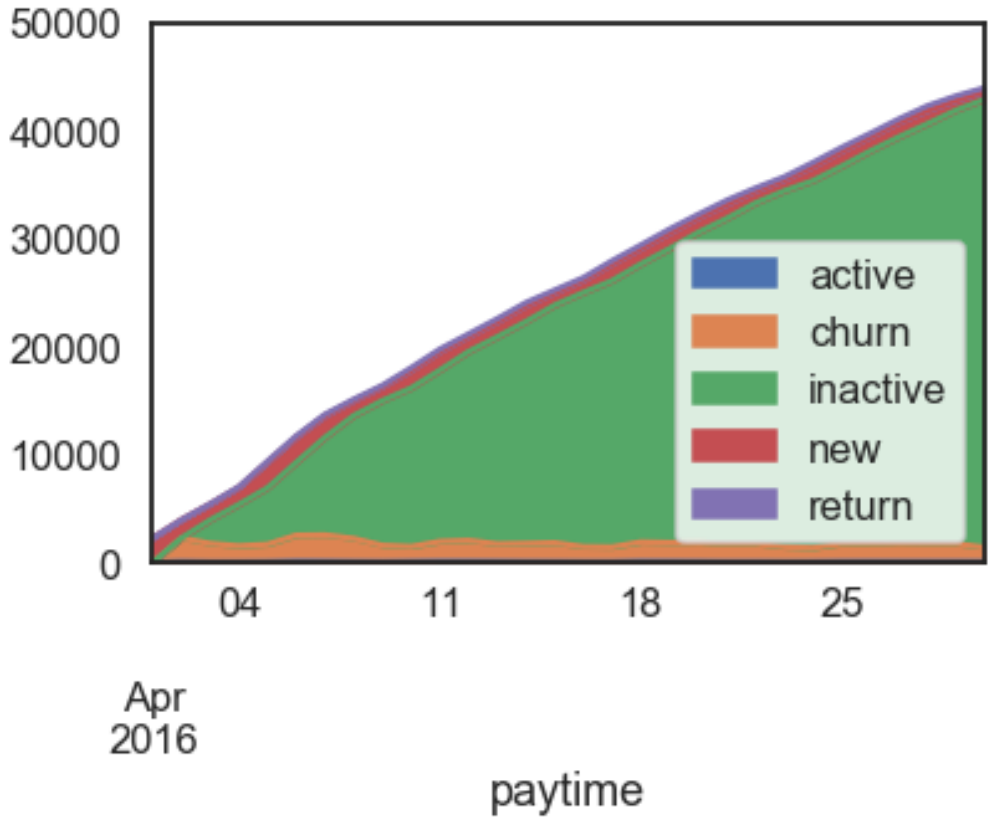
- **Important to keep:**
  - Contribute larger revenue
  - Purchase frequently
  - Purchase recently
- **Important value:**
  - Contribute larger revenue
  - Purchase frequently
  - No Purchase recently

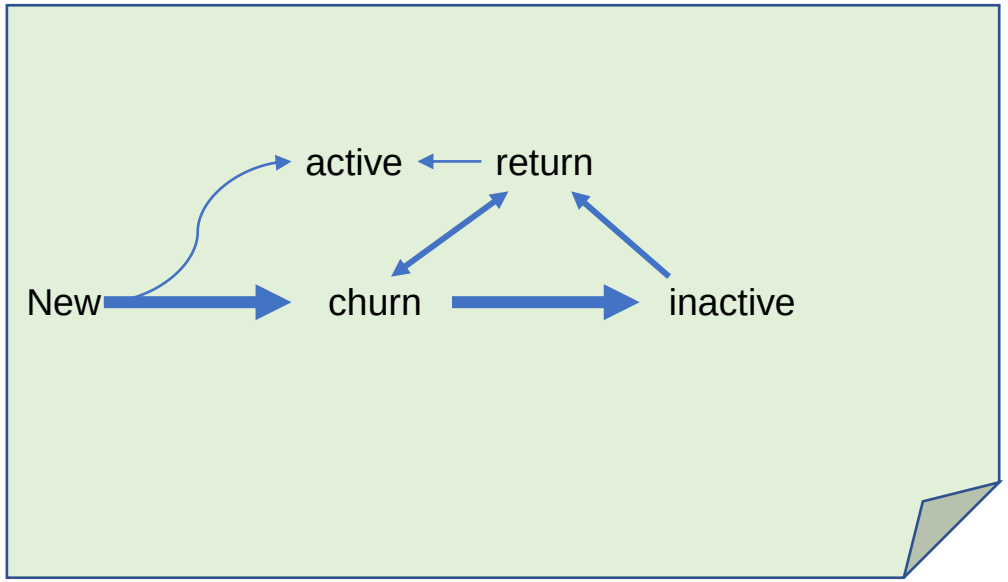
User label

- **Normal to keep:**
  - Contribute smaller rev.
  - Purchase frequently
  - Purchase recently
- **Normal value:**
  - Contribute smaller rev.
  - Purchase frequently
  - No Purchase recently

User Label – Life Cycle Period

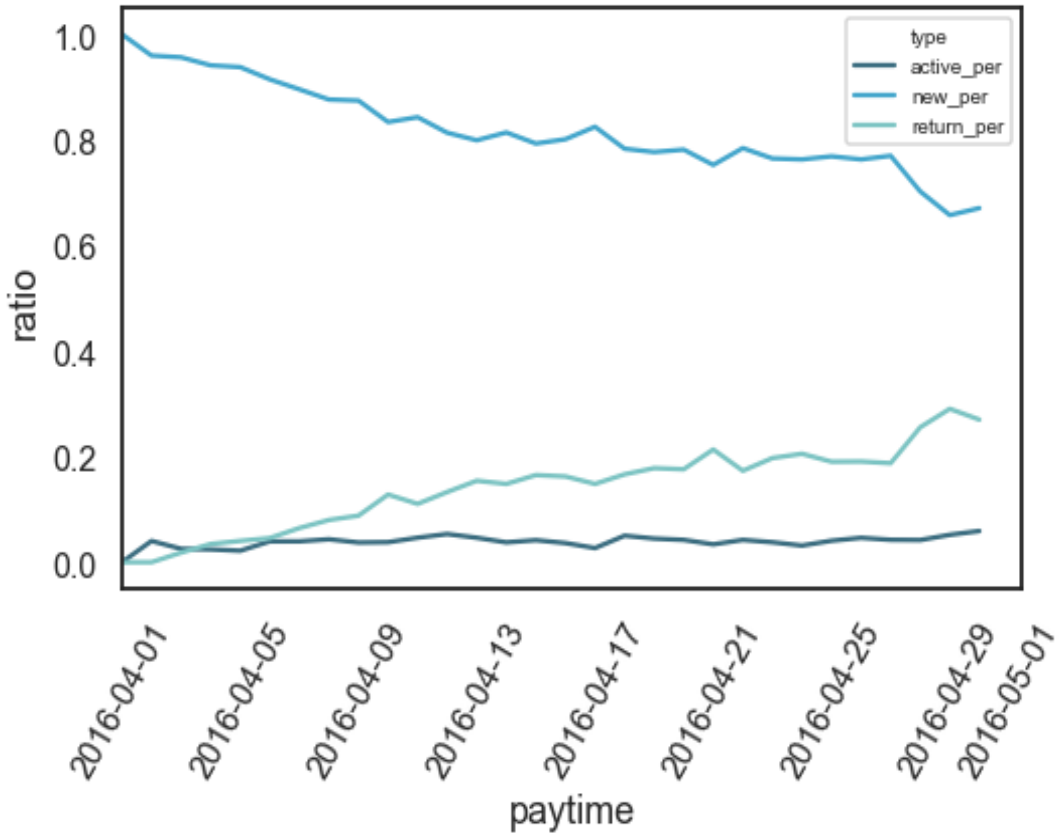
Healthy structure

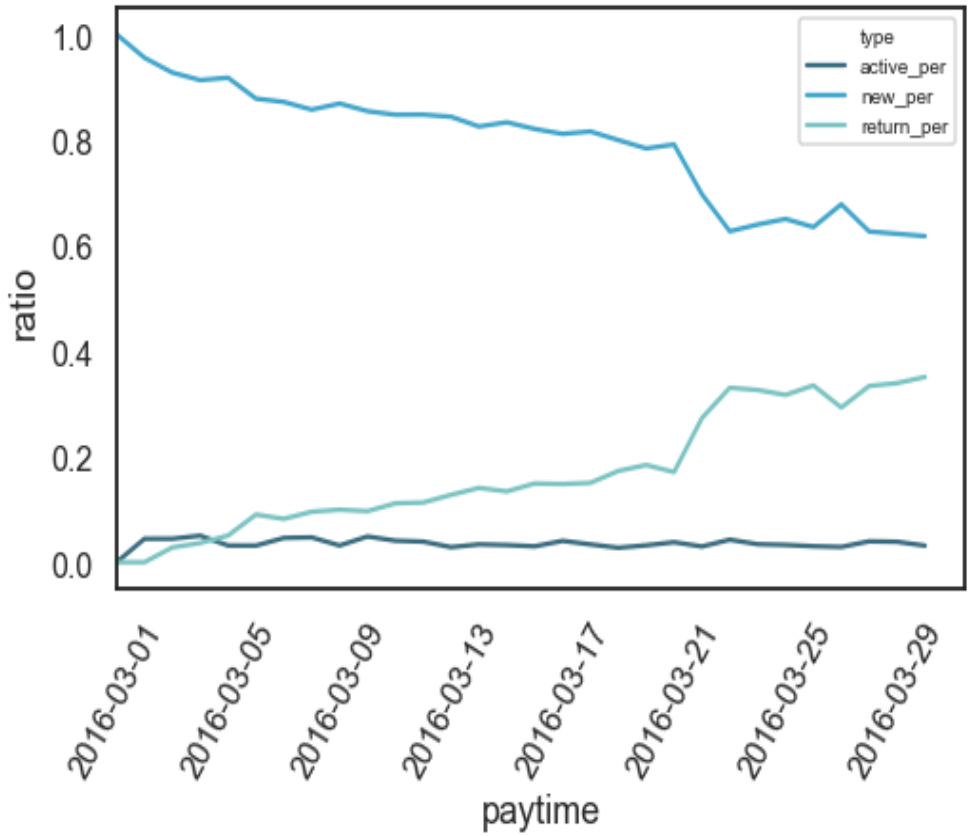




User Label – Life Cycle Period

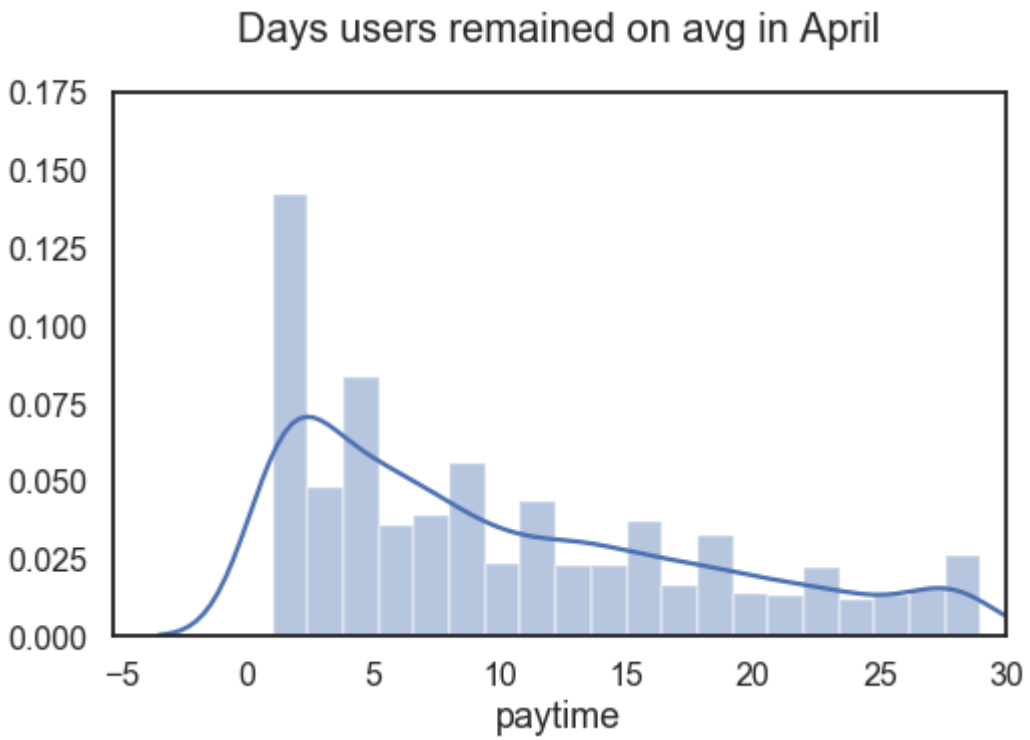
People are more likely to return in Mar

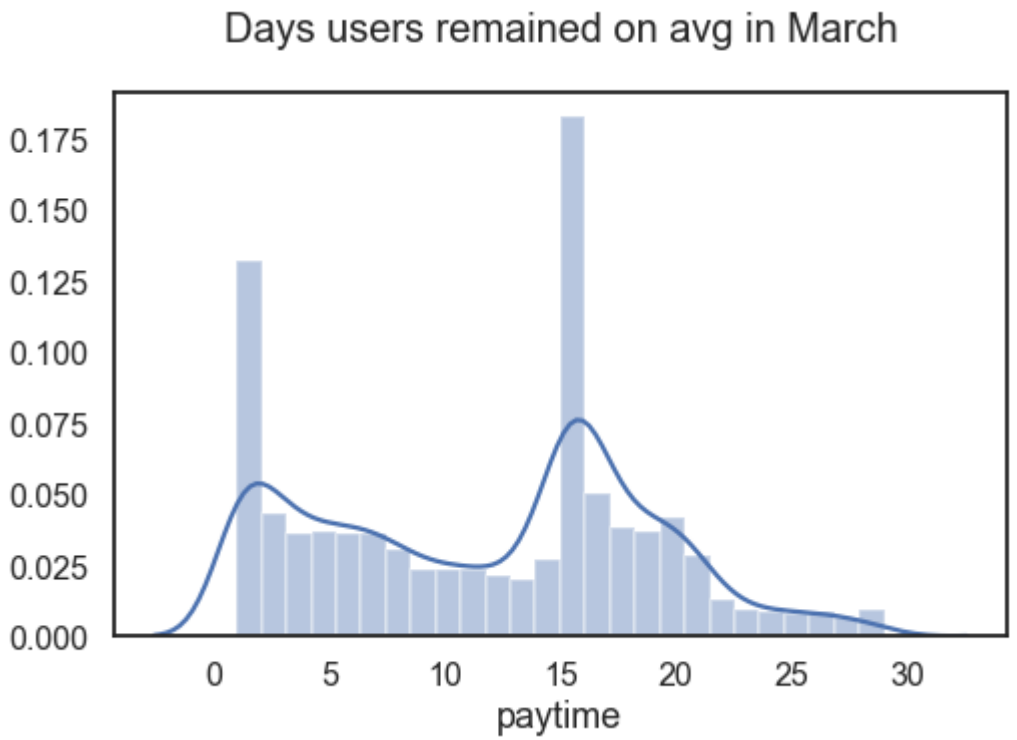




Life Cycle – How long users stay on avg?

For users who stay longer than 5, the remaining days distribute more evenly



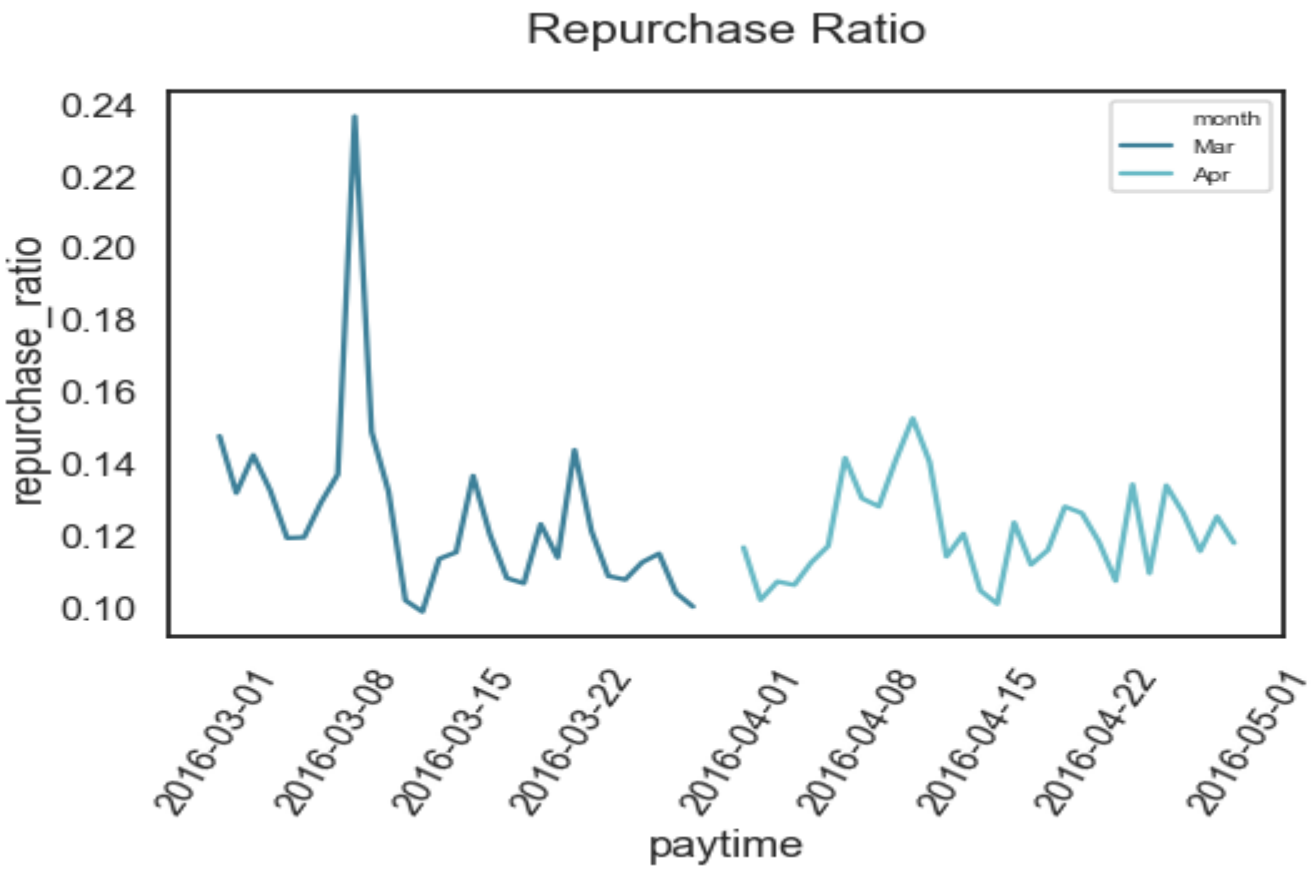


After filtering users just purchase once

Repurchase and purchase back ratio

Repurchase Ratio – do users purchase more than once in a day?

Repurchase ratio in last half of Apr is less than in Mar



After calculation, 24% users in March purchase again in April.

And users in Mar tend to purchase more than once in a day.