Churn rates with Codeflix

Learn SQL from scratch: Capstone project

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1. Getting familiar with Codeflix

1. Getting familiar with codeflix

The company that we are analysing is a monthly video streaming service called CodeFlix. To get acquainted with the data in the table, we look at the first 100 rows of the table.

id	subscription_start	subscription_end	segment
1	2016-12-01	2017-02-01	87
2	2016-12-01	2017-01-24	87
...	...	...	...

The table contains 4 columns, the id, the start and end of the subscription, and the customer segment.

```
-- Select the first 100 rows of the table
SELECT *
FROM subscriptions
LIMIT 100;
```

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1. Getting familiar with codeflix

What segments of users exist?

segment	Number of customers
30	1000
87	1000

From the results of our SQL query, we see that there are two different customer segments: segment 87 and segment 30. Both contain 1000 customers.

```
-- Select the number of distinct segments
SELECT DISTINCT segment, COUNT(*) as 'Number of
customers'
FROM subscriptions;
```

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1. Getting familiar with codeflix

How many months has the company been operating? Which months do you have enough information to calculate a churn rate?

min_start_date	max_start_date
2016-12-01	2017-03-30

Based on this SQL query, the number of months between the min and max dates is four. This is the number of months that the company has been operating. We can only compute the churn rate for three months (2017-01,2017-02,2017-03) because there are no subscription_end values for the December 2016.

```
-- We return for the minimum and maximum start
-- dates in the database

SELECT MIN(subscription_start) AS
'min_start_date',
MAX(subscription_start) AS
'max_start-date'
FROM subscriptions;
```

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2. Churn rates

2. Churn rates

The **Churn rate** is the percentage of subscribers that have canceled within a certain period, usually a month. To calculate the churn rate, we only will be considering users who are subscribed at the beginning of the month. The churn rate is the number of these users who cancel during the month divided by the total number

$$\text{Churn} = \frac{\text{Cancellations}}{\text{Total subscribers}}$$

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2. Churn rates

What is the overall churn trend since the company started?

- First we create a temporary table to store the three months that we will calculate the churn rates for. We store it in the "**months**" table.

```
 -- CREATE A temporary table for MONTHS
WITH months AS
(SELECT
  '2017-01-01' as first_day,
  '2017-01-31' as last_day
UNION
SELECT
  '2017-02-01' as first_day,
  '2017-02-28' as last_day
UNION
SELECT
  '2017-03-01' as first_day,
  '2017-03-31' as last_day
),
```

2. Churn rates

What is the overall churn trend since the company started?

- First we create a temporary table to store the three months that we will calculate the churn rates for. We store it in the "**months**" table.
- We then take the temporary "**months**" table and perform a cross-join with the "**subscriptions**" table. We store this table as "**cross_join**"

```
-- Now we cross Join the Months table with the
-- subscriptions table
cross_join AS
(SELECT *
FROM subscriptions
CROSS JOIN months),
```

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2. Churn rates

What is the overall churn trend since the company started?

- First we create a temporary table to store the three months that we will calculate the churn rates for. We store it in the "**months**" table.
- We then take the temporary "**months**" table and perform a cross-join with the "**subscriptions**" table. We store this table as "**cross_join**"
- We then take this cross joined table and compute the number of active and cancelled users using "**CASE**", store this in the "**status**" table

```
-- Now we Create the temporary status table for
-- the two customer Segments
status AS
(SELECT id, first_day as month,

  -- The is total active segment
 CASE
  WHEN (subscription_start < first_day)
    AND (
      subscription_end > first_day
      OR subscription_end IS NULL
    )
 THEN 1
  ELSE 0
END as is_active,

  -- The is cancelled segment
CASE
WHEN (subscription_end BETWEEN first_day AND
last_day)
THEN 1
ELSE 0
END as is_canceled FROM cross_join),
```

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2. Churn rates

What is the overall churn trend since the company started?

- Finally we aggregate the "**`status`**" table into the "**`status_aggregate`**" table, compute the number of cancelled and active members, sorted by date. From this we compute the churn rate. The result is given below

month	overall churn_rate
2017-01-01	0.161687170474517
2017-02-01	0.189795918367347
2017-03-01	0.274258219727346

```
-- Now we generate the Aggregate numbers
status_aggregate AS
(SELECT
  month,
 SUM(is_active) as sum_active,
 SUM(is_canceled) as sum_canceled
FROM status
GROUP BY month)

-- Compute the overall churn rate
SELECT month,
1.0*sum_canceled/sum_active as 'overall
churn_rate'
FROM status_aggregate;
```

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3. Comparison of churn rates

3. Comparison of churn rates

Compare the churn rates between user segments

- We now want to compare the churn rates for segment 87 and 30, to do so we add another case to our previous "**`status`**" table with the AND statement.
- The SQL query on the right shows how the case is modified to select segment 87.

```
status AS
(SELECT id, first_day as month,
...
 -- The is active 87 segment
 CASE
  WHEN (subscription_start < first_day)
    AND ( subscription_end > first_day
OR subscription_end IS NULL)
 AND segment = 87
 THEN 1
  ELSE 0
END as is_active_87,

 -- The is cancelled 87 segment
CASE
WHEN (subscription_end BETWEEN first_day AND
last_day) AND ( segment= 87)
THEN 1
ELSE 0
END as is_canceled_87,
…

FROM cross_join),
```

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3. Comparison of churn rates

Compare the churn rates between user segments

- We now want to compare the churn rates for segment 87 and 30, to do so we add another case to our previous "**`status`**" table with the AND statement.
- The SQL query on the right shows how the case is modified to select segment 87.
- Now we modify the SQL query on the right and add a case statement to select segment 30.

```
status AS
(SELECT id, first_day as month,
...
 -- The is active 30 segment
 CASE
  WHEN (subscription_start < first_day)
    AND ( subscription_end > first_day
OR subscription_end IS NULL)
 AND segment = 30
 THEN 1
  ELSE 0
END as is_active_30,

 -- The is cancelled 30 segment
CASE
WHEN (subscription_end BETWEEN first_day AND
last_day) AND ( segment= 30)
THEN 1
ELSE 0
END as is_canceled_30,
…

FROM cross_join),
```

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3. Comparison of churn rate

Compare the churn rates between user segments

- We now modify the "**`status_aggregate`**" table to give us the churn rates for segment 30 and 87 along with the total churn rates

month	total_churn_rate	churn_rate_30	churn_rate_87
2017-01-01	0.161687170474517	0.07560137457044	0.25179856115107
2017-02-01	0.189795918367347	0.07335907335907	0.32034632034632
2017-03-01	0.274258219727346	0.11731843575419	0.48587570621468

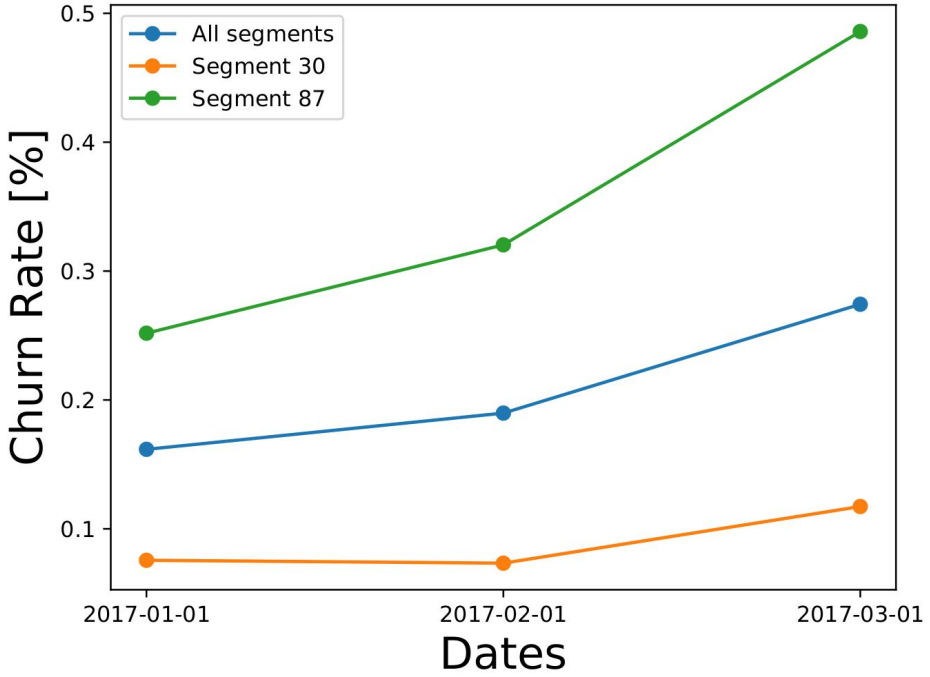
```
-- Now we generate the Aggregate numbers for
both segments with the total
status_aggregate AS
(SELECT
  month,
 SUM(is_active) as sum_active,
  SUM(is_active_30) as sum_active_30,
  SUM(is_active_87) as sum_active_87,
 SUM(is_canceled) as sum_canceled,
  SUM(is_canceled_30) as sum_canceled_30,
  SUM(is_canceled_87) as sum_canceled_87
FROM status
GROUP BY month)

-- Compute the Churn Rates
SELECT month,
1.0*sum_canceled/sum_active as
total_churn_rate,
1.0*sum_canceled_30/sum_active_30 as
churn_rate_30,
1.0*sum_canceled_87/sum_active_87 as
churn_rate_87
FROM status_aggregate;
```

4. Conclusions

4. Conclusions

Data Analysis

- Plotting the churn rates for all segments, segment 30 and segment 80, we observe an increasing churn rate pattern across all customer segments.
- The churn rate for Segment 87 was consistently higher than for Segment 30.



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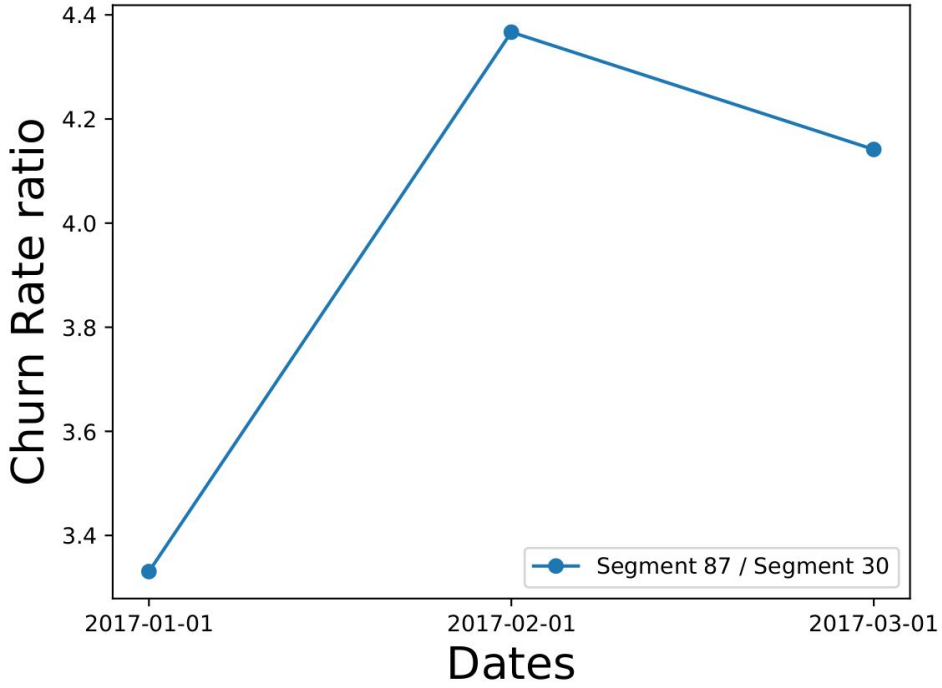
4. Conclusions

Data Analysis

- Taking the ratio of the churn rates of segment 87 and 30, we observe that there is a factor of approximately 3-4 between these two segments.
- The churn rate ratio is highest for the Month of February, where it reaches a value of 4.4



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4. Conclusions

Which segment of users should the company focus on expanding?

- Based on our analysis we can conclude that the churn rate increased from Jan- March. If possible, Codeflix should identify what caused the increase in churn rates for these months and take actions to reduce the churn rate.
- In particular, we found that customer segment 87, had a very high churn rate in comparison to segment 30. Codeflix should make changes to how they handle segment 87, in order to reduce the churn rate.
- **Codeflix should focus on expanding segment 30 and changing their approach to segment 87. That would reduce the overall churn rate.**
- Additional customer segments could be created by Codeflix to test and implement different methods of reducing churn rates.

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