Churn Dynamics in Telecom: A Closer Look At Customer's Behavior using SQL

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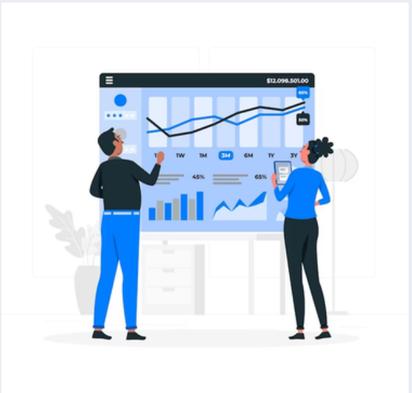
Problem Statement

In the competitive telecom industry, customers' critical evaluation of services shapes their perception of the entire company. Routine disruptions evoke anxiety, underlining the significance of churn analysis. The churn rate reflects customer loss, impacting revenue. Insights from analysis drive strategies, segment targeting, and service enhancement, fostering customer trust and satisfaction.

What is Customer Churn ?

Customer churn, also known as customer attrition or customer turnover, refers to the phenomenon where customers or subscribers stop doing business with a company or stop using its products or services. In other words, customer churn occurs when customers who were previously engaged with a business or its offerings decide to discontinue their relationship or stop making purchases. This can happen for various reasons, such as dissatisfaction with the product or service, competitive offerings, pricing issues, changes in personal circumstances, or a lack of perceived value



DATA CLEANING

Finding the Total number of customers

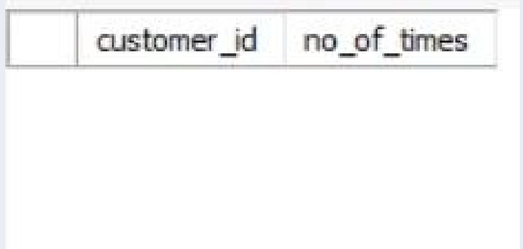
```
Select distinct count(customer_id) as TotalCustomers from churndata;
```

customers
7032

there are 7032 customers found in the dataset.

Checking the duplicate values

```
select customer_id , count(customer_id) as no_of_times from churndata group by customer_id having count(customer_id)>1;
```



customer_id	no_of_times

the query returns no data in the table, it indicates that there are no duplicate values in the dataset. This absence of results implies that each value within the specified dataset is unique, and there are no repeated or duplicated entrie

Checking Null Values

Let’s check for null values in the columns that might contain null values. Since we cannot determine whether null values are present within columns of string data type or integer data type, let’s perform a comprehensive check .

```
select ‘SeniorCitizen’ as ColumnName, count(*) as nullcount from churndata where ‘SeniorCitizen’ is null UNION
select ‘tenure’ as ColumnName, count(*) as nullcount from churndata where ‘tenure’ is null UNION
select ‘MonthlyCharges’ as ColumnName, count(*) as nullcount from churndata where ‘MonthlyCharges’ is null
UNION
select ‘TotalCharges’ as ColumnName, count(*) as nullcount from churndata where ‘TotalCharges’ is null UNION
select ‘numAdminTickets’ as ColumnName, count(*) as nullcount from churndata where ‘numAdminTickets’ is null
UNION
select ‘churn’ as ColumnName, count(*) as nullcount from churndata where ‘churn’ is null UNION
select ‘numTechTickets’ as ColumnName, count(*) as nullcount from churndata where ‘numTechTickets’ is null;
```

ColumnName	nullcount
SeniorCitizen	0
tenure	0
MonthlyCharges	0
TotalCharges	0
numAdminTickets	0
churn	0
numTechTickets	0

Here, we can see that there is no data in the table. Therefore, we do not need to worry about null data. Our data has been cleaned and is now ready to be explored for insights

DATA EXPLORATION

1. Whats the distribution of churned customers based on gender?

```
Select gender, count(*) as Totalcustomer, sum(churn) as Customers, cast(sum(churn) *
1.0 / count(*) *100 as decimal (10,2)) as churnrate from churndata group by gender order
by churnrate desc;
```

	gender	Totalcustomer	Customers	churnrate
▶	Female	3483	939	26.96
	Male	3549	930	26.20

We can observe the difference in churn rates, with females having slightly higher churn rates. However, the difference is relatively small, so we can’t predict customer churn based solely on gender. Customer churn rates for male and female customers are very similar to each other.

2. Calculate the total charge made by the churn customers based on their gender?

```
select gender, count(*) as totalcustomer,
round(sum(TotalCharges),2) as totalcharges from churndata
group by gender order by totalcharges desc;
```

	gender	totalcustomer	totalcharges
▶	Male	3549	8103814.5
	Female	3483	7952354.2

As the difference between females and males is smaller, the total amount paid is also similar. Therefore, the amount paid or charges can't be the deciding factor for churn

3. What is the churn rate for Senior citizens?

```
select case when SeniorCitizen=1 then 'Senior' else 'non-senior'
end as SeniorCitizen, count(*) as Totalcustomer, sum(churn) as
ChurnedCustomers, round(sum(TotalCharges),2) as
totalcharges, cast(sum(churn) * 1.0 / count(*) *100 as decimal
(10,2)) as churnrate from churndata group by SeniorCitizen order
by churnrate desc;
```

	SeniorCitizen	Totalcustomer	ChurnedCustomers	totalcharges	churnrate
▶	Senior	1142	476	3209551.25	41.68
	non-senior	5890	1393	12846617.45	23.65

Among the total number of customers, a larger number of churned customers are non-senior citizens, while the churn rate among senior citizens is higher. This suggests that being a SeniorCitizen has an impact on the customer churn rate. Seniorcitizens exhibit a higher churn rate compared to non-SeniorCitizens, and furthermore, they also have lower charges. This implies that customers of younger age are more inclined to prefer the services compared to seniors

4. What is the churn rate for customers with and without partners, and what is the overall churn rate?

```
SELECT CASE WHEN tenure <=12
THEN ‘0–12’
WHEN tenure <=24 THEN ‘12–24’
WHEN tenure <=36 THEN ‘24–36’
WHEN tenure <=48 THEN ‘36–48’
WHEN tenure <=60 THEN ‘48–60’
ELSE ‘60+’ END AS tenurerange,
ROUND((SUM(CASE WHEN churn
=’1' THEN 1 ELSE 0 END )/ COUNT(*)
*100), 2) AS churnrate,
COUNT(*) AS Totalcustomer,
SUM(churn) AS ChurnedCustomers
FROM churndata GROUP BY
tenurerange ORDER BY churnrate
DESC;
```

tenurerange	churnrate	Totalcustomer	ChurnedCustomers
0-12	47.68	2175	1037
12-24	28.71	1024	294
24-36	21.63	832	180
36-48	19.03	762	145
48-60	14.42	832	120
60+	6.61	1407	93

It’s evident that the highest churn rate is observed among customers with a tenure of 0–12 months. Short-term customers appear to be less interested in becoming long-term subscribers. To mitigate this, offering special offers and rewards could be a strategy to attract and retain customers

6. What is the churn rate for customers with PhoneService?

```
Select PhoneService, count(*) as Totalcustomer,
sum(churn) as ChurnedCustomers,
cast(sum(churn) * 1.0 / count(*) *100 as decimal
(10,2)) as churnrate from churndata group by
PhoneService order by churnrate desc;
```

PhoneService	Totalcustomer	ChurnedCustomers	churnrate
Yes	6352	1699	26.75
No	680	170	25.00

A majority of customers have opted for Phone Service, and the churn rate differs slightly between PhoneService users and those who also opted for Online Backup. In the case of PhoneService, more customers were retained even when they didn't have phone service, as compared to the number of customers who discontinued the service.

7. What is the churn rate for customers with services like Multiple Lines, Online Security, Online Backup, Device Protection, Tech Support, and Online Backup? Additionally, which service is the most commonly chosen and yet has the highest churn rate?

```
Select MultipleLines, count(*) as
Totalcustomer, sum(churn) as
ChurnedCustomers, cast(sum(churn)
* 1.0 / count(*) *100 as decimal (10,2))
as churnrate from churndata group
by MultipleLines order by churnrate
desc;
```

In the case of Multiple Lines, the churn rate is the same whether multiple lines are present or not. The churn rate for multiple lines is not significantly different, so it's perfectly fine to move on to the next aspect.

MultipleLines	Totalcustomer	ChurnedCustomers	churnrate
Yes	2967	850	28.65
No	3385	849	25.08
No phone service	680	170	25.00

```
Select OnlineSecurity, count(*) as Totalcustomer, sum(churn) as ChurnedCustomers, cast(sum(churn) * 1.0 / count(*) *100 as decimal (10,2)) as churnrate from churndata group by OnlineSecurity order by churnrate desc;
```

OnlineSecurity	Totalcustomer	ChurnedCustomers	churnrate
No	3497	1461	41.78
Yes	2015	295	14.64
No internet service	1520	113	7.43

well, that's the main topic, that should be discussed and we will go through it. As we can there is a higher difference in churn rate. but the online-security customers have comparatively fewer churn rates than the non-one except for no interest net services. customers with no online securities are not preferring to stay .

```
Select OnlineBackup, count(*) as Totalcustomer, sum(churn) as ChurnedCustomers, cast(sum(churn) * 1.0 / count(*) *100 as decimal (10,2)) as churnrate from churndata group by OnlineBackup order by churnrate desc;
```

OnlineBackup	Totalcustomer	ChurnedCustomers	churnrate
No	3087	1233	39.94
Yes	2425	523	21.57
No internet service	1520	113	7.43

Another factor to consider is the impact of online backup services. It's evident that online backup is also a significant contributor to customer churn. With the data now clearer, it's apparent that the churn rate is higher among customers who have not opted for these services. This implies that there is a general reluctance among customers to choose online backup. Even among those who have opted for these services, churn rates remain notable.

```
select DeviceProtection, count(*) as Totalcustomer,
sum(churn) as ChurnedCustomers, cast(sum(churn) *
1.0 / count(*) *100 as decimal (10,2)) as churnrate from
churndata group by DeviceProtection order by
churnrate desc;
```

DeviceProtection	Totalcustomer	ChurnedCustomers	churnrate
No	3094	1211	39.14
Yes	2418	545	22.54
No internet service	1520	113	7.43

```
Select TechSupport, count(*) as Totalcustomer,
sum(churn) as ChurnedCustomers, cast(sum(churn) *
1.0 / count(*) *100 as decimal (10,2)) as churnrate from
churndata group by TechSupport order by churnrate
desc;
```

TechSupport	Totalcustomer	ChurnedCustomers	churnrate
No	3472	1446	41.65
Yes	2040	310	15.20
No internet service	1520	113	7.43

Considering both the previous findings and the current analysis, it becomes apparent that the churn rate is significantly influenced by all the security-related services. This observation aligns with the context we've discussed earlier, where due to a higher percentage of customers not opting for these services, more than one-third of customers have churned

When focusing on customer satisfaction, services related to online security, OnlineBackup, DeviceProtection, and TechSupport emerge as crucial factors based on the visualizations above. It's evident that a substantial number of customers have chosen to switch their service providers due to inadequate service quality associated with these specific features

8. Do subscriptions to Streaming TV, and Streaming Movies impact the churn rate of customers?

```
Select StreamingTV, count(*) as Totalcustomer, sum(churn) as ChurnedCustomers, cast(sum(churn) * 1.0 / count(*) *100 as decimal (10,2)) as churnrate from churndata group by StreamingTV order by churnrate desc;
```

	StreamingTV	Totalcustomer	ChurnedCustomers	churnrate
▶	No	2809	942	33.54
	Yes	2703	814	30.11
	No internet service	1520	113	7.43

```
Select StreamingMovies, count(*) as Totalcustomer, sum(churn) as ChurnedCustomers, cast(sum(churn) * 1.0 / count(*) *100 as decimal (10,2)) as churnrate from churndata group by StreamingMovies order by churnrate desc;
```

	StreamingMovies	Totalcustomer	ChurnedCustomers	churnrate
▶	No	2781	938	33.73
	Yes	2731	818	29.95
	No internet service	1520	113	7.43

The values for Streaming TV and Streaming Movies subscriptions are quite similar. Despite customers subscribing to both Streaming TV and Streaming Movies, a significant number of them have churned. It appears that the issue cannot solely be attributed to the streaming content.

9. Does the churn rate vary based on the contract type, and if so, how does it vary?

```
Select Contract, count(*) as Totalcustomer, sum(churn) as ChurnedCustomers, cast(sum(churn) * 1.0 / count(*) *100 as decimal (10,2)) as churnrate from churndata group by Contract order by churnrate desc;
```

	Contract	Totalcustomer	ChurnedCustomers	churnrate
▶	Month-to-month	3875	1655	42.71
	One year	1472	166	11.28
	Two year	1685	48	2.85

The rate of customer churn is notably high for Month-to-Month contracts. This could be due to customers testing various available services and opting for the 1-month service to save money. Additionally, inconsistent experiences with the internet, streaming, and phone services could be contributing factors. As each customer's priorities differ, a subpar performance in any of these services could lead to the discontinuation of the entire service

10. Are streaming services influenced by contracts?

```
SELECT
Contract,
SUM(CASE WHEN StreamingTV IN
('yes') THEN 1 ELSE 0 END) AS
TotalCustomers, SUM(Churn) AS
ChurnedCustomers,
CAST(SUM(Churn) * 100.0 /
SUM(CASE WHEN StreamingTV IN
('yes') THEN 1 ELSE 0 END) AS
DECIMAL(10, 2)) AS ChurnRate
FROM churndata WHERE
StreamingTV IN ('yes') GROUP BY
Contract ORDER BY ChurnRate
DESC;
```

	Contract	Totalcustomer	ChurnedCustomers	churnrate
▶	Month-to-month	3875	1655	42.71
	One year	1472	166	11.28
	Two year	1685	48	2.85

```
Select Contract, SUM(CASE WHEN
StreamingMoviesIN ('yes') THEN 1
ELSE 0 END) AS TotalCustomers,
SUM(Churn) AS ChurnedCustomers,
CAST(SUM(Churn) * 100.0 /
SUM(CASE WHEN
StreamingMovies IN ('yes') THEN 1
ELSE 0 END) AS DECIMAL(10, 2))
AS ChurnRate FROM churndata
WHERE StreamingMovies IN ('yes')
GROUP BY Contract ORDER BY
ChurnRate DESC;
```

The customer churn rate in month-to-month streaming services is significantly higher. This is mainly attributed to the fact that many customers tend to subscribe to these services only for the duration of the extra 1-month free trial, leading to a higher churn rate. However, in the long term, the churn rate tends to be lower.

11. Is the Paperless Billing facility effectively attracting customers?

```
Select PaperlessBilling, count(*) as Totalcustomer,
sum(churn) as ChurnedCustomers,
cast(sum(churn) * 1.0 / count(*) *100 as decimal
(10,2)) as churnrate from churndata group by
PaperlessBilling order by churnrate desc;
```

PaperlessBilling	Totalcustomer	ChurnedCustomers	churnrate
Yes	4168	1400	33.59
No	2864	469	16.38

The results from the paperless billing facility show a negative trend, indicating that the company needs to address this aspect. The PaperlessBilling option is associated with a significant number of customers churning. This could potentially be due to payment or receipt issues. It appears that customers are not particularly appreciative of this feature.

12. What are the top most commonly used payment methods?

```
Select PaymentMethod, count(*) as Totalcustomer,
sum(churn) as ChurnedCustomers, cast(sum(churn)
* 1.0 / count(*) *100 as decimal (10,2)) as churnrate
from churndata group by PaymentMethod order by
churnrate desc;
```

PaymentMethod	Totalcustomer	ChurnedCustomers	churnrate
Electronic check	2365	1071	45.29
Mailed check	1604	308	19.20
Bank transfer (automatic)	1542	258	16.73
Credit card (automatic)	1521	232	15.25

When considering the PaymentMethod, the churn rate is high for electronic payments, whereas it is lower for bank transfers and credit card (automatic) payments. This discrepancy could be attributed to new customers hesitating to opt for bank transfers and credit card payments

13. What are the total charges for each payment method?

```
SELECT
PaymentMethod,
COUNT(*) AS TotalCustomers,
ROUND(SUM(TotalCharges), 2) AS TotalCharge
FROM
churndata
GROUP BY
PaymentMethod
ORDER BY
TotalCharge DESC;
```

	PaymentMethod	Totalcustomer	totalcharge
▶	Electronic check	2365	4944903.25
	Bank transfer (automatic)	1542	4748279.9
	Credit card (automatic)	1521	4671593.35
	Mailed check	1604	1691392.2

The electric check payment method is associated with both higher charges and a higher number of customers. Additionally, the churn rate for this payment method is also notably high

Conclusion and Recommendations

- To establish a robust customer base, the Telco Company should offer a straightforward and cost-effective entry to its services. During the initial six months, a concentrated effort on enhancing OnlineSecurity, OnlineBackup, DeviceProtection, and TechSupport is crucial. This phase is highly critical and uncertain for customers.
- The company should tailor its strategies to three customer segments: SeniorCitizen, customers with partners, and those living alone.
- The count of SeniorCitizen customers is limited, yet their minimum MonthlyCharges threshold surpasses that of other customer groups. This suggests that SeniorCitizen customers are willing to invest significantly, but in return, they expect top-tier services tailored to their preferences and needs.
- For customers with partners as well as those living alone
- To mitigate high churn rates, it’s advisable to discontinue the use of Electronic check for payments and instead prioritize Bank Transfer (automatic) and Credit Card (automatic). However, addressing the challenge of reducing the median churn tenure for these two payment methods, which currently stand above 20 months (twice that of Electronic check), will require focused efforts.
- When MonthlyCharges for a single service surpass 70, customer sensitivity towards their expenses increases significantly. Therefore, it’s imperative that the Telco Company distinguishes itself through exceptional service quality. This emphasis on quality should be the company’s unique selling proposition (USP). Implementing these measures is expected to not only bolster revenue but also enhance the existing value-delivery process.

Conclusion:

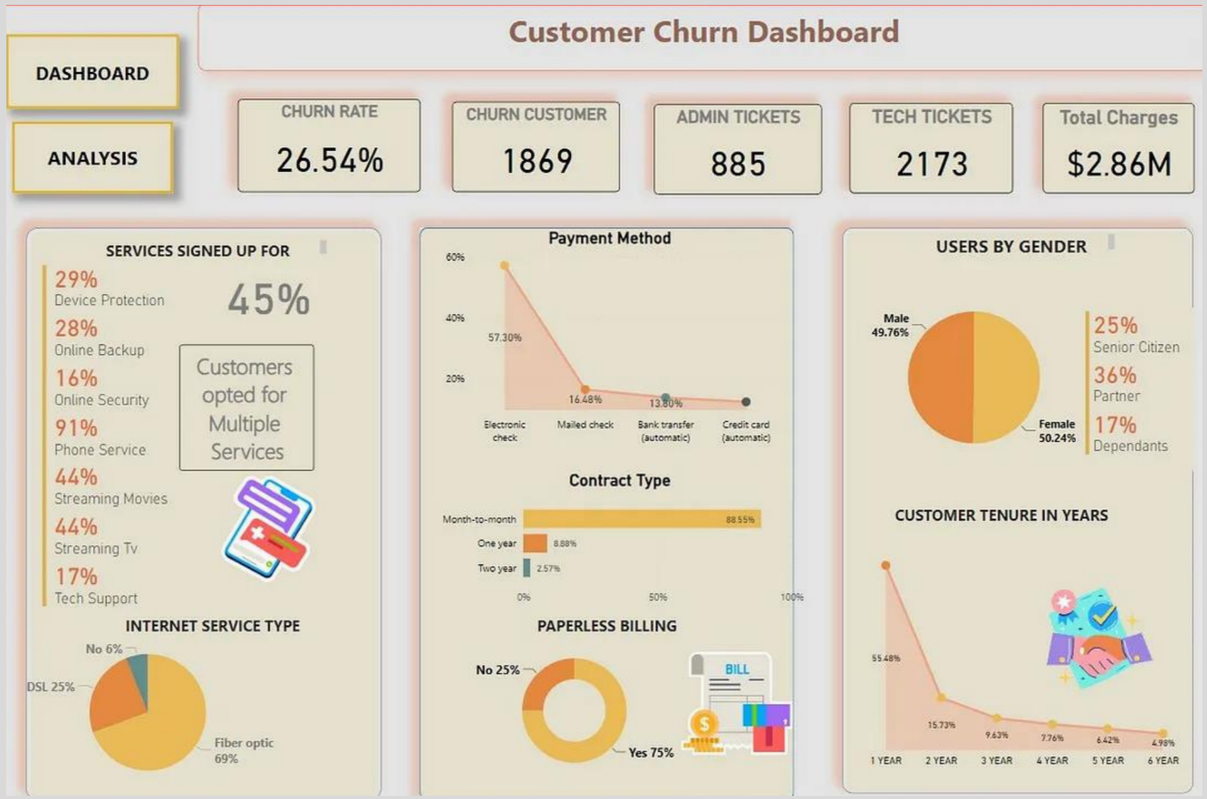
Segment Strategy: Crafting tailored strategies for different customer segments, such as SeniorCitizens, those with partners, and individuals living alone, can yield higher retention rates.

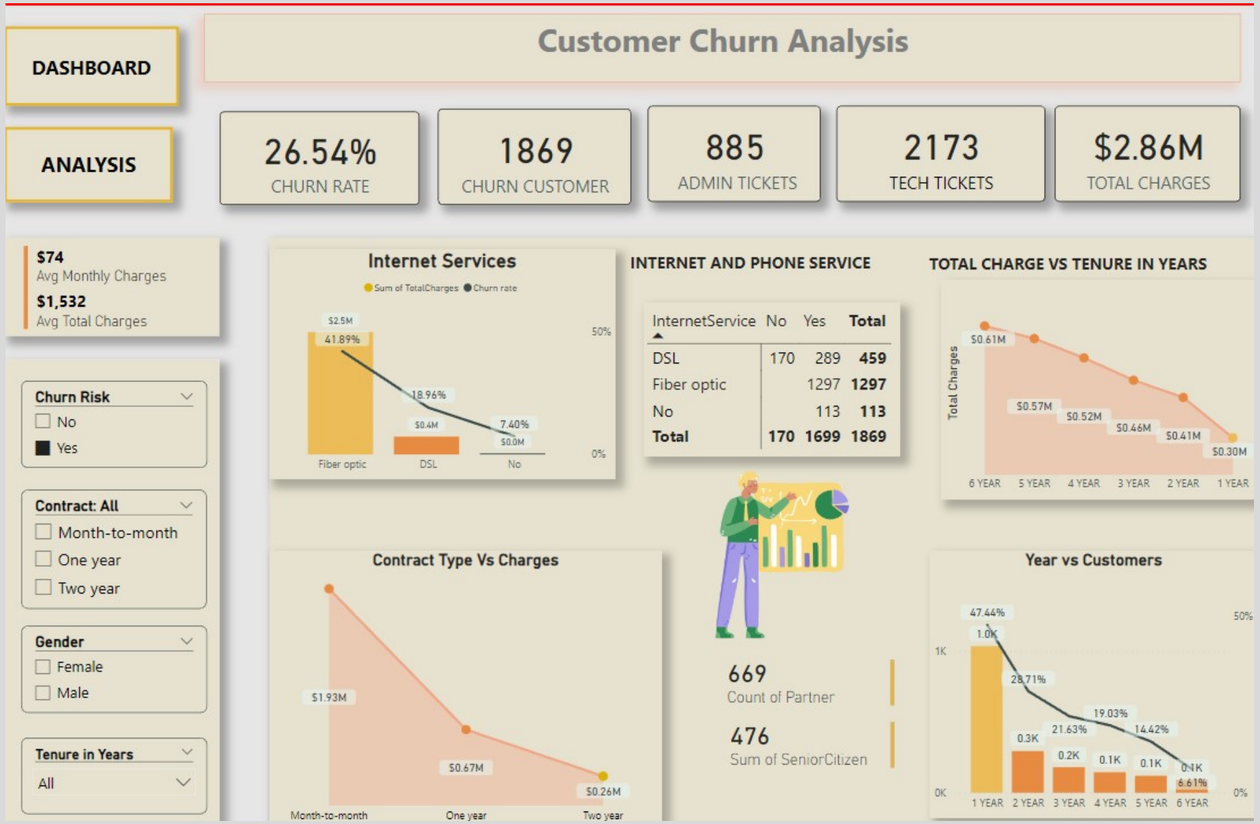
Payment Evolution: Shifting from Electronic checks to Bank Transfers & Credit Card payments can not only curb churn but also streamline financial processes.

Service Quality Triumphs: When MonthlyCharges cross the $70 mark, customers become more discerning. Prioritizing service quality over price is the cornerstone of customer loyalty.

First Impressions Matter: Elevating the initial 6-month customer experience through enhanced services like OnlineSecurity and DeviceProtection can lay a strong foundation for long-term retention.

CUSTOMER CHURN DASHBOARD





Dashboard link: https://www.novypro.com/project/customer-churn-analysis-power-bi-2

LinkedIn : https://www.linkedin.com/in/sateesh-godewar/

Instagram: https://www.instagram.com/analytic_guide/

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Customer Churn Analysis is Also Available on Medium
link below

https://medium.com/@sateeshgodewar45/customer-churn-analysis-203c1284f503

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