Databel Customer Churn Analysis

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Author: Thanita Eiamvijit

Tableau URL: https://public.tableau.com/app/profile/thanita.eiamvijit/vizzes

Table of Contents

1. Introduction

Undertaken with a fictional churn dataset from a Telecom provider named Databel to analyze, this project delves deep into the phenomenon of customer churn. The dataset consists of 29 different columns with one row per customer, which provides a comprehensive view of each customer through individual rows to retain valuable customers and maintain a strong relationship with their customer base.

2. Definition of "Churn"

According to Investopedia, the Churn Rate, also known as the rate of attrition or customer churn, is the rate at which customer stop doing business with an entity. It is commonly expressed as the percentage of service subscribers who discontinue their subscriptions within a given period.

The churn rate formula is the number of customers lost during the period divided by total number of customers. Churn rate is commonly expressed as a percentage used to evaluate the retention success and potential growth or decline of a business's customer base. A high churn rate may indicate customer dissatisfaction, while a low rate suggests customers are satisfied and remain loyal to the product or service. Minimizing the churn rate is crucial for sustained growth and profitability.

Churn Analysis is the process of evaluating and understanding the reasons and patterns behind customer choosing to end their relationship with a company or service over a specific period. Churn analysis is including:

- Descriptive analytics: It is used to understand the current churn rate and profile of churned customers.
- Predictive analytics: It is used to apply machine learning models to predict potential churn based on customer behavior and characteristics.
- Prescriptive analytics: It is used to recommend specific actions to prevent or reduce churn.

3. Objective

The primary objective of the customer churn analysis dashboards is to gain a comprehensive understanding of the factors and patterns leading to customer attrition. By segmenting and analyzing data across various dimensions such as age, contract type, data consumption, payment method, and customer service interactions, to pinpoint high-risk groups and the predominant reasons for churn.

4. Data Source

The dataset used in this project is a fictional churn dataset from a Telecom provider named Databel, the dataset consists of 29 columns or variables and 6687 rows of customer records with no time dimension. The description of variables is described in Table 1:

Table 1. The description of variables

No.	Column Name	Description	Data Type
1	Customer ID	Customer number with a unique identifier.	Categorical
2	Churn Label	Indicate whether a customer has left the company's service or not. (Yes, No)	Categorical
3	Account Length (in month)	The duration in months that the account has been active.	Numeric
4	Local Calls	The number of local calls made by the customer.	Numeric
5	Local Mins	The total number of minutes spent on local calls.	Numeric
6	Intl Calls	The number of international calls made by the customer.	Numeric
7	Intl Mins	The total number of minutes spent on international calls.	Numeric
8	Intl Active	Indicate if the customer is active in making international calls. (Yes, No)	Categorical
9	Intl Plan	Specify if the customer has an international calling plan. (Yes, No)	Categorical
10	Extra International Charges	Additional charges incurred for international services beyond the plan.	Numeric
11	Customer Service Calls	The number of times a customer has contacted customer service.	Numeric
12	Avg Monthly GB Download	Average monthly data usage by the customer in gigabytes.	Numeric
13	Unlimited Data Plan	Indicate if the customer is on an unlimited data plan. (Yes, No)	Categorical
14	Extra Data Charges	Additional charges incurred for data usage beyond the plan.	Numeric
15	State	U.S. state in which the customer resides.	Categorical
16	Phone number	Customer's phone number.	Categorical

17	Gender	The gender of the customer (Male, Female)	Categorical
18	Age	Age of the customer.	Numeric
19	Under 30	The customer is below 30 years of age. (Yes, No)	Categorical
20	Senior	The customer is categorized as a senior. (Yes, No)	Categorical
21	Group	The customer is part of any group or not. (Yes, No)	Categorical
22	Number of Customers in Group	The customer mentioned in the group.	Numeric
23	Device Protection & Online Backup	Indicate if the customer has both device protection and online backup services. (Yes, No)	Categorical
24	Contract Type	The type of contract the customer has with the company (Month-to-Month, One Year, and Two Year).	Categorical
25	Payment Method	The method by which the customer pays their bills (Credit Card, Direct Card, and Paper Check).	Categorical
26	Monthly Charge	The amount charged to the customer on a monthly basis.	Numeric
27	Total Charges	The total amount charged to the customer till date.	Numeric
28	Churn category	Attitude, Competitor, Dissatisfaction, Price, and Others.	Categorical
29	Churn Reason	Reasons by customers to stop using the product or service.	Categorical

5. Data Preparation

1. Data check: It is used to double check the duplicate rows in dataset by reviewing the number of Customer ID, which is equal to the count of unique customer ID. The calculated field commands in Tableau are described below:
    - Number of customers = COUNT([Customer ID])
    - Number of unique customers = COUNTD([Customer ID])

2. Churn label column indicates “Yes” or “No”, so it was converted into binomial column 0 for not churned or 1 for churned.
   The calculated field command in Tableau is described below:
    - Churned = IF [Churn Label] = 'Yes' THEN 1 ELSE 0 END

3. Create a measure for the number of churn customers.
   The calculated field command in Tableau is described below:
    - Number of churned customers = SUM([Churned])

4. Calculating Churn rate by dividing the total number of churned customers with the total number of customers.
   The calculated field command in Tableau is described below
    - Churn rate = [Number of Churned Customers]/[Number of Customers]

6. Dashboard Explanation and Recommendation

The customer churn analysis dashboards were created by using Tableau.

6.1. Dashboard 1 – Overview

Overview dashboard (see Figure 1) provides a comprehensive snapshot of the customer churn metrics essential for businesses to gauge customer satisfaction, identify potential issues. The total number of customers is 6687 with churned 1796 customers, the churn rate is about 29%. The overview dashboard showcases churn by category, customers by contract, churn reasons, and churn rate by state.

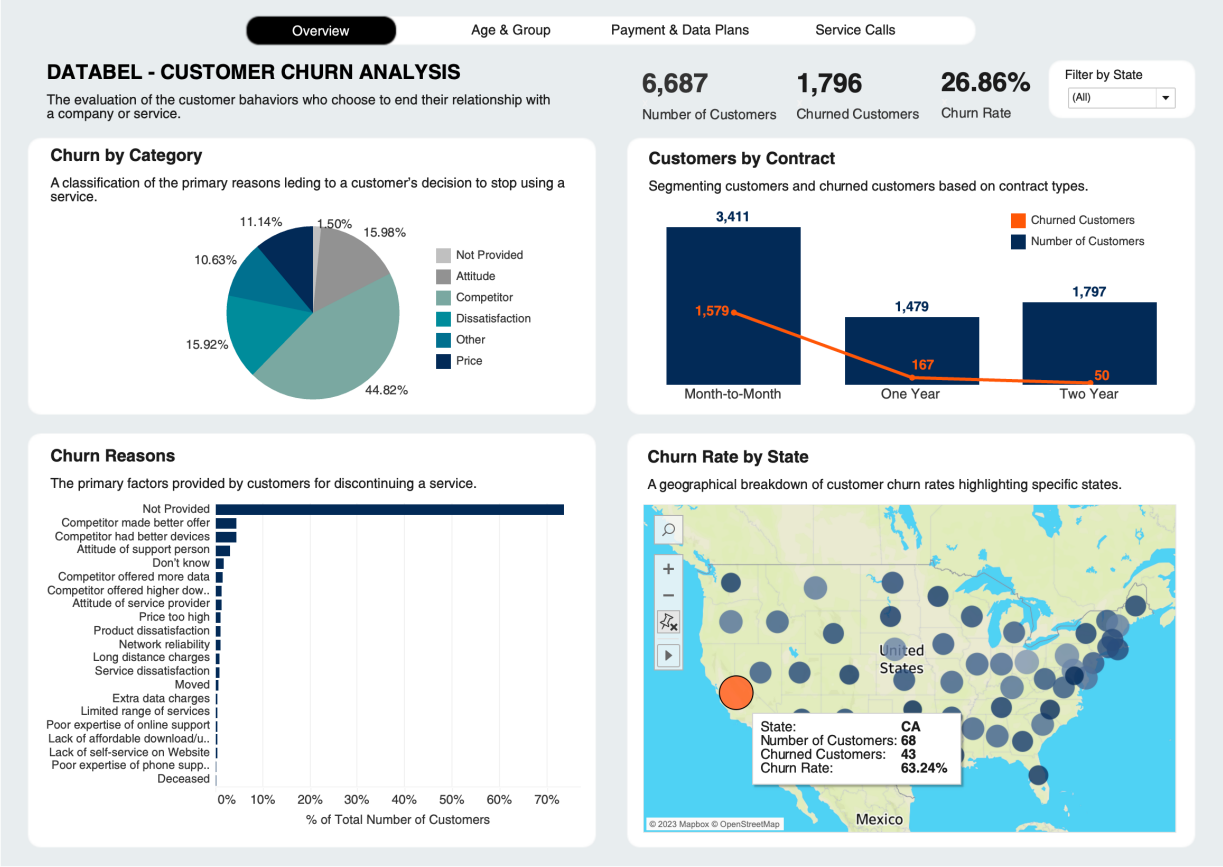

Figure 1. Overview dashboard

6.1.1 Churn by Category

- **Description:** This visualization provides a breakdown of customer churn based on different categories. By analyzing churn within specific categories, it can pinpoint which areas are most impacted and need immediate attention.
- **Key findings**: Competition is the dominant reason for customer churn at 44.82%, there is a clear indication that internal factors related to service quality, attitude, and pricing play significant roles as well. Addressing these areas can lead to a more substantial reduction in churn rate. Furthermore, understanding the specifics behind the 'other' category and those who did not provide a reason can offer even more detailed insights for improved customer retention strategies.
- **Recommendation:** Deeply analyze what competitors are offering in term of in pricing, features, or services. Moreover, the potential internal issues with the product, service, or customer interactions should be addressed by enhancing service quality, providing staff training, and improving customer service. Another consideration is to provide more competitive pricing models, discounts, or loyalty programs. These understanding can guide strategies to enhance product offerings or run campaigns to retain customers.

6.1.2 Churn Reasons

- **Description:** Highlighting the primary reasons customers provide when ending their relationship with the company, this segment is essential for understanding the pain points within the customer journey.
- **Key findings:** A significant number of customers at 73.55% did not provide a specific reason for their leaving. About 4.53% of customers left due to a better offer from a competitor, while 4.44% left because the competitor had better devices. Another potential issue is the customer support matters, specifically attitude of support personnel caused 3.04% of customers to churn. Lack of clarity with 1,84% of customers churned because they "don't know" why they left. Therefore, the main reasons of ending the service are the competitors and customer support that are in line with the Churn by Category.
- **Recommendation:** The large percentage of unspecified reasons indicates a potential data collection issue or customers choosing not to disclose their reasons. The surveys or feedback might need to be refined to encourage more customers to share their reasons for leaving. Additionally, competitors are effectively luring away customers by presenting more attractive offers or better tech devices, focusing on market research to ensure our offers remain competitive. Another pain point is customer support that requires to be improved by implementing training programs and monitoring customer support interactions.

6.1.3 Customers by Contract

- **Description:** This section provides the distribution of customers based on their contract types (month-to-month, one-year, two-year).
- **Key findings:** Contract length directly correlates with churn rates, with shorter contracts exhibiting higher churn. The flexibility of month-to-month contracts, while attractive to some customers, also makes it easier for them to leave with the highest at 1579 out of 3411 customers (about 46.3%). However, longer contracts indicate higher loyalty, one-year contracts have a much lower churn rate, with only 167 out of 1479 customers (about 11.3%) leaving. Two-year contracts show an even stronger loyalty, with only 50 out of 1797 customers (about 2.8%) churning.
- **Recommendation:** Due to the short-term nature of month-to-month contracts, generally have a higher volatility and less commitment. To enhance customer retention, consider transitioning these customers to longer-term contracts by introducing attractive incentives.

6.1.4. Churn Rate by State

- **Description:** A geographical representation of churn rate, this visualization offers insights into regional trends and specific market issues. The orange color indicates the highest churn rate in the state.
- **Key findings:** California (CA) stands out with a concerning churn rate of 63.24% indicates that almost two-thirds of customers base in this state has decided to leave the service.
- **Recommendation:** The high churn rate in California suggests either a strong presence of competitors, potential shortcoming in offerings, regional trends, or market-specific issues. Due to the size of California market, understanding the root causes of this churn rate should be main priority.

6.2 Dashboard 2 – Age and Group

Age and Group dashboard (see Figure 2) offers a segmented view of customer churn, diving deep into specific age categories and group affiliations. User can toggle through pick metric to examine parameters such as the number of customers, average monthly charge, number of churned customers, or average customer service calls.

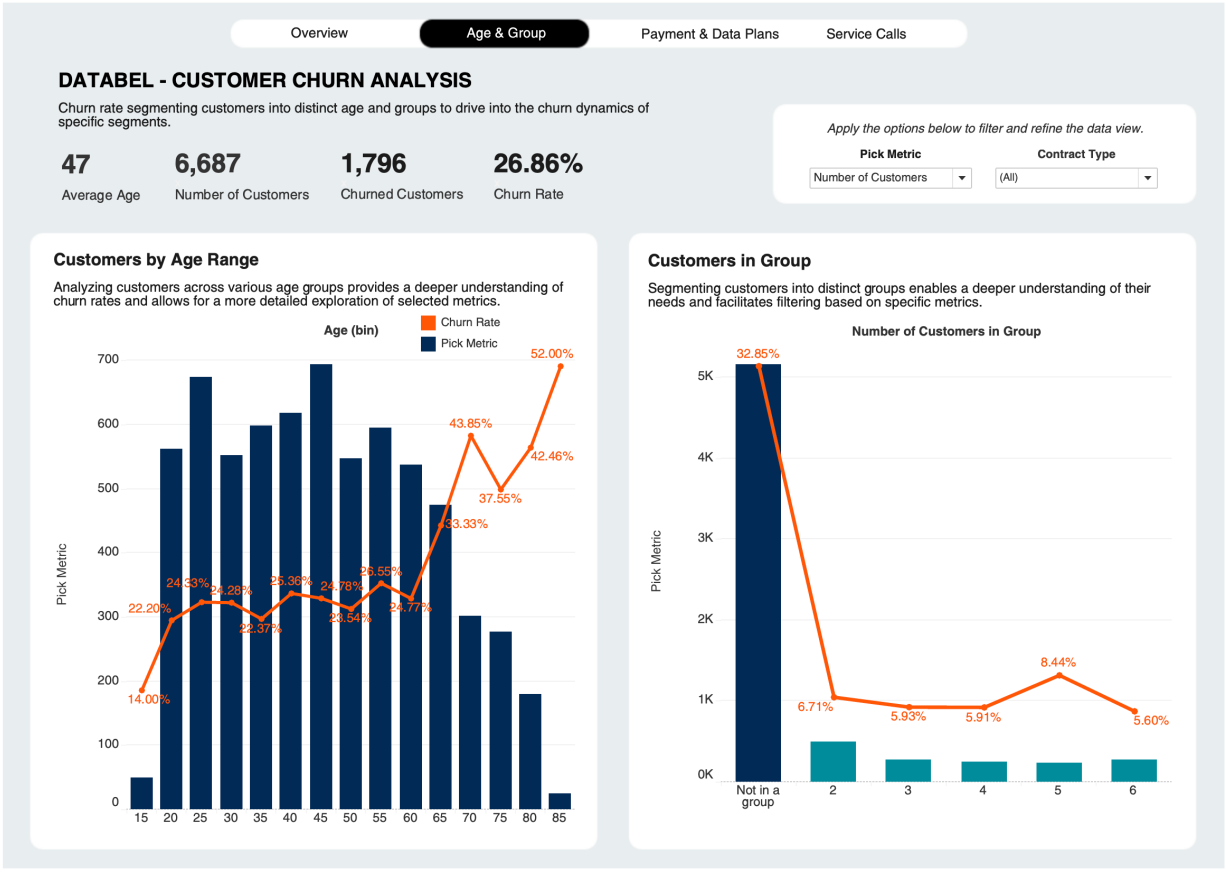

Figure 2. Age and group dashboard

6.2.1 Customers by Age Range

- **Description:** The chart shows the distribution of customer across various age brackets and their respective churn rates. By visualizing churn across age demographics, it provides insights into which age groups are most likely to discontinue the service.
- **Key findings:** The middle-aged customers, particularly those in their late forties, form the majority of the customer base. Churn rates remain relatively consistent across younger to middle-aged groups between approximately 22 to 25 percent but see a noticeable surge in senior age brackets, especially the age of 70 with

churn rate about 44%. For the number of customers, the customer base seems to peak in the middle-aged brackets particularly between 45-50 years about 700 customers. Younger age group (20s and early 30s) also maintain a consistent representation. However, as age increased beyond 65, there is a decline in customer numbers, with the fewest customer in the 85-90 age range.

- **Recommendation:** High churn rates among the elderly (70-90 age group) suggest specific needs and consider simpler interfaces or specialized support. The significant customer base in the range 45-50 age group highlights the importance of targeted retention strategies including promotion or loyalty programs for this group. Young adult (20-30 age group) could benefit from age-specific campaigns. Adapting communication and support to suit different age demographics can enhance customer satisfaction and loyalty.

6.2.2 Customer in Group

- **Description:** The chart categorizes customers based on a specific group with their respective churn rate.
- **Key findings:** Customers not affiliated with any group show a significantly high churn rate of 32.85% and comprise the majority of the customer base about 5200 customers. This could be indicative of a lack of engagement or benefits to this group members. Among the customers in groups, the churn rates are considerably lower, ranging from 5.60% to 8.44%. Group no.5 has the highest churn rate at 8.44% but this is still significantly lower than the non-grouped segment. It is noteworthy that while the numbers of customers in each group vary, the churn rates are relatively consistent, suggesting that the benefits or engagements across groups might be uniform.
- **Recommendation:** Customers not affiliated with aby group show the highest churn rate. Consider implementing engagement programs or offering some exclusive benefits targeted specifically to this group. Although grouped customers generally have a lower churn rate, Group no.5 stands out with a slightly higher rate, delve deeper into this group to understand if there are unique concerns within this group.

6.3 Dashboard 3 – Payment Methods, Contract Types, and Data Plan

Payment methods, contract types, and data plan dashboard (see Figure 3) provides detailed insight into the correlation between various customer selections and churn rates. The visualizations show variations in churn based on payment methods, contract lengths, international activity, and data usage preferences to understand the preferences of loyal customers and those more likely to churn.

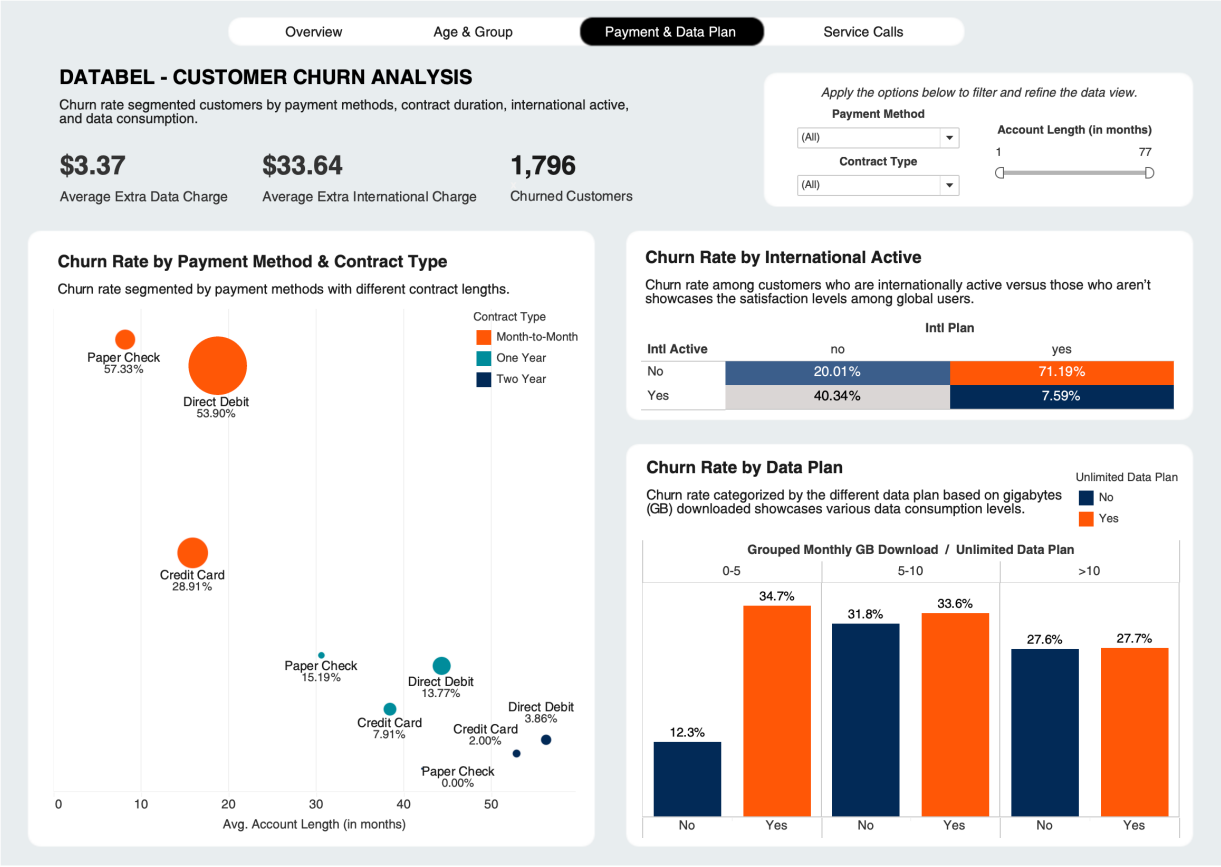

Figure 3. Payment methods, contract types, and data plan dashboard

6.3.1 Churn Rate by Payment Method and Contract Type

- **Description:** This visualization showcases the relationship between customer's chosen payment methods (credit card, direct debit, paper check) and the length or type of their contracts with the churn rate to help identifying which combinations might be more vulnerable to customer churn.
- **Key findings:** Month-to-month and one-year contract shows that contract paid by paper check and direct debit have high churn rates about 57% and 54% for month-to-month and 15% and 14% for one-year. On the other hand, customers using

credit cards have significant lower churn rate, it suggests that those using credit cards may find the convenience of automated payments or have more financial stability. Customers under two-year contracts show the lowest churn rate across all payment methods.

- **Recommendation:** Since the churn rate decreases as the contract duration increases. Payment methods also significantly influence the churn rate, especially with credit card users consistently showing the lowest churn across all payment methods and contract types. Encouraging customers toward longer-term contracts and promoting credit card payments might be strategic moves to reduce overall churn.

6.3.2 Churn Rate by International Active

- **Description:** This visualization highlights the churn among customers who are internationally active versus those who are nit, this metric offers how international services might influence customer retention. Additionally, international active customers may have different needs and expectations, especially concerning connectivity, service quality abroad, and international charges.
- **Key findings:** A significant churn rate of 71% is observed for customers who have subscribed to the international plan but not actively using it. This suggests dissatisfaction or mismatch between their needs and the services. About 40% of churn rate is seen among customers who do not have an international plan but are active internationally. This indicates that they are incurring higher costs due to not being on an appropriate plan. Customers without international plan and not active have a churn rate about 20%. Customers who utilize the international services, shows a relatively low churn rate of 7.59%. This indicates that both services align better with customers actual usage needs.
- **Recommendation:** Churn rate seems to be highly influenced by the alignment of customer needs with their chosen plans, especially international services. Customers who pay for services they do not use, or who use services they have not subscribed to, tend to churn at higher rate. To better align service offerings with customer needs, perhaps through personalized plan recommendations or regular usage reviews.

6.3.3 Churn Rate by Data Plan

- **Description:** As data consumption patterns have changed, understanding how different data plans affect customer loyalty is crucial. This chart categorizes customers based on their data consumption and compares this to the churn rate, revealing whether data limitations or excess influence the decision to churn.

- **Key findings:** Churn rates seem to be influenced by the alignment between data consumption habits and the chosen data plan. Especially for low data consumers, having an unlimited plan appears to be a source of dissatisfaction with churn rate of 34.7%. On the other hand, as data usage increases, the differences in churn between unlimited and non-unlimited plan users are quite close, indicating that the decision to churn is influenced by factors other than data limits.
- **Recommendation:** To address churn based on data consumption, introducing personalized plans for low data users (0-5 GB). For mid-range users (5-10 GB and above 10 GB), actively engagement can uncover churn factors beyond data limits such as pricing or service quality. Further, ensuring a robust network by optimizing network for high data consumers (above 10 GB) prioritize services for heavy data consumers over 10 GB will solidify and enhance retention by consistently meeting their demands.

6.4 Dashboard 4 – Customer Service Calls

Customer service call dashboard (see Figure 4) is to understand the relationship between customer service interactions and customer churn across different states. It helps to pinpoint regions where improved customer service could potentially lead to a significant reduction in churn. In addition, the churn rate by customer service calls offers a revealing perspective into customer satisfaction and intent. A high churn rate in correlation with increased customer service calls in a particular state could signal underlying issues with the service or product.

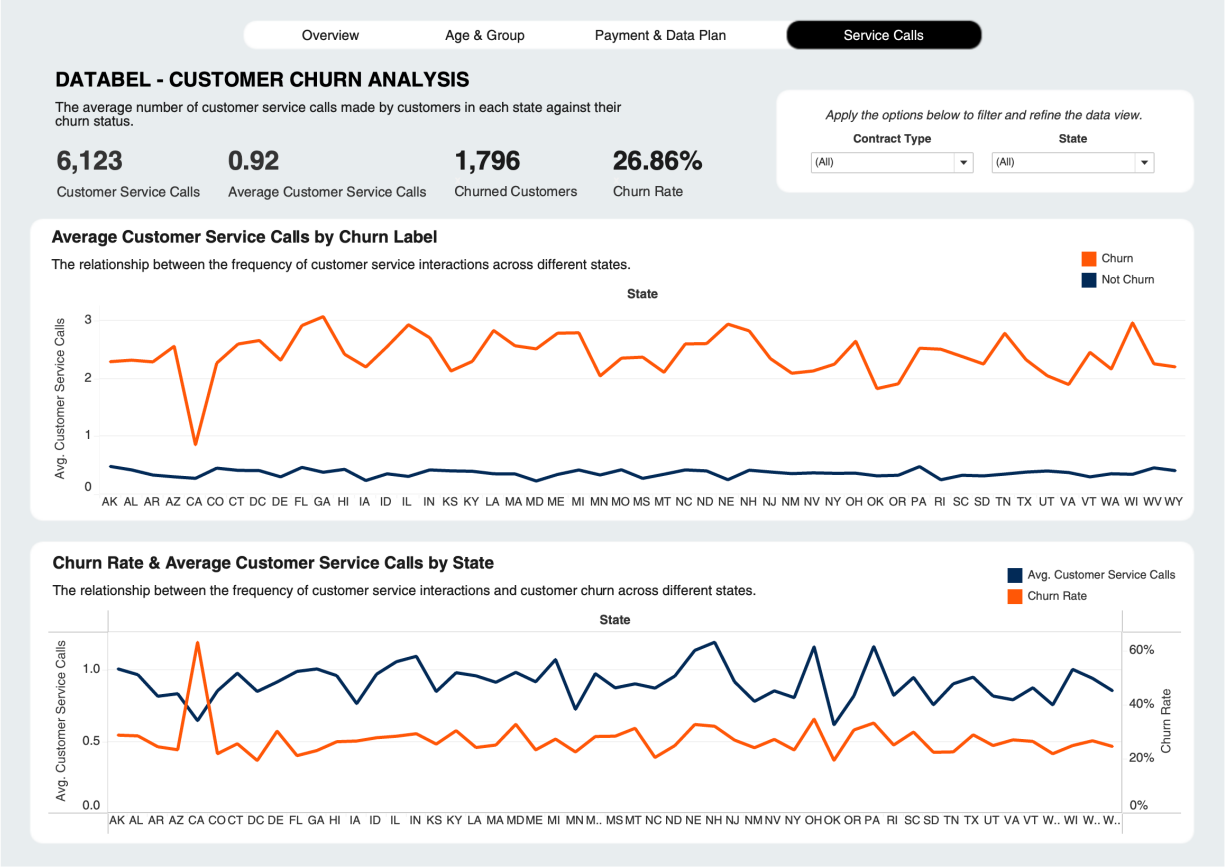

Figure 4. Customer service call dashboard

6.4.1 Average Customer Service Calls by Churn Label

- **Description:** This chart shows the comparison of the average number of customer service calls made by customers in each state between churned or not churned customers. It reveals whether frequent customer service calls correlate with an increased likelihood to churn.

- **Key findings:** Customers who eventually churn consistently have higher average customer service calls across states, ranging between 0.8 to 3. In contrast, customer who remain show a significantly lower engagement with customer service, with their average calls staying below 1. This suggests that churned customers are likely experiencing more issues leading to have more contact with customer service before deciding to leave. In notable, California (CA) stands out among the states for having the lowest average customer service calls for churned customers at 0.86.
- **Recommendation:** Since customers who churn tend to have higher average customer service calls, proactively engage with customers who start showing an increase in service call frequency. This early intervention can help identify issues and potentially prevent churn.

6.4.2 Churn Rate and Average Customer Service Calls by State

- **Description:** This visualization was map out each state with a dual-axis chart. One axis reveals the average number of customer service calls made, while the other shows the churn rate of customers in that state. This view provides a comprehensive look for states with high churn rates and high call averages might indicate systematic issues that require urgent attention.
- **Key findings:** Most of states, there are a visible direct relationship between average customer service calls and churn rate. The more frequently customers reach out to customer service, the higher the likelihood they will churn. However, an anomaly is found in California (CA). Despite having the lowest average customer service calls at around 0.65, it exhibits the highest churn rate at 63%. This could indicate that customers in CA might be facing issues that are not directly related to customer service interactions.
- **Recommendation:** For states with a direct link between high customer service calls and churn rate, it is crucial to invest in enhancing the quality of customer service. It is to ensure that the resources and information needed to address customer concerns effectively. The unique situation in California requires a focused analysis, especially conducts surveys, focus groups, or other forms of direct customer outreach to understand the underlying factors for such high churn. Furthermore, expanding support channels using predictive analytics for early churn detection to reduce the number of churn rate.

7. Conclusion

- The overview dashboard reveals a 29% customer churn rate, is primarily driven by competition, service quality, and unclarified customer concerns. With month-to-month contracts yielding the highest churn and California showing a concerning about 63% churn rate. It is suggested to improve the offerings, promote longer-term contracts, and streamline feedback processes.

- The age and group dashboard, the customer base is particularly in middle-aged customers, specifically those in their late forties. The churn rates are relatively consistent among younger to middle-aged groups. There is a considerable increase in churn rate among customers aged 70 and older. Furthermore, customers not associated with any group have remarkable high churn rate about 32%, whereas those in specific groups shows much lower churn rates. Based on the information, it is recommended to include support for elderly, targeted retention strategies for forties age group, and further investigate on Group 5.

- The payment methods, contract types, and data plan dashboard highlights that customer churn rates are closely linked to payment methods, international activity, and data plan alignment. The long-term contracts and credit card payments reduce churn, mismatches in international service increase churn, and data consumption habits influence customer loyalty. To boost retention, should focus on personalized service offerings and align services with customers' actual needs.

- The customer service calls across states dashboard brings that a higher frequency of customer service interactions correlates with an increased of churn. Customers who eventually churn make more customer service call, with an average ranging from 0.8 to 3 calls, whereas those who remain engaged fewer calls below 1. California (CA) presents an anomaly, despite having a low average of service calls, it records a high churn rate of 63%. This suggests that other factors, unrelated to customer services might be influencing churn in this state. It is recommended that proactive engagement with frequent callers to prevent churn and investing in better customer service. Additionally, CA needs a further detailed analysis and a potential need for more customer outreach efforts.