DOCUMENTATION

DESCRIPTIVE ANALYSIS FOR POWER BI WORKFLOW

Predictors | **SLIIT**

12/15/23

Team Details

Team Name: Predictors

Selected Theme: Business and Economy

University Name: Sri Lanka Institute of Information Technology

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Table of Contents

1. Background

In the fast-paced landscape of the telecommunications industry, customer churn stands as a critical metric, representing the percentage of customers who discontinue a company's product or service within a specified timeframe. As our team explores this complex area, we understand that customer turnover is more than just a number; it's a critical metric for assessing business expansion. The adage is true: keeping current clients is not only economical but also critical in a market where attracting new ones requires significant investment.

The telecom industry, characterized by fierce competition, presents an annual churn rate ranging from 15-25 percent. In this dynamic market, where customers have the freedom to choose among a plethora of service providers, the implications of churn are substantial. A mere two percent churn rate for top companies translates to staggering financial losses, with estimates pegging the cost at $65 million per month.

To mitigate the financial impact of churn, telecom companies are compelled to proactively identify and retain customers at risk of churning. The challenge lies in the sheer volume of customers; individualized retention efforts for each customer are logistically and economically unfeasible. However, the advent of predictive analytics provides a ray of hope.

In this analysis, we leverage the power of Power BI to dissect the intricate matrices of customer churning within the telecom sector. Under the overarching themes of business and economy, our goal is to unravel patterns, trends, and insights that empower telecom companies to make informed decisions, ultimately steering them towards enhanced customer retention strategies. Join us in this exploration as we harness the capabilities of Power BI to decode the complexities of customer churn in a landscape where every insight counts.

2. Dataset Details

Brief Description about the Dataset

This dataset contains 2 tables in CSV format.

- The Customer Churn table contains information on all 7,043 rows of customers from a Telecommunication company California in Q2 2022.
- Each record represents one customer, and contains details about their demographics, location, tenure, subscription services, status for the quarter (joined, stayed, or churned), and more!
- The Zip Code Population table contains complimentary information on the estimated populations for the California for the California zip codes in the Customer Churn table.

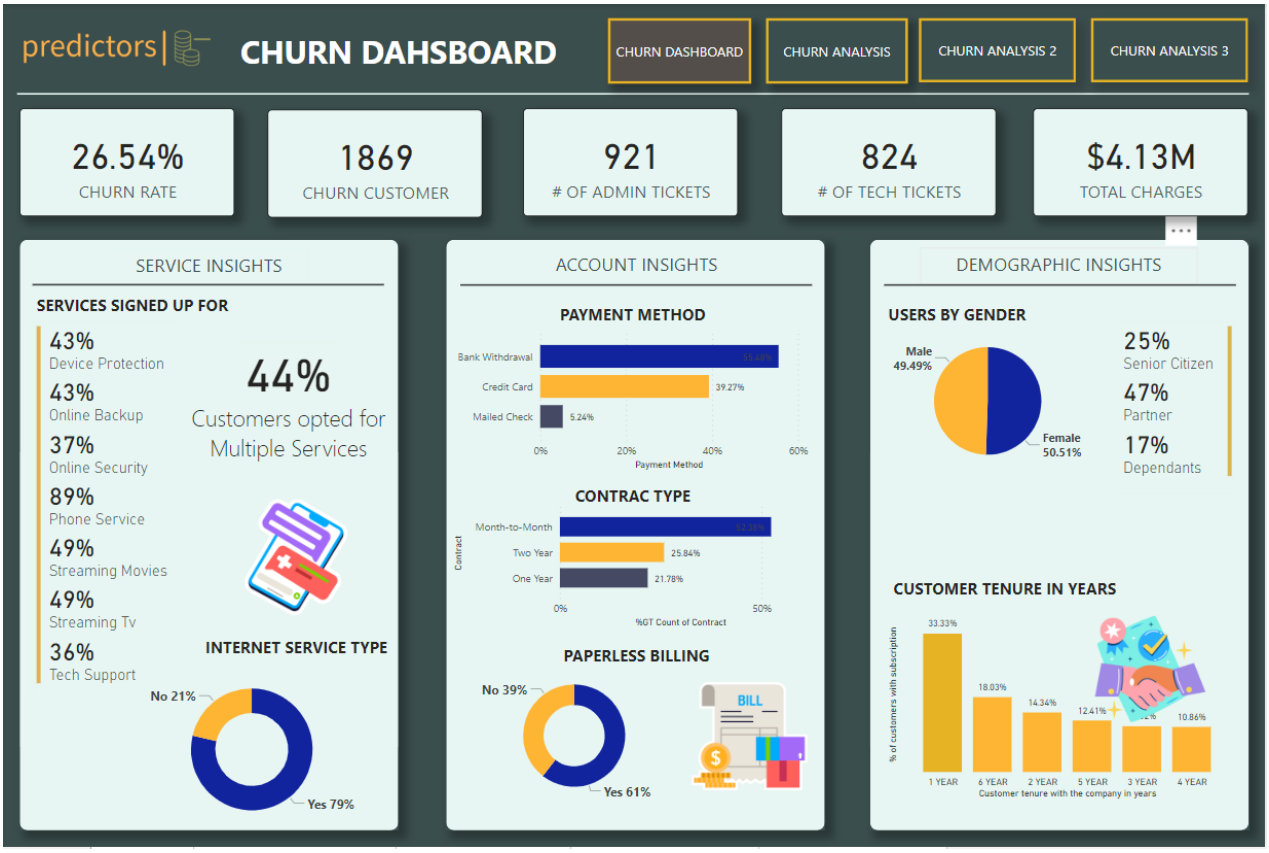
Dataset Link: https://www.kaggle.com/datasets/shilongzhuang/telecom-customer-churn-by-maven-analytics

3. Steps to Preprocess

- Upload to Google Drive:
    - Uploaded two CSV files to Google Drive for easy accessibility and management.
    - Mount Files in Colab.
    - Mounted the CSV files in the Colab environment to seamlessly integrate them into the analysis workflow.
- Individual CSV Merging:
    - Merged the two CSV files separately to consolidate relevant data for further analysis.
- Handling Missing Values:
    - Employed techniques such as imputation or deletion to address missing values.
    - Considered the nature and significance of missing data to enhance overall dataset completeness.
    - And fill them using directly ‘fillna’ function and column average method.
- Address Duplicate Records:
    - Implemented procedures to identify and eliminate duplicate entries within the dataset.
    - Aimed to mitigate bias and inaccuracies that could potentially affect downstream analysis.
- Refined Dataset Ready:
    - After successful merging and preprocessing, the dataset was refined and ready for subsequent analysis.
- Save Processed Dataset:
    - Took precautionary measures to save the cleaned dataset locally.
    - Ensured preservation of the refined data for future reference and analysis.
- Foundation for Analysis:
    - The saved, refined dataset serves as a solid foundation for various analytical tasks.
    - Provides a reliable basis for exploratory data analysis, modeling, and other analytical endeavors.

4. Snapshots & Details of the Final Work

1.Churn Dashboard



Here we use five cards to get precise understanding about the overall dataset by just looking at once.

1- CHURN RATE (26.54%)
2- CHURN CUSTOMER (1869)
3- #OF ADMIN TICKETS (921)
4- #OF TECH TICKETS (824)
5- TOTAL CHARGES($4.13M)

And use another three cards to present “Service Insigts”, “Account Insights” and “Demographic Insights”.

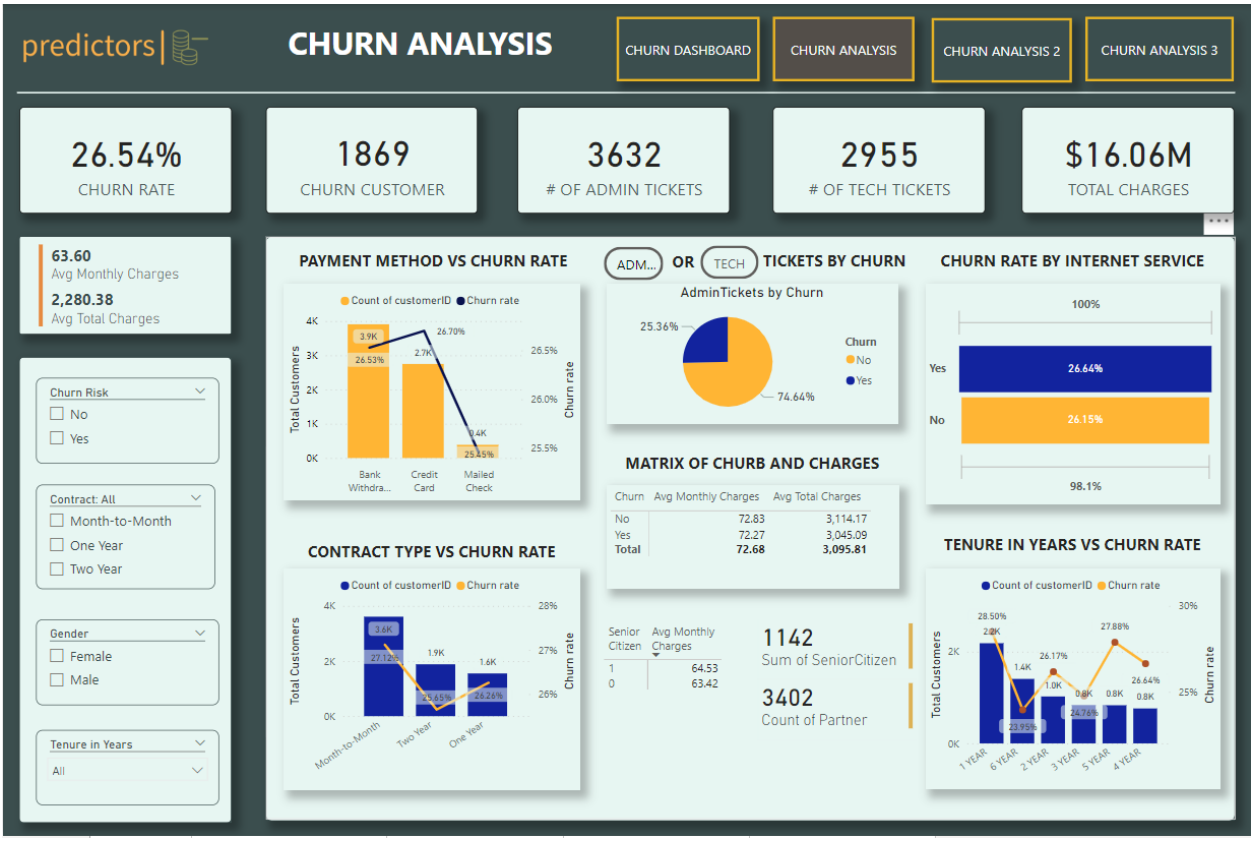
After analyzing the dataset related to telecom customer churn as a team, we have made our final analytical decisions as follows. At the first glance of dataset, we can observe the basic attributes of the customer base such as customer churn rate, churn customer count, no of admin tickets number of tech tickets and the total charges. Those attributes have been displayed on the home page of the designed dashboard.

By analyzing the churn rate, we can decide that over a quarter of the total customer base has churned from the relevant service provider. Next attributes provide a brief reasoning for such a scenario. By analyzing the number of admin tickets and the number of tech tickets we can have a rough idea of the number of issues customers have faced in the given period. However, the company have managed to generate over four million USD from the charges of the customers. In the first tile of the dashboard, it can be observed the service insights of the customers which means the customer

provided reasons to use the service as a percentage. Most of the customers marked the phone service as one of a reason. That can be used to make the decision that the strongest service of the service provider is phone service. The customer percentage who obtained multiple services is marked as 44% which means that over half of the user base have only used one service from the relevant service provider.
The second title of the home page displays the information about customers payment method information. Analyzing the bar charts given in the dashboard we can observe that most of the customers are making their payments using bank withdrawals. The Mailed check method, which is an outdated method, is used only by around five percent of the customers making the payment procedures of the company more efficient. Over half of the customer base is using monthly payments. That allows customers to leave the service more easily. That might have an answer for having churned customer rate over 25%. Around 60 percent of the customers are using paperless transaction. Using paperless transactions is a modern efficient way. But around 40% percent of the customer base is not using paperless transactions to pay their bills.

According to the data in the third title we can observe there is not any significant gender bias in using this service provider. But around a quarter of the customer base is marked as senior citizens, which might have an answer on the company focusing on outdated and old transaction methods and technology services such as mobile services.

2.Churn Analysis 1



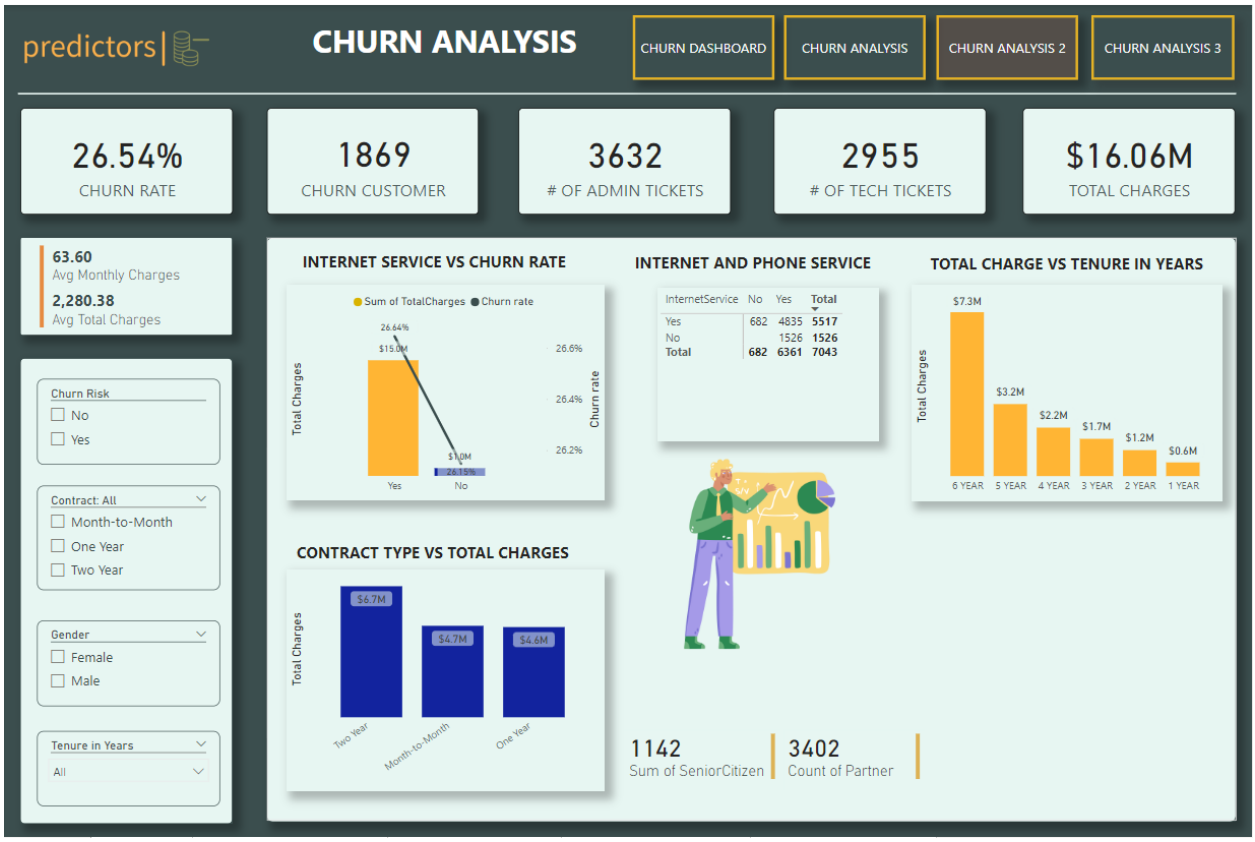
The second part of the dashboard our team implemented is the visualization of churn analysis. According to the first graph which displays the information about the percentage of the customer churn percentage vs the payment method, it can be observed that customers who are using mailed payment method have lower tendency in leaving the service.

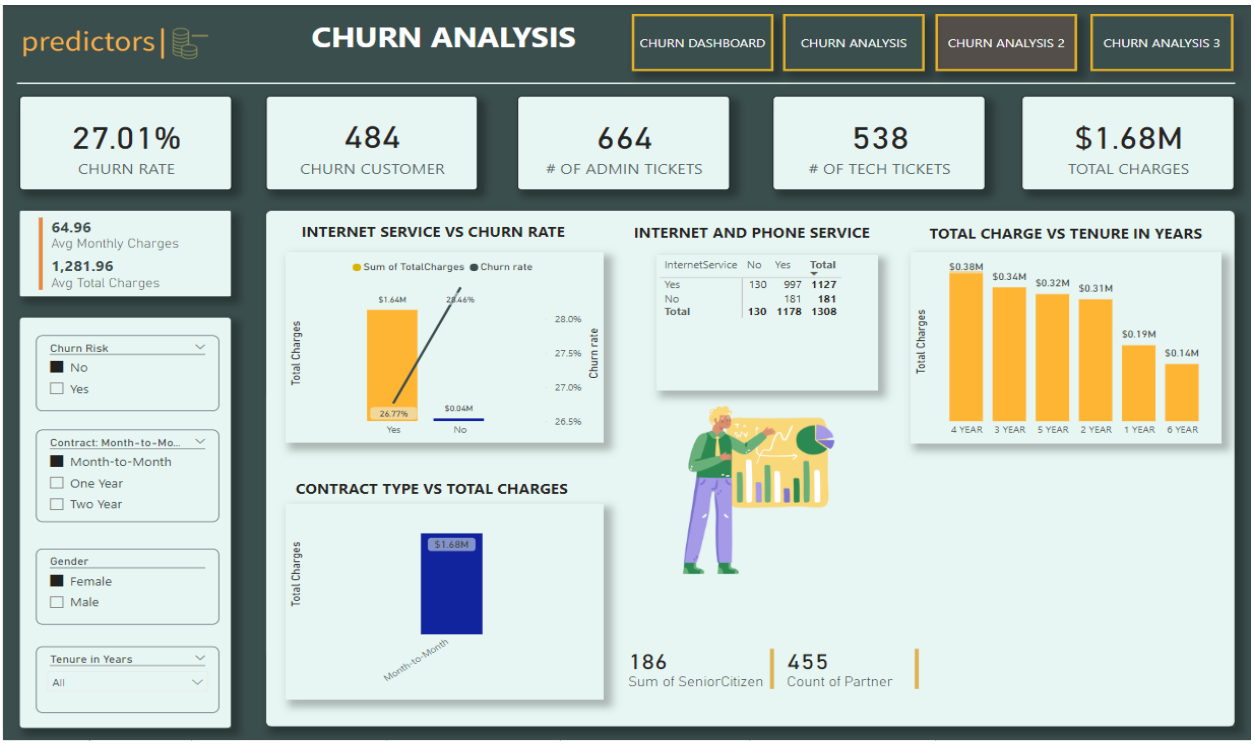
As we decided earlier, the customers who are using monthly payment package have the highest tendency in cancelling the service while the longest payment package which is two-year package having the lowest tendency in cancelling the service. This information can be observed by the graph implemented in the page.

The graph implementation about the customer tenure vs churn rate shows that the customers with long duration history with the company are having low tendency in leaving the service while the short duration customers having high tendency in cancelling the service which means the new customers are leaving sooner. This can be caused by the company's outdated techniques we observed before.

There is a pie chart displaying the churn rate of customers who raised tech tickets or admin tickets. The churn rate there is 25.36%. The overall churn rate is 26.54%. Which means the tech tickets, or the admin tickets only managed to decrease the customer churn by 1.18%. By analyzing this information, the company can be recommended to enhance their customer service strategies as they have not been very effective in past years.

3. Churn Analysis 2

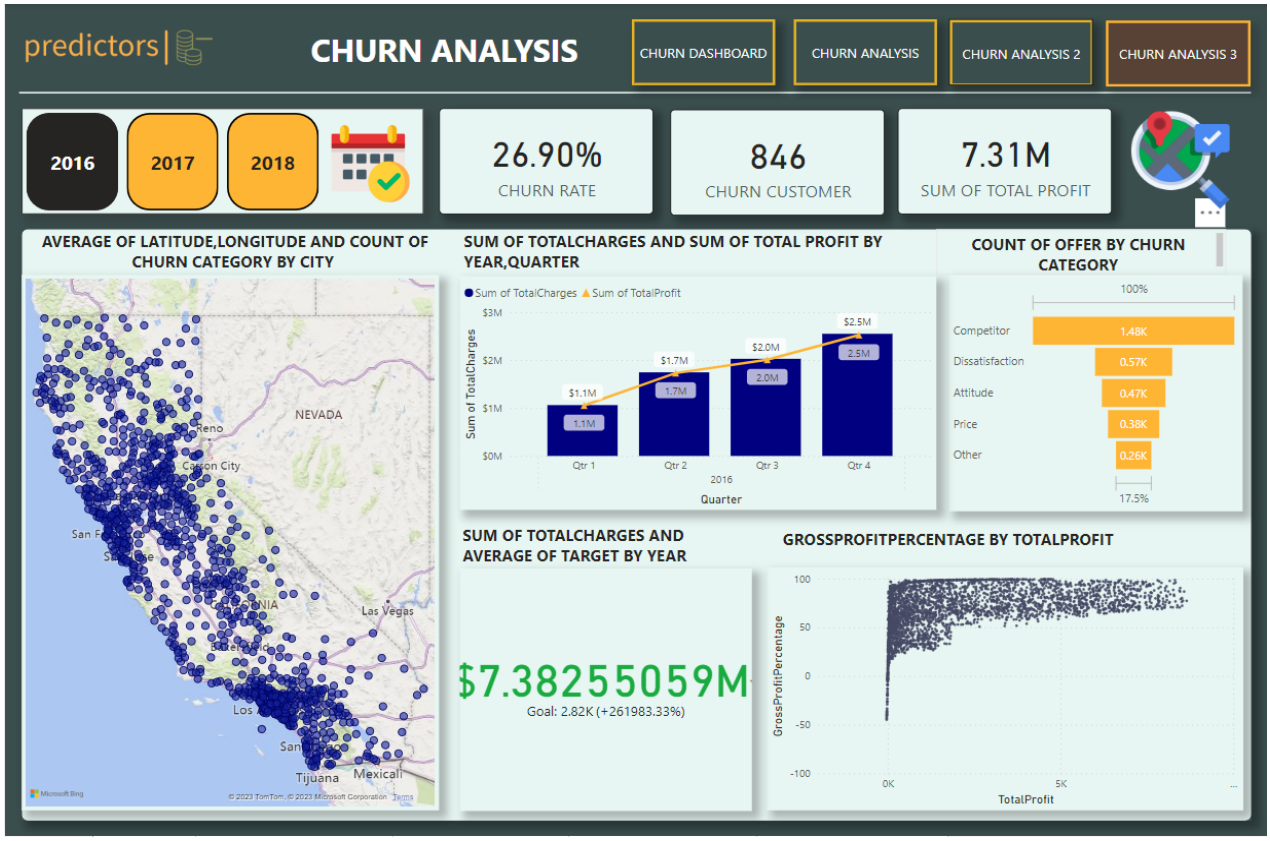


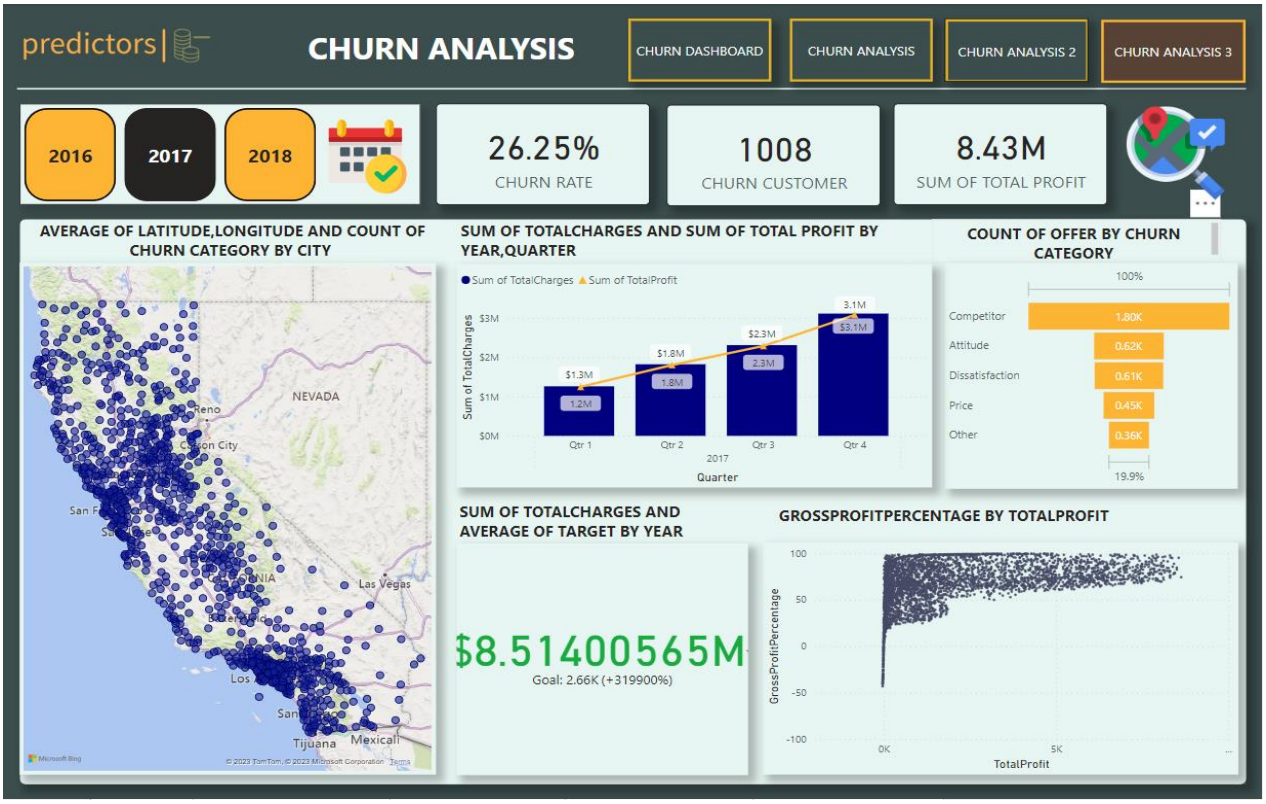


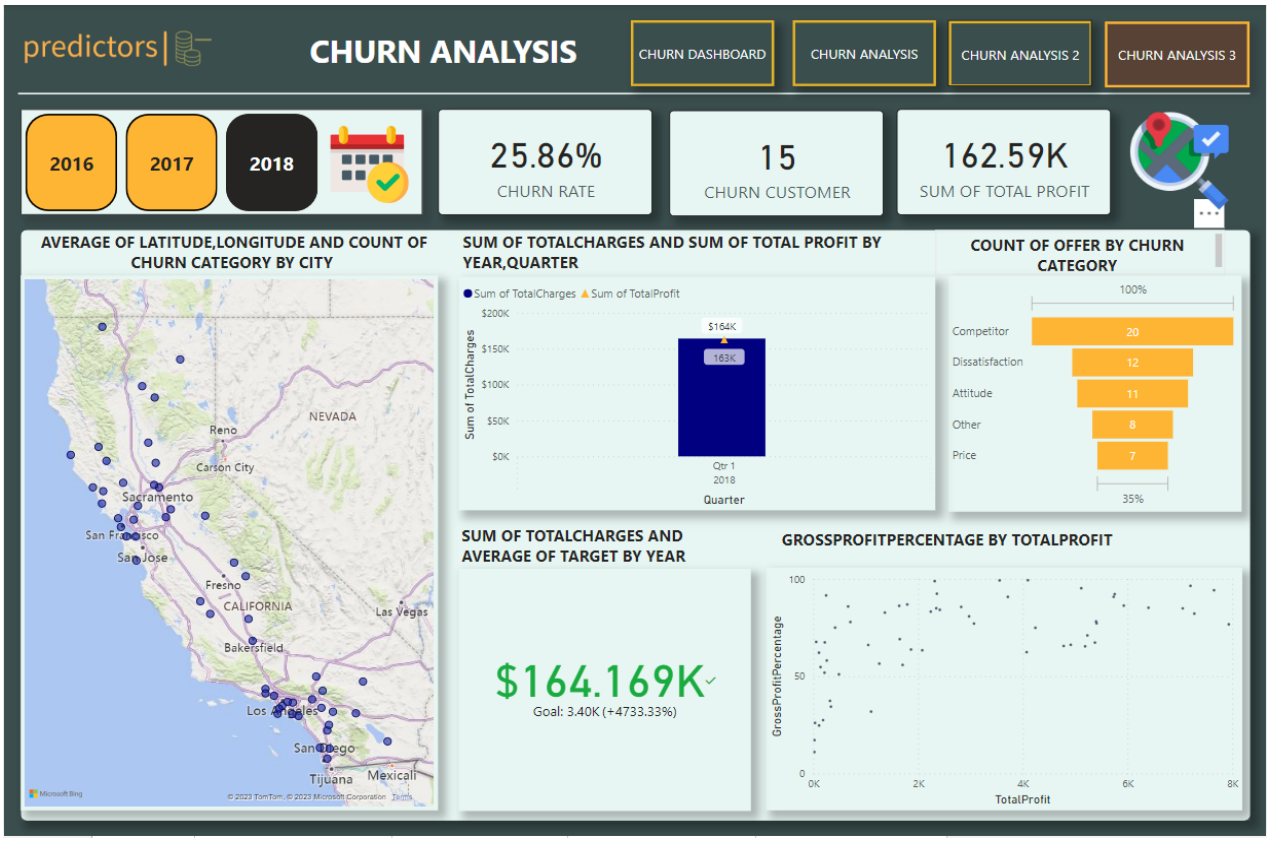
In the churn analysis 2 dashboard page there are several implementations of graphs with the filtering options. In the filters we have added the churn risk status, payment frequency filter, gender filter and tenure filter. By using these filters users can generate the internet service vs churn rate graph, internet and phone service matrix, total charges vs the tenure in years graph and contract type vs total charges graph.

By analyzing the graphs without using the given we can make some analytical decisions. Customer who are not using the internet service are having lower tendency in leaving the service. By observing that fact we can assume that company's non-internet services are in a better status while internet-based services of company needed to be enhanced. To make further analytical decisions we need to use the given filters in real time in the power BI.

4.Churn Analysis 3







In the churn analysis 3 page also, we can see a filtering option which filters data with the relevant year. By analyzing the three years we can see a drop-in customer churn rate in 2018. Apparently, this might be caused by the lack of information in 2018. In all given years the major reason for the service cancellation can be identified as the competitor. According to the map data given in the display we can observe that the density of the customer is higher around San Francisco and Los Angeles. Customer density around the Las Vegas is near to zero. By observing this geographical information, we can predict that the company will have an opportunity to expand their services in the nearest cities as well. We can assume that competitors who are being selected by the left customers might be having better coverage around other nearest cities such as Las Vegas enabling their customers to travel without any connection issues.

5. Conclusion

In conclusion, our exploration of customer churn within the telecommunications industry through Power BI has been a journey into the intricate dynamics of business and economy. As we navigated the fast-paced landscape, the significance of customer churn as a pivotal metric for business expansion became increasingly apparent. Leveraging the capabilities of Power BI, our team successfully dissected the complexities of customer churning matrices, unraveling patterns and trends that empower telecom companies to make informed decisions. The focus on business and economy themes allowed us to align our insights with strategic imperatives, ultimately steering towards enhanced customer retention strategies. Through this endeavor, we not only delved into the intricacies of Power BI but also contributed valuable insights to the broader discourse on customer churn in a landscape where every understanding is a catalyst for growth.