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D211 Advanced Data Acquisition

**A1, Datasets**

The datasets used in the analysis have been included in the submission. The 'churn\_data.csv' file results from joining the tables within PostgreSQL. The ‘churn\_competitor.csv’ file contains the original dataset sourced from Kaggle, which was then manipulated within the database. The link to the Kaggle source can be found below.

[Kaggle: Churn in Telecom dataset](https://www.kaggle.com/datasets/becksddf/churn-in-telecoms-dataset/data)

**A2, Instructions for Installation and Viewing**

* To access and use the Company Churn Dashboard, the user should perform these steps:
  + If accessing from Labs on Demand, Tableau desktop should already be installed, and the download step can be ignored
  + If Tableau desktop is not installed, download the program from the link below and follow the installation steps
    - [**Download Tableau Public**](https://www.tableau.com/en-gb/products/desktop/download)
  + Once installed, open the Tableau file that was included in the submission
    - The file is connected to the Churn database in PostgreSQL and has a data extract saved. Should the user be prompted for sign-in information, enter the following:
      * Server: localhost
      * Port: 5432
      * Database: churn
      * Username: postgres
      * Password: Passw0rd!
    - Navigate to the Churn Dashboard tab at the bottom of the screen
    - On the top toolbar, select Window -> Presentation Mode, or simply press F7
      * To exit presentation mode, press the Escape button

**A3, Instructions for Dashboard Navigation**

* A helper icon on the top right corner of the dashboard will provide overall dashboard instructions.
  + Hover over the asterisk symbol (pictured below)
    - **A blue star of snowflake

      AI-generated content may be incorrect.**
* Three of the visuals are meant for interaction and will filter the dashboard.
  + Map
    - The map represents the company churn rate by state with thematic shading
      * Darker Red indicates a higher churn rate, while darker blue indicates a lower churn rate
    - Click a state on the map to filter the other visuals for data about the selected state
    - Clear the state selection by clicking the state a second time
  + Churn Rate Comparison – Company vs Competitor
    - This chart represents the company churn rate by state, compared to the competitor churn rate in the same state.
      * Blue bars represent the company, while orange bars represent the competitor.
    - The dotted reference lines represent the overall churn rates for the company and its competitor.
    - Click a state bar to filter the other visuals for data about the selected state.
    - Clear the state selection by clicking the bar a second time
  + Churn Rate by Contract Type
    - This chart represents the company churn rate by the customer's contract type.
    - Click a contract type bar to filter the other visuals for data about the selected contract type.
    - Clear the contract type selection by clicking the bar a second time
* Two additional tables provide context to the interactions
  + Monthly Charge and Bandwidth Used table
    - This table displays the average monthly charge and bandwidth used by customers broken out by active and churned customers. The table helps the user identify potential differences between the two metrics.
  + Monthly Charge Comparison – Company vs Competitor
    - This table displays the average monthly charge for the company and the competitor. The table helps the user identify pricing gaps with the competition.

**A4, SQL Code**

Custom views were created within PostgreSQL to combine tables and get data into the desired format for loading into Tableau. The ‘Churn\_data’ view joins the tables and contains all 10,000 records. The ‘Churn\_competitor’ view groups the external competitor data by state and aggregates customer counts, tenure, monthly charges, and churn metrics.

*Churn Data View SQL Code:*

SELECT

cust.customer\_id,

cust.lat,

cust.lng,

cust.population,

cust.children,

cust.age,

cust.income,

cust.marital,

cust.churn,

cust.gender,

cust.tenure,

cust.monthly\_charge,

cust.bandwidth\_gp\_year,

cust.outage\_sec\_week,

cust.email,

cust.contacts,

cust.yearly\_equip\_faiure,

cust.techie,

cust.port\_modem,

cust.tablet,

cust.job\_id,

cust.payment\_id,

cust.contract\_id,

cust.location\_id,

contract.duration,

loc.city,

loc.state,

loc.zip,

loc.county,

pmt.payment\_type,

job.job\_title

FROM customer cust

LEFT JOIN contract

ON cust.contract\_id = contract.contract\_id

LEFT JOIN location loc

ON cust.location\_id = loc.location\_id

LEFT JOIN payment pmt

ON cust.payment\_id = pmt.payment\_id

LEFT JOIN job

ON cust.job\_id = job.job\_id;

*Churn Competitor View SQL Code:*

SELECT

competitor.state,

count(competitor.state) AS customers,

round(sum(competitor.account\_length)::numeric, 2) AS total\_acct\_length,

round(avg(competitor.account\_length), 2) AS avg\_acct\_length,

round(sum(competitor.total\_charge), 2) AS total\_charge,

round(avg(competitor.total\_charge), 2) AS avg\_charge,

sum(

CASE

WHEN competitor.churn = true THEN 1

ELSE 0

END) AS count\_churn,

round(sum(

CASE

WHEN competitor.churn = true THEN 1

ELSE 0

END)::numeric / count(competitor.state)::numeric, 4) AS churn\_rate

FROM competitor

GROUP BY competitor.state;

**B, Panopto Link**

A Panopto recording was created to accompany the dashboard and can be found in the link below.

<https://wgu.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=eafb4c5e-477d-4742-9ac3-b2910153c6f9>

**C1, Purpose and Function**

The dashboard's purpose is to compare and analyze the churn rate of customers across various customer and geographic characteristics. The dashboard sheds light on the monthly charges and bandwidth used by active and churned customers and can be further sliced with geographic information. The dashboard aligns with the executive team's needs, as it will help them assess pricing across states and identify key areas for customer retention.

**C2, Justification of Tool**

Tableau was the business intelligence tool used in the analysis. Tableau allows the user to seamlessly connect to databases and live-query the data, which was critical in this case, given the data was housed in PostgreSQL. The program has excellent visual representations, which helped craft the narrative that is presented to executives. Tableau also has an easy-to-learn interface with drag-and-drop calculations and manipulation.

**C3, Data Cleaning**

The data from the company consisted of five tables within the Churn database in PostgreSQL. Checks were performed on key fields to ensure there were no missing values, and it was determined that this data was already cleaned and ready to go. A view was created that joined the five tables via their respective keys before loading the data into Tableau. The result was one single view that could be loaded into Tableau.

The external competitor data was downloaded as a CSV file, and a table was created with the Churn database to house it. The competitor data was checked for missing values within the key columns used and deemed clean. A view was created that grouped the competitor data by state and aggregated various metrics. The view was then loaded into Tableau.

**C4, Dashboard Steps**

The data within PostgreSQL was in proper relational database format. A view was created that joined the relevant customer data, which was then used as the source in Tableau. An additional view was created for the external competitor data, which was grouped by state and aggregated customer and churn counts, tenure, and monthly charges.

The first step to creating the dashboard in Tableau was to load the data. The appropriate server information was entered using the PostgreSQL connector, and the two views were loaded. Users can choose to have an extract of the data loaded, which saves a copy of the underlying data so anyone can access it, or decide to live-query it. The extract option was chosen so others can view the dashboard if they have the file. A relationship was created between the company and competitor data on the state field. The relationship enables Tableau to reference and compare the competitor data for a given state when applicable.

Once the data was loaded and ready, worksheets were created for each visual or table. The visuals from each worksheet were used to populate the Churn dashboard. An additional worksheet was designed for an info icon, which allows the user to hover over it and get further instructions while viewing the dashboard (Data Viz Canvas, 2022). After the dashboard was created and finalized, the source tabs were hidden to reduce clutter.

**C5, Results**

The dashboard's purpose was to shed light on the churn landscape within the company. Executives need to know if certain areas have higher churn rates so they can focus efforts on retaining customers. It is also helpful to know if there were differences between customers who churned compared to active customers or if certain contract types lead to more loyal customers. It is also critical to understand how you stack up against the competition to know if the company is leading or lagging.

The dashboard informs Executives that the competitor has significantly lower churn rates overall and in nearly every state where they co-exist. The company has an overall churn rate of 26.5%, and the competitor comes in at 14.5%. The average monthly charge comparison provides insight into why this could be happening. On average, the competitor is priced much lower than the company, and customers may be leaving the company to pursue better deals. Within the company, customers who have churned paid more monthly and used less bandwidth than active customers. The company may need to assess its pricing model or focus on ensuring a customer is signed up for the proper plan. The contract type chart also shows a much higher churn rate among customers with a month-to-month contract, while one-year and two-year contracts drive more loyalty. A focus should be placed on converting customers to longer-term contracts.

**C6, Limitations**

One limitation of the analysis is the use of the competitor data. Companies would not typically willingly provide information like this to a direct competitor. It could be used as a benchmark, but it should be taken with a grain of salt overall. Executives should exercise caution when making decisions based on this data.

**D, Sources for Data and Code**

Becks, David (n.d). *Churn in Telecom’s dataset*. Kaggle. Retrieved February 4, 2025, from <https://www.kaggle.com/datasets/becksddf/churn-in-telecoms-dataset/data>

**E, Sources for Paper**

Data Viz Canvas (July 4, 2022). *How to add an info button and instruction in Tableau dashboard* [YouTube video]. YouTube. <https://www.youtube.com/watch?v=dkv8HrvMr5a>