

Customer Churn Analysis Report

This report summarizes the Python script **churn_analysis.py**, which performs data cleaning and visualization for the Telco Customer Churn dataset. The goal of this project is to understand customer churn behavior using interactive dashboards built with Dash and Plotly.

1. Data Loading and Preprocessing

- The dataset 'WA_Fn-UseC_-Telco-Customer-Churn.csv' is loaded using Pandas.
- Blank values in the 'TotalCharges' column are replaced with 0 and converted to float.
- Basic data checks are performed, including missing values, duplicates, and descriptive statistics.
- The 'SeniorCitizen' column is converted from numerical (0 or 1) to categorical ('no' or 'yes').

2. Interactive Dashboard Setup (Dash App)

- A Dash web app is initialized for visualization.
- A dropdown menu allows users to select categorical customer features like 'PhoneService', 'InternetService', etc.
- The layout displays a dynamic countplot that shows how each feature correlates with churn (Yes/No).

3. Visualization Logic

- The callback function updates the Plotly Express histogram dynamically based on the selected feature.
- Bars are grouped and color-coded for churned and non-churned customers.
- The figure automatically updates titles, axis labels, and text values for clarity.

4. Execution and Output

- Running the script launches a local web application using Dash.
- Users can interactively explore how different features affect customer churn through the dashboard interface.

Conclusion

The churn analysis script provides a user-friendly and visual way to analyze customer retention trends. By integrating data preprocessing and dynamic visualizations, it enables telecom companies to identify patterns that contribute to customer churn.