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This study conducts an Exploratory Data Analysis (EDA) to identify trends, patterns, and outliers in metro ridership data, focusing on economic influences, commuting behaviors, and event-driven fluctuations. By analyzing ridership variations across different time periods and locations, we aim to reveal important insights into urban transportation dynamics.

One area of investigation is the economic impact of metro ridership in commercial districts. By corresponding metro usage with economic activity such as business foot traffic and retail performance, we aim to evaluate the effect of transit accessibility and how it influences local commerce. Geographic heat maps will be utilized to visualize high-ridership stations near business hubs to calculate their economic significance.

Additionally, we will explore how commuting times and locations impact ridership patterns. By analyzing peak vs. off-peak travel times and identifying high-traffic stations, we aim to understand daily commuting behaviors. Factors such as employment hubs, residential areas, and transit connectivity will be considered to assess their influence on ridership trends.

This study also examines outliers in ridership data, particularly those influenced by one time. Large-scale gatherings consisting of concerts, festivals, sporting events, political rallies, conventions, and holiday celebrations often cause temporary but significant fluctuations in metro traffic. By analyzing ridership data from specific dates, we aim to identify unusual spikes or declines and hypothesize their causes using time series plots and event-based boxplots.

Our findings will provide insights for transportation planners, policymakers, and businesses, aiding in optimizing metro operations, improving transit accessibility, and supporting economic and urban planning.