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Data Analytics challenge 2: DC WMATA Metro Ridership Analysis
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Abstract

Public transit forms the backbone of efficient urban mobility, yet fare evasion and shifting commuter behaviors pose persistent challenges for transportation agencies. Our research, centered on the DC WMATA Metro Ridership Analysis, investigates the impact of fare enforcement strategies and federal work schedules on passenger volumes and system sustainability. We employed ridership data from stations before and after the installation of advanced, taller faregates to evaluate fluctuations in “Tappers” versus “Non-Tappers,” thereby quantifying the extent of unauthorized entries. By mapping these patterns, we determined faregate effectiveness in reducing fare evasion, highlighting several stations that maintained high rates of non-tapped entries. Simultaneously, we explored how federal employees’ commute choices—especially on Thursdays and Fridays—affect overall ridership, noting a marked decline in passenger counts in tandem with telework policies. Federal holidays further support this trend, as Metro usage frequently drops to weekend levels. Our findings demonstrate that improved faregate design can significantly mitigate revenue loss from evasion, although persistent problem areas remain. Moreover, the data highlights the critical impact of remote work on travel demand, signaling the need for more flexible scheduling and pricing structures. By aligning fare enforcement, service schedules, and outreach initiatives with evolving commuting behaviors, agencies can bolster revenue stability and optimize resource allocation. This study offers actionable insights for WMATA and other urban transit systems striving to adapt to contemporary work patterns and maintain robust public transportation networks.