Project Title: A/B Testing Analysis – Facebook vs. Google Adwords Campaigns

Objective:

To analyze historical marketing campaign data from Facebook and Adwords and determine which platform delivered better performance based on key metrics like CTR, CPC, Conversion Rate, and Cost per Conversion.

Data Overview:

- The dataset contains performance metrics for various ad campaigns.
- Key columns include: Date, Platform, Views, Clicks, Conversions, CostPerAd, CTR, ConversionRate, CPC and CostPerConversion.
- Tools & Libraries: Python, Seaborn, Scipy, Pandas, Matplotlib & Jupyter

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Analysis Performed:

Task	Details
Data Cleaning & Transformation	Converted dates, extracted months, reshaped long format
Exploratory Data Analysis (EDA)	Platform-wise summary stats (CTR, CPC, Conversions, etc.)
Visual Analysis	Line plots of CTR, Conversion Rate, CPC over time per platform
Efficiency Assessment	Reviewed cost-efficiency per platform using Cost per Conversion
Time Pattern Analysis	Monthly trend of total conversions
Statistical Testing	Independent t-tests between Facebook and Adwords for CTR, CPC, and Conversion Rate

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Key Findings:

- Facebook had **higher CTR and Conversion Rates**, indicating stronger ad engagement.
- Adwords had **higher Cost per Conversion**, showing lower cost efficiency.
- Statistical tests confirmed **significant performance differences** between platforms.
- Monthly conversion spikes, like in **July 2023**, were not linked to any clear campaign strategy based on available data.
- Ad timing appeared **irregular** as ads may have run on certain occasions or random ad-hoc schedules.

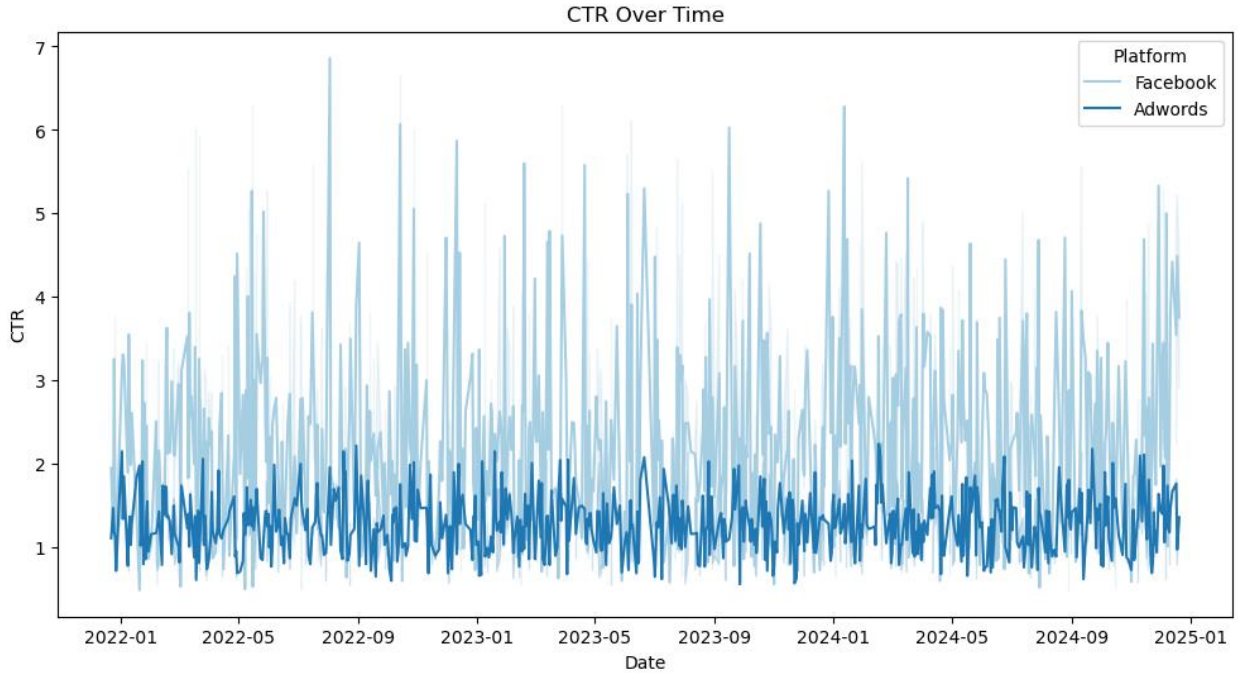
Limitations:

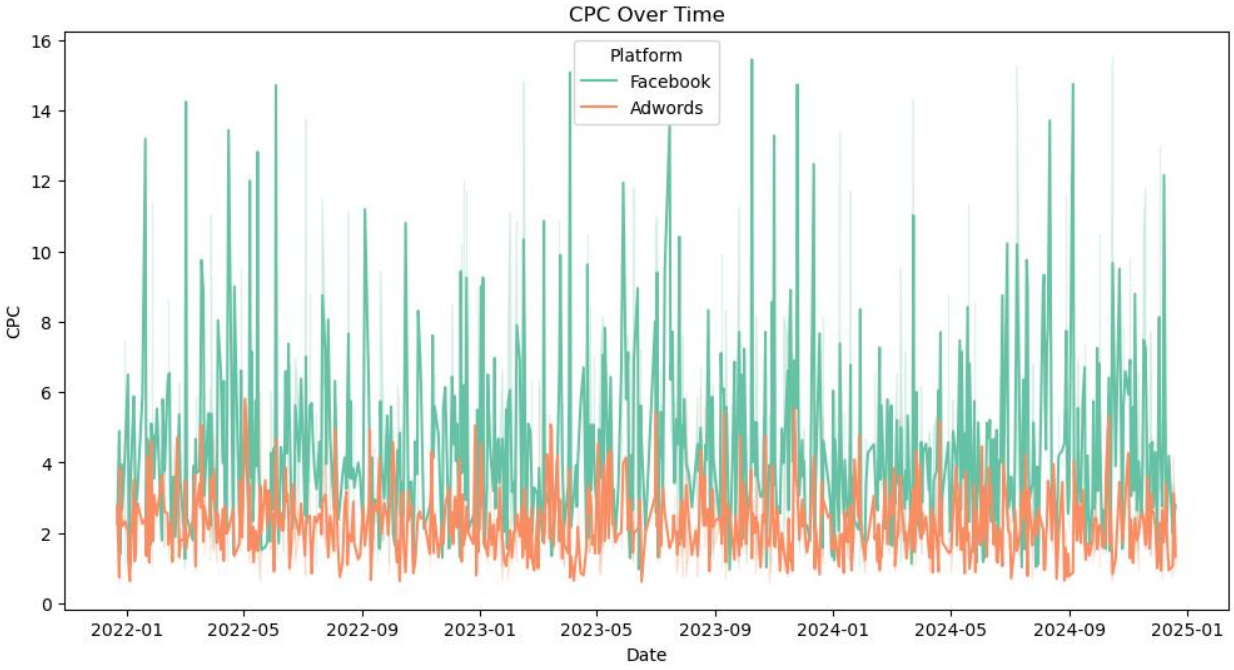
- The dataset lacks information on **campaign objectives**, **target audience** or **budget constraints**.
- We assume all conversions and costs are consistent across campaign types, which may not reflect real-world nuances.

Conclusion:

Facebook outperformed Adwords in most performance metrics in this dataset. Future campaign decisions could benefit from more structured testing and clearer objective mapping.

Visuals:




CPC Over Time
Platform
Facebook
Adwords
CPC
Date
0
2
4
6
8
10
12
14
16
2022-01
2022-05
2022-09
2023-01
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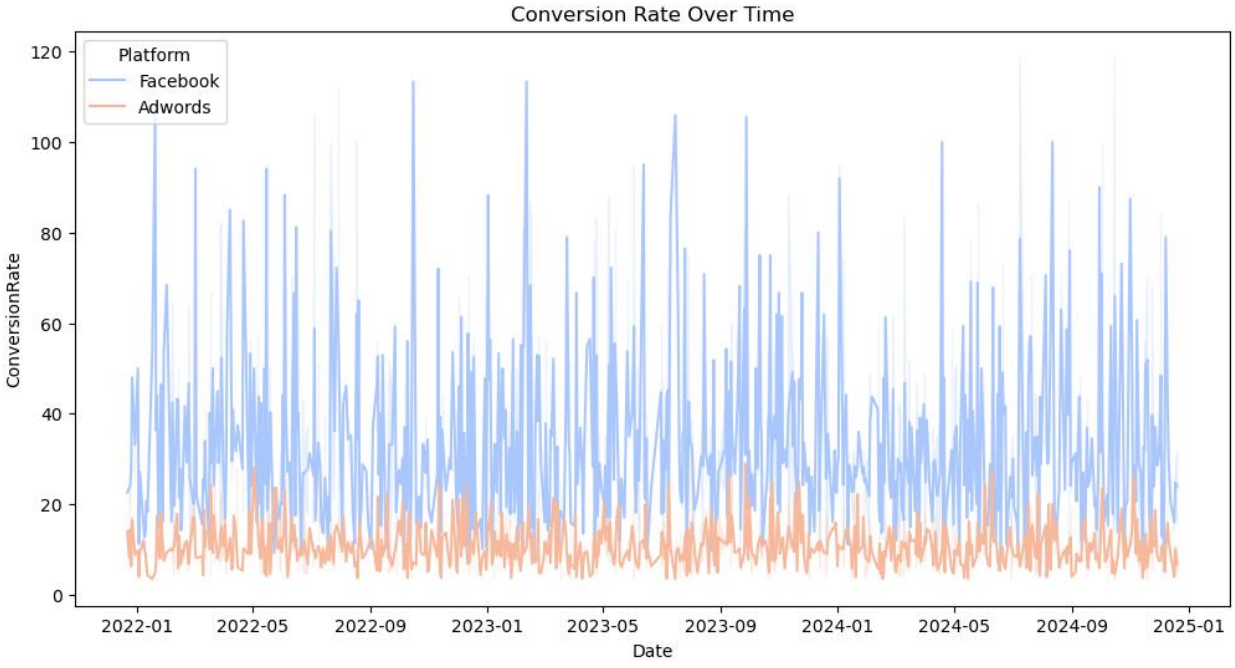
2023-09
2024-01
2024-05
2024-09
2025-01


Conversion Rate Over Time
Platform
Facebook
Adwords
ConversionRate
Date
0
20
40
60
80
100
120
2022-01
2022-05
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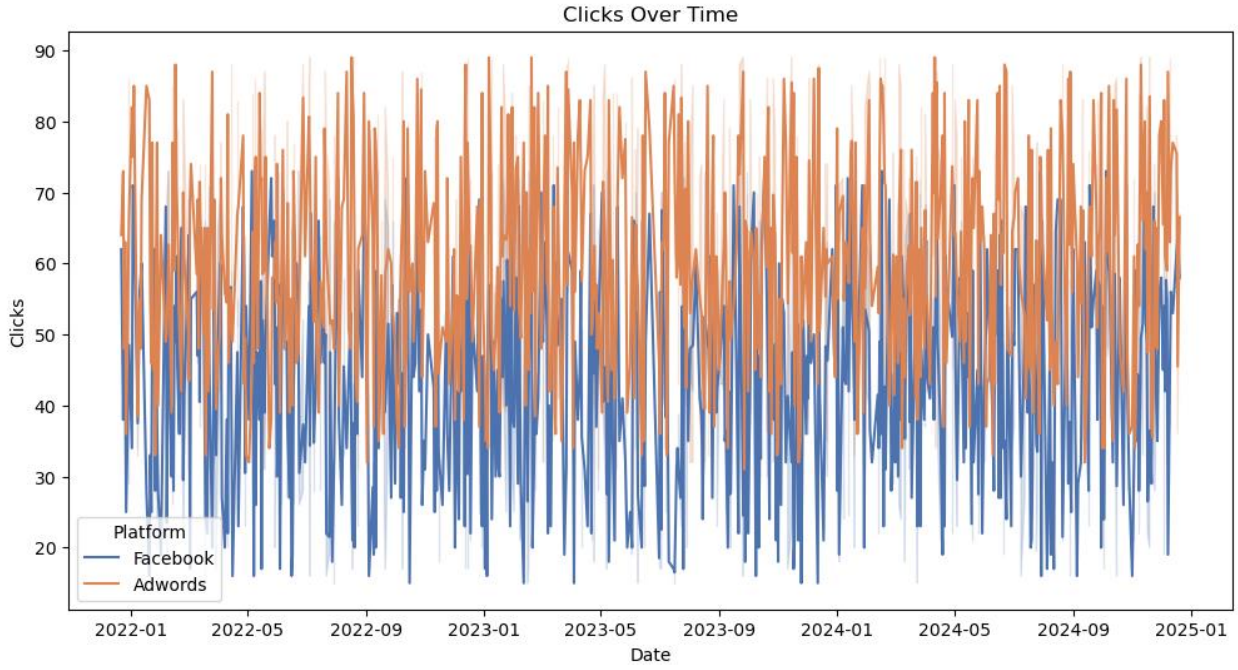
2023-09
2024-01
2024-05
2024-09
2025-01


Clicks Over Time
Clicks
Date
Platform
Facebook
Adwords
90
80
70
60
50
40
30
20
2022-01
2022-05
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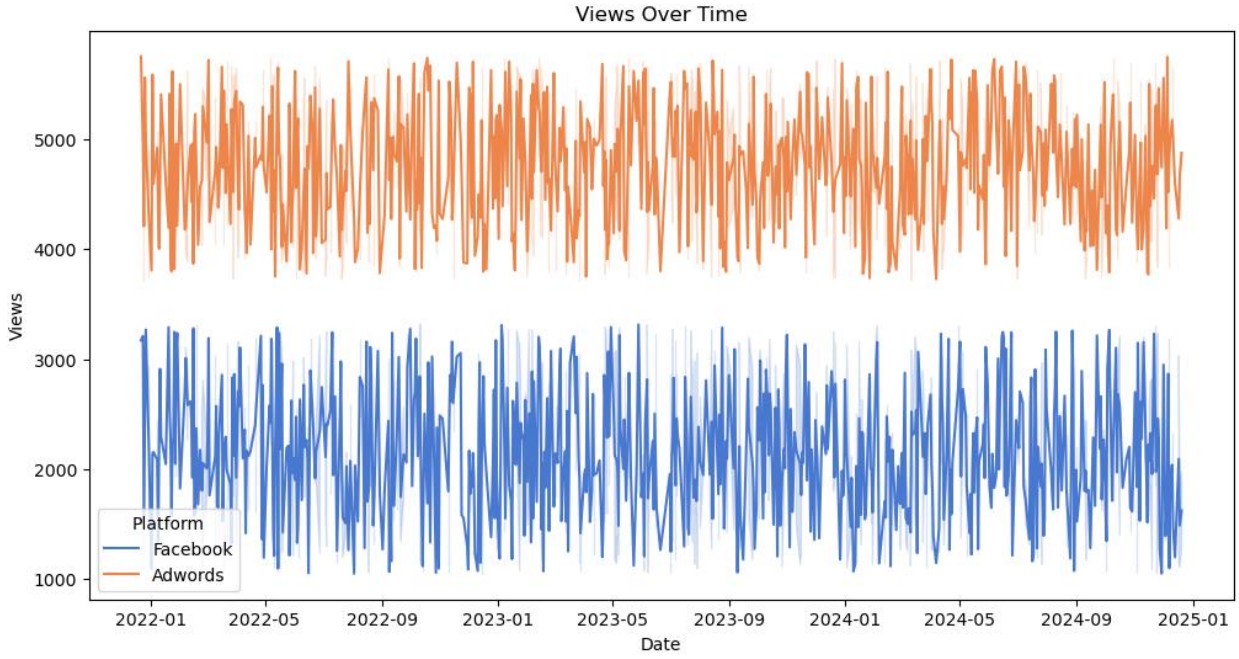
2023-09
2024-01
2024-05
2024-09
2025-01


Views Over Time
Views
Date
Platform
Facebook
Adwords
5000
4000
3000
2000
1000
2022-01
2022-05
2022-09
2023-01
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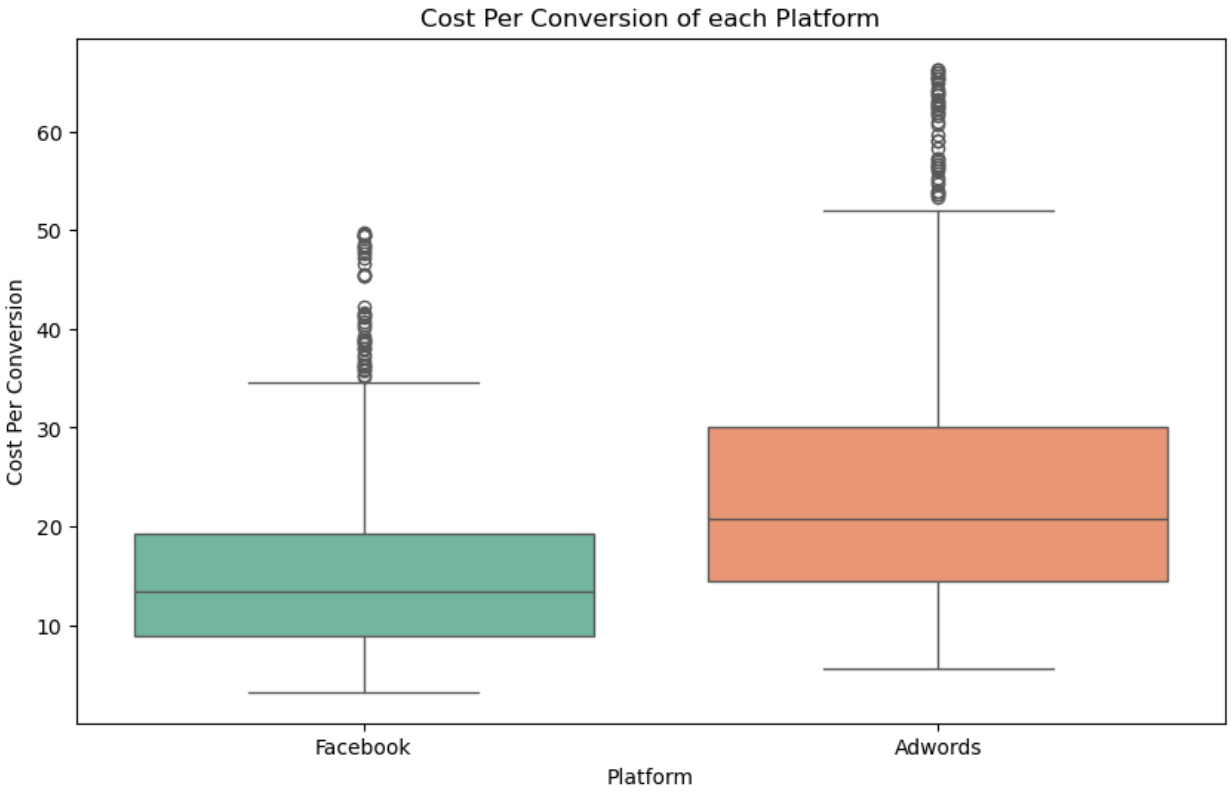
2023-09
2024-01
2024-05
2024-09
2025-01


Cost Per Conversion of each Platform
Cost Per Conversion
60
50
40
30
20
10
Facebook
Adwords
Platform