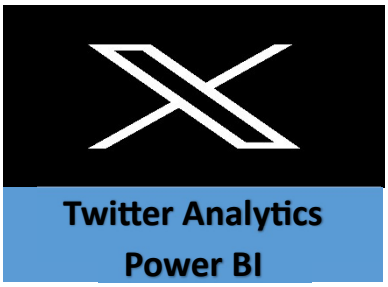
NullClass Internship Project Report



Introduction

During my internship at NullClass, I was tasked with a challenging and transformative project focused on analyzing Twitter (X) data and building an advanced Power BI dashboard. Social media platforms like Twitter generate enormous amounts of data every second, providing organizations with the opportunity to extract actionable insights if processed effectively. My role was to transform raw data into meaningful and interactive visualizations, addressing specific analytical objectives. The internship aimed to develop my technical and analytical expertise while helping the organization understand its social media performance better.

This project revolved around exploring various aspects of tweet performance, user engagement, and interaction trends. It required designing and implementing custom measures and filters that addressed the unique requirements of each task. For instance, time-restricted visuals played a pivotal role in narrowing the analysis to specific time periods. Beyond this, the dashboard included advanced features such as forecasting, enabling proactive decision-making. Each visual was tailored to uncover insights relevant to user behaviors, media performance, and tweet engagement patterns, providing a comprehensive view of the data.

The internship provided me with an invaluable opportunity to apply my technical skills in a real-world context. It allowed me to gain hands-on experience with data transformation, advanced Power BI functionalities, and dynamic visualization techniques. The project was not just about creating visuals but about ensuring that each insight served a specific business purpose. By the end of the internship, I had not only gained a deeper understanding of data analytics but also delivered a dashboard that stakeholders could use to drive strategic decisions.

Background

Social media platforms like Twitter have become integral to organizations seeking to understand and connect with their audiences. The vast amount of data generated on such platforms holds the potential for strategic insights, provided it is analyzed effectively.

This project focused on analyzing Twitter data to:

- **Evaluate Tweet Engagement**: Identify factors contributing to high-performing tweets.
- **Monitor Performance Trends**: Track patterns over time to refine future strategies.
- **Enable Informed Decision-Making**: Present data in a way that is easily interpretable and actionable for stakeholders.

The project involved cleaning and transforming the raw dataset, creating time-sensitive visualizations, and implementing forecasting techniques to make the dashboard future-ready.

Learning Objectives

Technical Mastery

- Gain expertise in Power BI, including DAX (Data Analysis Expressions), Power Query, and visualization techniques.
- Create dynamic and interactive dashboards using slicers and filters for enhanced user experience.

Data Transformation

- Clean and preprocess raw data to create meaningful and actionable metrics.
- Develop custom columns and measures to address specific business needs, such as engagement rates, time restrictions, and tweet categorization.

Time-Specific Analysis

- Implement advanced DAX formulas to create measures that dynamically filter data for specific time periods, ensuring relevance for each task.

Predictive Analysis

- Introduce forecasting capabilities to analyze future trends and support long-term decision-making.

Practical Application

- Deliver a professional dashboard that meets the specific requirements of social media analysts and managers, aligning with real-world scenarios.

Activities and Tasks

Key Activities

- **Data Preparation:** Cleaned, structured, and transformed the dataset (Twitter_data.csv) using Power Query. Generated custom columns and measures to derive key insights, such as engagement rate and tweet category.
- **Dashboard Development:** Designed eight visuals, including an additional line chart for trend forecasting. Integrated a date slicer and dynamic filters for time-specific analysis.

Tasks Completed

Task 1: Tweets with the Highest Engagement Rates (Top 10%)

- Identified tweets with engagement rates in the top 10%.
- Filters applied:
    - The graph only works between 1 PM and 4 PM.
    - Tweets with Word count under 30 and likes above 50 and were posted on weekdays.

      Visual: Horizontal bar chart displaying the top tweets and their respective engagement rates.

Task 2: Top 10 Tweets by Combined Retweets and Likes

- Ranked tweets by the combined total of retweets and likes.
- Filters applied:
    - Odd tweet dates, even impressions, tweets posted on weekdays.

- The graph only works between 3 PM and 6 PM, and word count under 30.

  Visual: Vertical bar chart showing the top 10 tweets with user profiles.

Task 3: Interaction Breakdown by Tweet Category

- Analyzed interaction types (URL clicks, profile clicks, hashtag clicks) based on tweet categories.
- Filters applied:
  - The graph only works between 3 PM and 6 PM, even dates, tweets that have at least one of these interaction types and word count under 40.

    Visual: Clustered bar chart showing interactions by tweet category.

Task 4: Media Engagements vs. Media Views

- Explored the correlation between media engagements and media views for tweets with more than 10 replies.
- Filters applied:
  - Tweets with engagement rates above 5%, the graph only works between 12 PM and 6 PM on odd dates, with word count under 50.

    Visual: Scatter plot with highlighted points for high-engagement tweets.

Task 5: Monthly Trends in Engagement Rates: Media vs. Non-Media Tweets

- Compared monthly engagement rates for tweets with and without media content.
- Filters applied:
  - Odd dates, even engagement metrics, the graph only works between 3 PM and 6 PM.

    Visual: Line chart showing trends for both media and non-media tweets.

Task 6: Daily Analysis of Media Interactions in the Last Quarter

- Analyzed the daily pattern of media views and engagements over the last quarter.
- Filters applied:
  - Odd dates, even impressions, the graph only works between 3 PM and 6 PM, and word count under 30.

    Visual: Dual-axis bar chart highlighting spikes in media interactions.

Task 7: Engagement Rate Comparison: Tweets with App Opens vs. Without App Opens

- Compared engagement rates for tweets leading to app opens versus those without app opens.

- Filters applied:
    - Tweets posted between 9 AM and 5 PM on weekdays, odd dates, even impressions, word count under 40 and Graph only works between 12 PM to 6 PM. **Visual**: Doughnut chart showing the distribution of engagement rates.

Additional Visual

Engagement Trend Over Time (Monthly Breakdown with Forecasting)

- Purpose: Provide stakeholders with a forecast for engagement trends.
- A line chart showing monthly engagement trends, with a predictive component for future analysis.
- Offers a strategic advantage by enabling proactive decision-making based on anticipated trends**.**

X Logo

- Incorporated the X logo image into the plot area background of all visuals except the doughnut chart. This visual enhancement improves the visual appeal and maintains a consistent theme throughout the dashboard.

Date Slicer

- Added a date slicer to control the time-restricted visuals effectively, allowing users to focus on specific time periods without losing context.

Skills and Competencies

Technical Skills:

- Proficient in Power BI (visualizations, DAX, Power Query).
- Expertise in time-specific data filtering and advanced data transformations.
- Basic forecasting techniques integrated into visual dashboards.

Analytical Skills:

- Identified key metrics to derive actionable insights from raw data.
- Solved real-world challenges through systematic data analysis.

Project Management:

Balanced time-bound tasks and managed evolving project requirements effectively.

Feedback and Evidence

Feedback: The project received positive feedback from supervisors, especially for its professional presentation, dynamic filters, and advanced forecasting features. The time-restricted measures and interactivity of the dashboard were particularly appreciated for their business relevance.

Evidence: The final dashboard included eight professionally designed visuals, a date slicer for flexible time-based analysis, and task-specific filtering. The dashboard design supports informed decision-making and provides a visually appealing experience. The GitHub Repository Link for accessing the analysis report: https://github.com/darga28/Real-Time-Twitter-Data-Analytics-with-Power-BI and the snapshot of the dashboard:

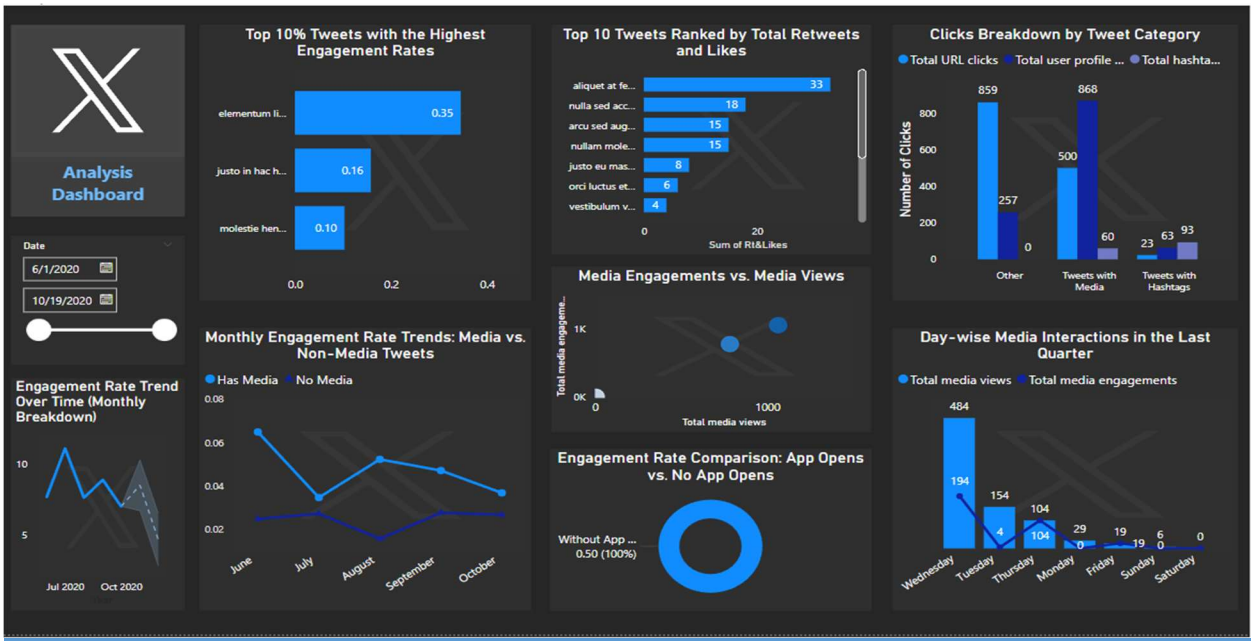


Fig: Twitter Data Analysis Dashboard: Integrating Trends, Engagement, and Sentiment into Visual Representation

Challenges and Solutions

1. **Balancing Diverse Requirements:**
   Challenge: Simultaneously managing different time and data filters for each task.
   Solution: Created custom measures and conditional filters for each visual to isolate specific subsets of data.
2. **Limited App Opens Data:**
   Solution: Highlighted the limitation transparently in the dashboard and focused on showcasing the available insights.
3. **Dashboard Usability:**
   Solution: Organized visuals logically, added slicers for flexibility and ensured consistent formatting for a seamless user experience.

Outcomes and Impact

- **Actionable Insights:** Delivered a Power BI dashboard with eight visuals, enabling users to analyze tweet performance dynamically, identify engagement trends, and forecast future patterns.
- **Skill Development:** Strengthened proficiency in Power BI, DAX, Power Query, and forecasting methodologies.
- **Business Value:** The dashboard provides a centralized tool for monitoring social media performance, helping stakeholders make data-driven decisions with improved efficiency.

Conclusion

The completion of this internship project marked a significant milestone in my journey as a data analyst. Through the creation of a robust and dynamic Power BI dashboard, I was able to address complex analytical challenges, turning raw data into actionable insights. One of the standout features of the dashboard was the forecasting component, which offered a forward-looking perspective on engagement trends. This predictive capability added immense value by enabling stakeholders to anticipate future behaviors and adjust strategies proactively. Additionally, the inclusion of time-restricted filters made the dashboard more interactive and specific, ensuring relevance for diverse analytical needs.

The experience also helped me refine my problem-solving skills. For instance, creating DAX measures to handle time-specific filters and ensuring the accuracy of the data involved meticulous attention to detail. Overcoming challenges like limited app data and managing diverse stakeholder requirements has strengthened my ability to think critically and develop practical solutions. The dashboard's professional design and logical structure were praised for their clarity, making the insights accessible even to non-technical users. These achievements reflect not only the technical success of the project but also its tangible impact on decision-making processes.

Overall, this internship has been an incredible learning experience, combining technical expertise with business acumen. It has deepened my understanding of data visualization tools like Power BI while emphasizing the importance of designing solutions tailored to stakeholder requirements. Beyond the technical skills, it has reinforced the value of effective communication, collaboration, and adaptability in a professional setting. This project has not only enriched my skill set but also prepared me for the challenges of data-driven roles in a dynamic industry.