INTERNSHIP REPORT

Project Title: Build Real-Time Twitter Analytics Dashboard – Power BI

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- **Duration: 10th Feb 2025 – 10th Apr 2025**
- **Organization: NullClass**

1. **INTRODUCTION:-**The aim of the internship project was to build a Twitter metrics dashboard that could analyze tweets in real time using Power BI. The main task was to take the raw data around a tweet's engagement activity and turn it into digestible and interactive visualizations, while also applying some complicated filters and logic.
   Social media, particularly Twitter, has emerged as a powerful mode of communication, marketing and public engagement in today's world. Organizations today are also becoming more reliant on data analytics to understand audience behavior and trends. Residing at NullClass for an internship during the summer of 2023 allowed me to utilize what I have learnt throughout my academic studies to analyze real-world social media data using Power BI. The intent of the internship was to develop a complete, interactive Twitter analytics dashboard, detailing the level of user engagement through user interactions with varying metrics, including impressions, clicks, likes, and retweets. The internship's primary focus was to give interns a hands-on learning experience of data visualization & DAX based filtering logic within Power BI while working with an active, live-action dataset modeled to simulate Twitter's real-time information.Through this experience, I also had the opportunity to engage in critical thinking and exploratory learning autonomously. The internship was designed in such a manner that no external mentorship or support was permitted, providing added incentive to self-learn and be resourceful. In addition to learning the technical components, I also put more effort into managing my time, while remaining motivated to learn. The assigned tasks were both time constrained, and logical in nature, making this chance affording me an opportunity to think productively about the theoretical knowledge I had been taught in the course of my education.

2. **BACKGROUND:-**As a second-year BCA student concentrating on Data Analytics, I felt that this opportunity was a fitting way of applying all the theoretical knowledge I had acquired to the workplace. The operational work I had embarked on would be classified as part of the field of business intelligence and data visualization using Microsoft Power BI.

   I have always had a fascination with the potential of data to surface complex relationships and allow for evidence-based action. In our studies, we had some introduction to data visualization and business intelligence, but this internship allowed me to expand my examination of the topic considerably beyond my initial experience. Prior to the internship, I had a basic understanding of Microsoft Power BI and data modelling concepts, but the project focused on complex uses of DAX, Power Query and conditional logic, skills which I had to learn 'on the fly'. The data received was a simulated real-time dataset that identified twitter metrics, including impressions, user clicks, profile clicks, hashtags, media views, engagement rates, tweet date, and tweet content. This dataset was invaluable in providing an understanding of how raw, unstructured social media data could be interpreted, using visual storytelling to derive insights. This type of experience also provided exposure to industry expectations, such as developing dashboards that are not just functional, but responsive to time-based context.

3. **LEARNING OBJECTIVES:-**The objectives of this internship were multi-fold. I was expected to learn a wide variety of concepts from the program: learning how to use Microsoft Power BI, specifically its analytical and visualization capabilities. A primary objective was to learn how to filter data dynamically, based on the system time, content length, engagement rate, or any other metadata to get me started. Another was to use the dashboards I created in a business context, for example, a social media marketing team, trying to understand when and why a tweet performs in a good way.

   Other objectives included:

   - Learning how to clean and transform data using Power Query.Learning how to write calculated columns/measures using DAX.

- Learning how to create time-based visibility logic to manipulate visibility of elements on the dashboard.
- Learning how to improve user engagement, adding drill-down capabilities.
- Learning how to create dual-axis and multi-layered charts for comparative analysis.
- Meeting these objectives would require me to apply theory to practical problems and to ensure that the final product not only balanced the technical spec, but also maintained some business relevance.

4. **ACTIVITIES AND TASKS:-**During my internship, I completed five overall dashboard specific tasks. Each of these tasks required their own rules, filters, and display capabilities, and I had to think critically and put together in a logical way.
    - Pie Chart with Procurement Drill-Down: This pie chart showed the share of total clicks (url clicks, user profile clicks, and hashtag clicks) for each tweet that had over 500 impressions. Additionally it had drill down capability, where a user could click on each category and get a breakdown of clicks per tweet. To implement this, I used DAX to filter out any tweets that had less than 500 impressions, and built a hierarchy for the drill down.
    - Clustered Bar Chart: This visualization took all the clicks, or total clicks, for tweets that were categorized into media, links, or hashtags, and only displayed the clicks between 3 - 5 PM IST. Also, these tweets all had to have a word count greater than or equal to 40 words, and they had to be posted one some even number date of the month between the 2nd and the 28th. I used calculated columns to isolate and check the date parity and the word count (counting the characters) and then used DAX to implement the time based logic.
    - Top 10 Tweets Chart: The first task was to create a chart for the top 10 tweets based on the number of likes and retweets. There were no weekend tweets, tweets were only eligible if they had even impressions, had odd dates, and a word count below 30. This was one of the more challenging tasks, as it

pooled several conditional clauses with ranking logic, and exclusion criteria.

- Monthly engagement trend line chart: This chart depicted the average engagement rate month by month with a separate line for tweets with media, and tweets with no media. This chart only appeared between the hours of 3 PM–5 PM, and 7AM–11 AM in IST. It only appeared with tweets that had even engagement, odd dates, a character count above 20, and had all words with the letter ‘C’ excluded from the content.
- Dual Axis Media Graph: This exercise was to create a dual-axis graph displaying the media views and engagements through weekdays for the last quarter. Similar filters applied here: Even impressions, odd dates, character count > 30, and remove words with 'H'.All of the graphs were executed using a combination of Power Query (for data shaping), calculated columns (for custom logic), and DAX (for filtering/advanced filtering/visibility through time).

5. **SKILLS AND COMPETENCIES:-**Throughout my time on the internship, I acquired a variety of technical and soft skills that support a career in analytics and business intelligence. Examples of key skills I developed include:

Technical Skills:

- ***Power BI:*** Advanced proficiency in report development, slicers, and data model management.
- ***Power Query:*** Used heavily for transforming raw data and deleting unwanted content (for example, filtering out certain letters in words in tweets).
- ***DAX (Data Analysis Expressions):*** Used in nearly every chart to create measures and filters, and to control visibility based on date/time and content conditions.
- ***Data Modeling:*** Linked tables appropriately to sustain relational integrity and maximize performance.
- ***Time-based Logic:*** Implemented conditions to broadly show/hide visuals based on system time using NOW(), TIMEVALUE(), and IF statements.

Soft Skills:

- ***Self-learning & Research***: Though there were no mentors to assist with issues, I became comfortable with reading documentation and watching a variety of tutorials to figure things out.
- ***Time Management:*** I efficiently managed my academic schedule around the internship timetable.
- ***Problem Solving:*** I solved complex logical tasks independently and learned to debug all of the DAX formulas and Power Query steps.

6. FEEDBACK AND EVIDENCE:-

During the internship, I kept track of my progress on a regular basis and made sure that any work I completed had the appropriate support.

The GitHub repository includes:

- The .pbix file with all dashboards and logic
- A README file that provides a detailed description of how the dashboard works.
- This detailed internship report.
- I learned the value of writing well-documented code and reports, even in the absence of formal feedback from my mentor.
- I learned the importance of consistency, such as completing the daily progress notes, and submitting only original work.

7. CHALLENGES AND SOLUTIONS:-

This internship had many difficulties that made the learning more meaningful.

Some of the most important ones were:

- ***Dynamic time-filtering in Power BI:*** Power BI dashboards do not natively support time-based visibility. I needed to use the NOW() and TIMEVALUE() functions in DAX in order to create a custom logic that would hide visuals outside of specified time windows.
- ***Even/odd filters:*** Filtering tweets by even/odd days or impression date was not something that was entirely straightforward. In order to determine whether a numeric value was even or odd, I had to use a modulo operation in the calculations columns.

- ***Character/Word Filters:*** Removing words in tweets that contained certain letters (for example, 'C' or 'H') took considerable time and use of creativity in Power Query's Text.Contains and Text.Remove functions.
- ***Combining multiple filters:*** Many of the tasks included combining a few different complex conditions. Which meant I had create multiple calculated columns, and use logical AND/OR operations to accomplish all the needs at once.I met every challenge head on, and by taking the time to search online for solutions, I was able to overcome challenges and improve my level of quality.

8. OUTCOMES AND IMPACTS:-

The internship provided me with a solid foundation for Power BI and helped me appreciate the significance of data visualization in decision-making.

Completing this project had the following impact:

- I feel confident building real-time, dynamic dashboards.
- I learned how to implement user-friendly, interactive filters.
- I obtained industry-relevant experience to inform my real-world knowledge.
- I learned how to independently manage a project from start to finish to submission.
- This will be a great experience to help build my portfolio and resume, especially as I continue to search for internships and jobs related to data analytics and BI.

9. CONCLUSION:-

To summarize, this internship has been an incredibly valuable and rewarding experience. I got to explore the ideal intersection of theory and practice. Not only was I able to conceptualize and develop an actual Twitter analytics dashboard, but I have also grown significantly in my independence as a learner and problem solver. Overall, this experience confirmed and bolstered my interest in data analytics and motivated me to continue working on data-driven projects that have significant meaning behind them. I'm thankful to NullClass for allowing me this opportunity and I look forward to being able to carry these skills into the future for my academic and professional pursuits.

10. GITHUB LINK:-

https://github.com/anweshapal30/Twitter-Analytics-PowerBI