

NullClass Internship Report for Task 1

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Introduction

In today's digital age, social media platforms like Twitter are powerful tools for communication, marketing, and brand building. With millions of tweets sent every day, it is crucial to track and analyze engagement metrics such as likes, retweets, and impressions to understand which content resonates with an audience. Businesses, influencers, and content creators increasingly rely on analytics dashboards to assess their social media performance. These dashboards not only help in tracking engagement but also in making informed decisions to improve content strategies and drive audience growth.

During my internship, I was assigned the task of developing a Power BI dashboard that displays tweets with the highest engagement rates. Specifically, my objective was to filter and visualize only the top 10% of tweets based on engagement rates, which include metrics like likes and retweets. Additional filters were required to exclude tweets with fewer than 50 likes and those posted on weekends. A unique challenge was the dashboard's functionality—it was to only be operational between 1 PM to 4 PM based on the local system's time. Furthermore, only tweets with a word count below 30 were to be included in the analysis. Through this task, I had the opportunity to apply complex DAX (Data Analysis Expressions) logic, handle real-time data constraints, and create visualizations that conveyed clear insights.

Background

Social media analytics has become essential for organizations and individuals seeking to measure the effectiveness of their online content. Twitter, being a platform with global reach, generates data at an enormous rate, which requires tools like Power BI to analyze and derive insights. Tracking engagement rates, such as likes and retweets, is crucial in understanding which tweets perform best and why. This helps in identifying trends, improving content strategies, and engaging more effectively with the target audience.

The specific task I was assigned aimed to provide a visual representation of the top-performing tweets while applying multiple filtering criteria. The first challenge was calculating engagement rates and determining which tweets belonged to the top 10% based on their performance. The second challenge was ensuring the dashboard only worked within the specified hours of 1 PM to 4 PM. Additionally, the task required filtering tweets by weekday, number of likes, and word count. These conditions mirrored real-world data constraints, where users or clients may want to focus on specific periods and criteria to derive the most relevant insights.

This task was an excellent opportunity to deepen my understanding of how social media metrics are used to gauge performance and how dashboards can be tailored to specific requirements. The real-time filtering based on system time added a layer of complexity that made the task both challenging and rewarding.

Learning Objectives

The primary learning objective of this task was to apply advanced data analysis techniques using Power BI, with a focus on building dynamic and interactive dashboards. By completing this task, I sought to strengthen my skills in several key areas, including:

- 1. DAX Formulas and Logic:** Understanding how to write complex DAX formulas to filter data, calculate engagement rates, and rank tweets based on specific metrics. The objective was to use DAX efficiently to achieve real-time interactivity and precision in the dashboard.
- 2. Real-Time Data Handling:** One of the main objectives was learning how to handle real-time data constraints. The dashboard needed to function only between 1 PM and 4 PM, meaning I had to develop solutions that worked dynamically with the system's local time, an important skill for creating time-dependent dashboards.
- 3. Visualizing Data:** Learning to choose the right types of visualizations (bar charts, pie charts, KPI cards) to represent social media engagement data clearly and effectively. The goal was to create visuals that would make it easy to compare top-performing tweets with others and present meaningful insights.
- 4. Applying Filters:** Another objective was to gain a deeper understanding of how filters work in Power BI. The task involved filtering tweets not just by engagement rate but also by likes, word count, and day of the week. Learning to apply these filters in an intuitive and user-friendly manner was critical.

Activities and Tasks

The activities for this task were divided into multiple stages, each requiring a specific set of actions and considerations. The first task was data cleaning and preparation. I had to filter out tweets that did not meet the specified conditions—those with fewer than 50 likes and those posted on weekends. This helped narrow down the dataset, making the analysis more focused and meaningful. The tweets also needed to have fewer than 30 words, a condition that required creating a calculated column using DAX to count the number of words per tweet.

The screenshot displays the Power BI interface. The main area shows a table with the following data:

	Tweet	time	ConvertedDate	ConvertedTime	impressions	eng
1	elementum ligula vehicula consequat morbi a ipsum integer a nibh in ...	2020-07-10 13:47 +0000	7/10/2020	7:17:00 PM	156685	
2	justo in hac habitasse platea dictumst etiam faucibus cursus urna ut te...	2020-07-01 00:25 +0000	7/1/2020	5:55:00 AM	9820	
3	bibendum imperdiet nullam orci pede venenatis non sodales sed tinci...	2020-09-25 16:02 +0000	9/25/2020	9:32:00 PM	3833	
4	molestie hendrerit at vulputate vitae nisl aenean lectus pellentesque e...	2020-10-07 11:31 +0000	10/7/2020	5:01:00 PM	4489	

The formula bar at the top shows the DAX formula: `= Table.RenameColumns(#"Added Custom16",({"Custom", "CurrentTime"}))`. The right-hand pane shows the 'Query Settings' for 'Task one', including 'PROPERTIES' and 'APPLIED STEPS'.

Once the dataset was prepared, I moved on to the second task—creating calculated columns and measures. I used DAX to calculate the engagement rate for each tweet, which is the sum of likes and retweets. Then, I ranked the tweets based on their engagement rates and flagged the top 10% with a binary indicator (1 for the top 10%, 0 for the rest).

The third task involved the time-based filtering of the dashboard. This was one of the most complex parts of the task, as I had to ensure that the entire dashboard would only be functional between 1 PM to 4 PM. I created a measure using DAX that compared the system time with the specified time window and returned "Active" or "Inactive" accordingly. The dashboard was set to filter out all data outside of this time window.

Finally, I developed multiple visualizations—a clustered bar chart comparing the engagement rates of the top 10% of tweets with others, a KPI card to highlight the top tweet, a stacked column chart for likes and retweets comparison, and a pie chart to show the proportion of top-performing tweets. Each visualization was customized with the required filters and settings.

Skills and Competencies

This task honed a variety of technical and analytical skills essential for a career in data analytics:

1. **Advanced Power BI Skills:** I deepened my knowledge of Power BI, particularly in creating complex DAX queries and calculated columns. Handling conditions like time-based functionality and multi-level filters improved my ability to work with real-time data and build responsive dashboards.
2. **Data visualization:** Creating visuals that accurately represented the data and met the task's requirements was a significant learning experience. I learned how to choose the appropriate chart type (e.g., clustered bar, pie chart, KPI card) based on the specific insights I wanted to convey.
3. **Time-Based Filtering:** The requirement for the dashboard to function only between 1 PM to 4 PM was a novel challenge. I had to learn how to work with system time data, a skill that is valuable for building dashboards that need to react dynamically to real-time events.
4. **Problem Solving and DAX:** Debugging DAX formula errors and addressing type mismatch issues required patience and problem-solving skills. For instance, handling the type mismatch between text and Boolean values in the CurrentTime measure was a crucial learning moment.
5. **Project Management:** Managing multiple aspects of the dashboard—from data preparation to visualization—taught me how to structure and organize a data analytics task efficiently. I learned how to break down complex requirements into manageable tasks and execute them systematically.

Feedback and Evidence

Since I undertook this task independently, there was no formal feedback provided by a supervisor or mentor. The entire process—from planning to implementation—was self-driven. I encountered several challenges, particularly with the time-based functionality, but through trial and error, I was able to develop effective solutions. This task was a valuable exercise in

self-assessment and problem-solving, as I had to rely on my judgment to determine the effectiveness of the visualizations and the accuracy of the filters.

Despite the lack of external feedback, I took proactive steps to evaluate the success of the task. For instance, I continuously tested the dashboard under various conditions (different times of the day, filtering out tweets, etc.) to ensure all components worked as expected. After several iterations, I implemented a robust solution that dynamically updated the dashboard based on system time and other filtering criteria.

Evidence of my work includes the completed Power BI file, which features fully functional filters, time-based constraints, and accurate visualizations. I also captured screenshots at various times during the day to demonstrate how the dashboard transitioned between "Active" and "Inactive" states based on system time. Through this process, I gained valuable hands-on experience, further improving my technical proficiency in Power BI and data analytics.

Challenges and Solutions

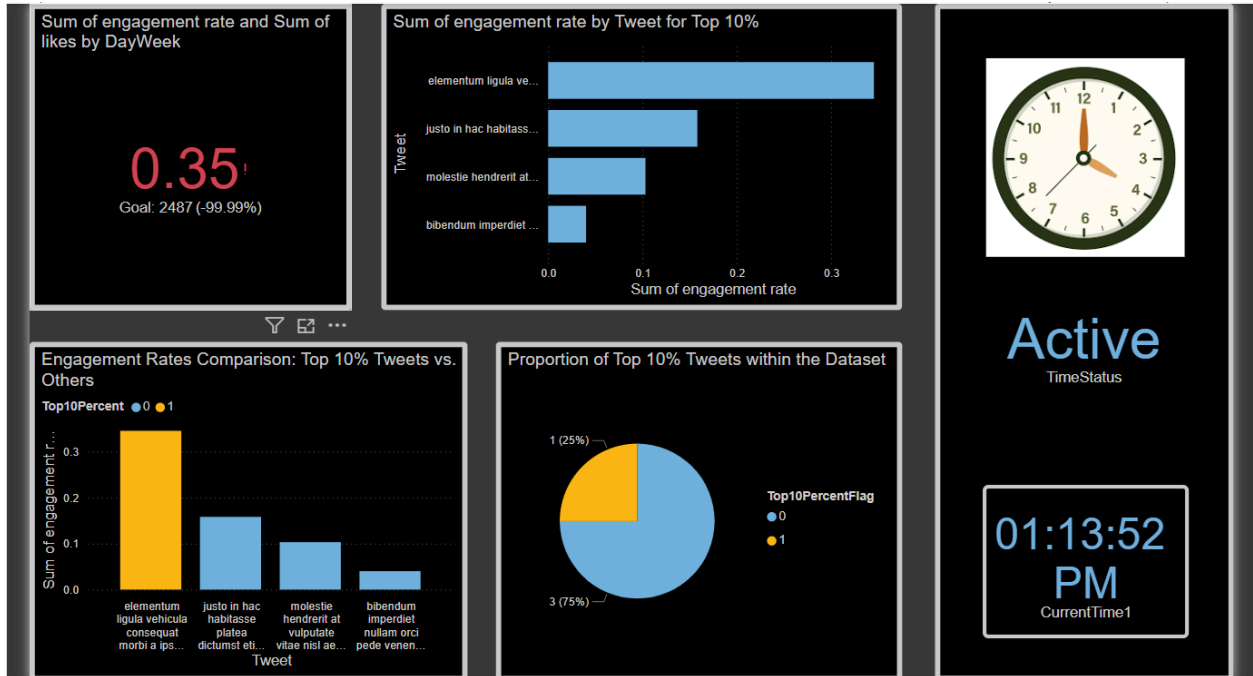
The primary challenge I faced was implementing the dashboard's time-based restriction, where it needed to function only between 1 PM and 4 PM. Handling system time within Power BI and making it dynamically control the entire dashboard's functionality was a complex task. Initially, I faced issues where the time-based filter was either not updating correctly or applying inconsistently across visuals. The solution was to create a DAX measure (TimeStatus) that checked the system's local time and returned either "Active" or "Inactive". This value was then used to control the dashboard's functionality through page-level filters.

Another challenge was dealing with DAX formula errors, particularly type mismatches when comparing text and Boolean values. The error occurred while comparing the CurrentTime column with Boolean values, which was resolved using the FORMAT() function. Additionally, ensuring that the entire dataset was filtered correctly (e.g., excluding weekends, filtering by likes, and word count) required careful application of DAX filters.

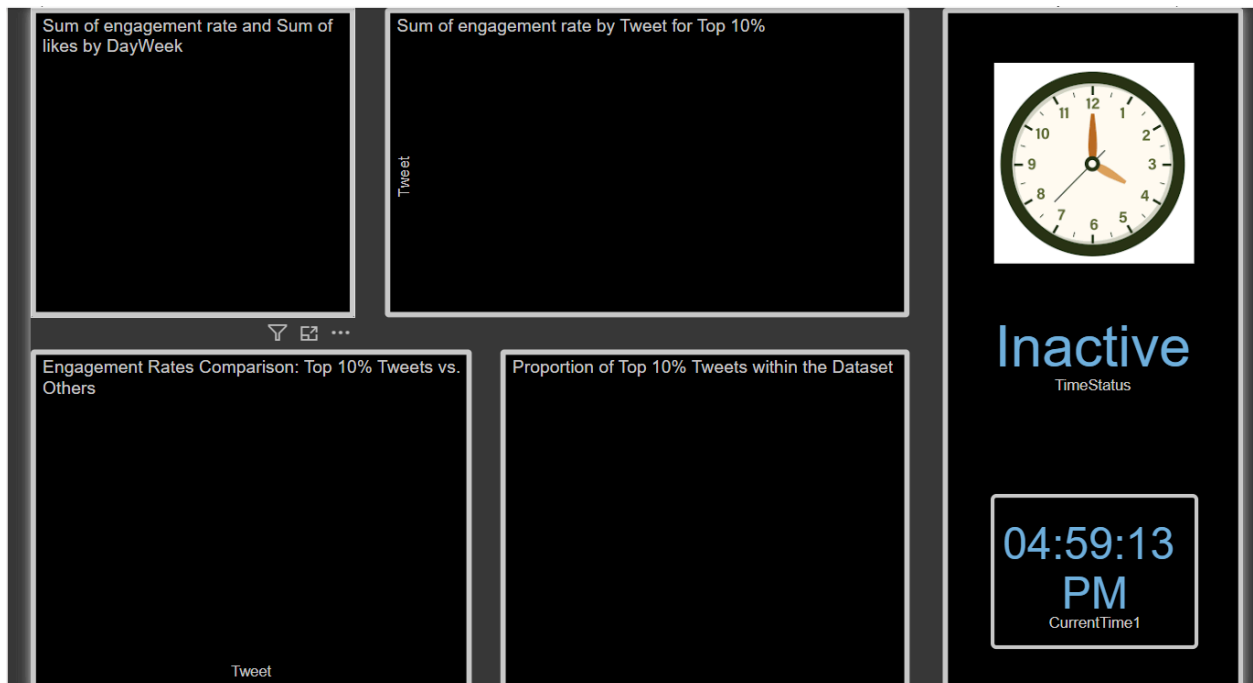
Finally, visualizing the data with minimal records (four rows) while maintaining clarity and insight was a challenge. I had to carefully choose chart types that could present the limited data effectively without losing the overall narrative.

Outcomes and Impact

The task was highly successful in achieving the desired outcome. The final Power BI dashboard accurately displayed the top 10% of tweets based on engagement rates and met all filtering criteria, including the time-based restriction. The dashboard also provided clear and concise insights through various visualizations, such as the clustered bar chart comparing engagement rates and the pie chart showing the proportion of the top 10% of tweets. These insights could be valuable for social media managers looking to track tweet performance and adjust their strategies based on engagement metrics. By incorporating filters for tweets posted on weekdays, receiving more than 50 likes, and having a word count below 30, the dashboard ensured that only the most relevant tweets were analyzed, providing actionable insights for optimization.



One of the key outcomes was the ability to visualize tweet performance so that users can interact with it in real-time, which significantly impacts decision-making. For example, a social media manager can monitor live engagement between 1 PM and 4 PM and make quick adjustments to content strategy.



The dashboard is dynamically updated to reflect the system time, working only between 1 PM and 4 PM. This functionality added a unique, real-time element to the task, making it more interactive and tailored to the user's needs.

The impact of this task extends beyond just a simple visualization; it helps in refining content strategies by identifying which tweets are driving the most engagement. Time-based interactivity adds further value as it allows users to focus on critical periods for social media engagement. In the long term, such a dashboard can aid in enhancing content creation strategies and improving overall social media performance by highlighting patterns of user interaction and tweet effectiveness.

Conclusion

This internship task has been a pivotal learning experience in my data analytics journey. Developing the Power BI dashboard with real-time constraints and complex filtering criteria provided me with practical insights into data visualization and DAX. The task of filtering tweets to display only those with the highest engagement rates, incorporating time-based functionality, and using various chart types allowed me to apply theoretical knowledge to real-world scenarios effectively. By creating visualizations like KPI cards, clustered bar charts, and pie charts, I not only enhanced my technical skills but also improved my ability to communicate insights clearly and concisely. The experience of handling time-based filters and dynamic data updates has equipped me with valuable problem-solving abilities and a deeper understanding of user-centric dashboard design. Overall, this task has significantly strengthened my analytical capabilities and prepared me for future challenges in the data analytics field, contributing to my professional growth and career readiness.