

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
“Jnana Sangama”, Belgaum-590014, KARNATAKA, INDIA



An Internship Report on

Build Real-Time Twitter Analytics Dashboard

*An internship report submitted in partial fulfillment of the requirements for the award of the degree of **Bachelor of Engineering in Computer Science and Engineering – AIML** of Visvesvaraya Technological University, Belgaum.*

Submitted by:

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Under the Guidance of:

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2024-2025

Department of Computer Science and Engineering



CERTIFICATE

Certified that the internship report entitled **“Build Real-Time Twitter Analytics Dashboard”** carried out by **Indrajith Nair (1AM21CI018)**, Bonafide student of AMC Engineering College in partial fulfillment for the award of Bachelor of Technology in Computer Science and Engineering with Artificial Intelligence and Machine Learning of the Visvesvaraya Technological University, Belgaum during the year 2024-25. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the Report. The internship report has been approved as it satisfies the academic requirements in respect of Internship work prescribed for the said degree.

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DECLARATION

I, **Indrajith Nair**, a student of 8th semester Department of Computer Science and Engineering – AIML, AMC Engineering College, declare that my internship work entitled “Build Real-Time Twitter Analytics Dashboard” is a Bonafide work of mine. My internship project is neither a copy nor by means a modification of any other engineering project. I also declare that this project was not entitled for submission to any other university in the past and shall remain the only submission made and will not be submitted by us to any other university in the future.

NAME

USN

SIGNATURE

Indrajith Nair

1AM21CI018

ACKNOWLEDGMENTS

I have a great pleasure in expressing my deep sense of gratitude to founder **Chairman Dr. K.R. Paramahamsa** and **Executive Vice President Mr. Rahul Kalluri** for having provided me with a great infrastructure and well-furnished labs for successful completion of my internship.

I express my special thanks and gratitude to our Academic Advisor **Dr. Nagaraja R** for providing me with all the necessary advice for successful completion of my internship.

I express my sincere thanks and gratitude to our Principal **Dr. Yuvaraju B N** for providing me with all the necessary support successful completion of my internship.

I would like to extend my special thanks to **Dr. Nandeewar SB** Professor and HOD, Department of CSE-AIML, for his support and encouragement and suggestions given to me in the course of the internship.

I would like to extend my special thanks to Internship coordinator **L Sreenivasa Perumal**, Professor, Department of CSE-AIML, for his support and encouragement and suggestions given to us in the course of my internship.

I would like to thank my internship guide **Mr. Sasank** for helping and guiding me throughout the internship period.

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Last but not the least, I wish to thank all the teaching and non-teaching staffs of department of Computer Science and Engineering, for their support, patience and endurance shown during the preparation of this internship report.

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OFFER LETTER

NULLCLASS

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February 24, 2025

Dear Indrajith Nair,

We are pleased to offer you the opportunity to join NullClass as an **Data Analyst Intern**
24-02-2025 to 24-06-2025 (4 Months)

This offer is conditional upon Annexure A: Terms and Conditions attached below . Upon fulfilling the internship criteria, you will embark on a journey of professional growth and real-world experience with us

Congratulations!



Vetriselvan G.,

CEO



ABSTRACT

This internship report presents the work and outcomes of a project titled "**Build Real-Time Twitter Analytics Dashboard**", carried out as part of the Data Analyst internship at **NullClass**. The objective of this project was to transform raw Twitter data into meaningful insights using **Power BI**, enabling real-time monitoring and analysis of tweet-level metrics. The dataset used in this project included various attributes such as tweet impressions, engagements, likes, retweets, replies, link clicks, media views, and timestamps. The internship focused on designing and implementing a series of dynamic and interactive dashboards that allowed users to filter and analyze data based on specific time periods, tweet content, engagement types, and performance metrics.

Key deliverables involved the creation of visualizations to track engagement rates over time, identify high-performing tweets, analyze interaction patterns, and compare impressions with actual engagement. The project also included building custom DAX measures to derive insights, applying advanced filters for comparative analysis, and enhancing user interactivity through slicers and conditional formatting.

The results of the project demonstrate how business intelligence tools can be leveraged for effective social media monitoring. The developed dashboard provides a comprehensive view of tweet performance, aiding in strategic decision-making for content optimization and audience engagement.

This internship significantly enhanced my skills in data analytics, Power BI, and real-world data interpretation, while contributing to a practical, industry-relevant solution for social media analytics.

CONTENTS

CERTIFICATE	i
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
OFFER LETTER	iv
ABSTRACT	vi
1 COMPANY PROFILE	1
1.1 Introduction	1
1.2 Mission	1
1.3 Vision	2
1.4 Services	3
1.4.1 Executive Summary	3
1.4.2 Virtual Internship	3
1.4.3 Project Based Learning Models.	3
1.4.4 Conclusion	4
1.5 Software Technologies	4
2 ABOUT COMPANY DEPARTMENT	5
2.1 Overview of Department	5
2.2 Organizational Structure	5
3 TASKS PERFORMED	6
3.1 Work Schedule	6
3.2 Introduction	7
3.3 System Requirements	7
3.3.1 Functional Requirements	7
3.3.2 Non-Functional Requirements	8
3.3.3 Hardware and Software Requirements	8
3.4 System Design	9
3.4.1 Data Collection and Import	9
3.4.2 Data Cleaning and Preprocessing	10
3.4.3 Data Modelling	12

3.4.4	Dashboard Design and Interaction	12
3.5	Implementation.....	12
3.5.1	Data Import and Preprocessing	13
3.5.2	Data Modeling and Relationship.....	13
3.5.3	Creation of Calculation Measures	13
3.5.4	Visual Design and Layout.....	14
3.5.5	Adding Filters and Interactions.....	14
3.6	Platform.....	14
3.6.1	Programming Language	14
3.6.2	Library and Tools	14
4	RESULTS	15
4.1	Categorization of Events	15
4.2	Observation and Findings	16
4.3	Final Outcomes	16
	BIBLIOGRAPHY	18

LIST OF FIGURES

Fig. No.	Title	Page No.
3.1	Data Fetched from Raw Excel Sheet.....	10
3.2	Cleaned Data(1)	11
3.3	Cleaned Data(2)	11
3.4	DAX Measure creation for time filter	14
4.1	Visualization Plane with filtered Data and field selection	15
4.2	Dashboard showing KPI card, Bar Chart and Pie Chart	16
4.3	Twitter Analysis dash board-Final output	17
4.4	Twitter Analysis dash board Internship Final Output	17

LIST OF TABLES

Table No.	Title	Page No.
3.1	Work Schedule.....	6
3.2	Hardware and Software Requirements.....	9

CHAPTER 1

COMPANY PROFILE

1.1 Introduction

NullClass is a forward-thinking ed-tech startup that aims to bridge the gap between academic knowledge and industry requirements through project-based experiential learning. Established with the vision of making learning more application-oriented, NullClass empowers students and early professionals by providing them with real-time, hands-on exposure to trending technologies such as Data Analytics, Machine Learning, Web Development, and Cybersecurity.

Operating through a robust online platform, NullClass offers internships and project-based learning opportunities curated by industry experts. Their unique model allows learners to build real-world projects while being mentored remotely, making them job-ready and confident to take on practical challenges in their chosen tech domains.

1.2 Mission

The mission of NullClass is to **transform passive learning into active doing**. By focusing on experiential learning through internships and live projects, the company aims to:

- Help students get practical experience in emerging technologies.
- Provide industry relevant training that complements academic learning.
- Foster a growth mindset by encouraging students to innovate , experiment, and implement .

NullClass believes in creating a generation of tech professionals who are not just certified, but **skilled, confident, and work-ready**.

1.3 Vision

NullClass envisions a future where **every student can learn through real-world experience**, regardless of their academic background or geographical limitations. The company is committed to **democratizing practical tech education** by making experiential learning accessible, affordable, and impactful for all learners.

Key elements of NullClass's vision include:

- **Skill-First Education:** Moving away from traditional rote learning to focus on building practical skills that matter in the industry.
- **Global Reach:** Becoming a preferred internship and learning platform for students not only in India but across the globe.
- **Industry Integration:** Collaborating closely with tech companies to ensure that the projects reflect **current trends and demands** in the job market.
- **Empowering Innovation:** Encouraging students to explore new ideas, take ownership of real projects, and gain confidence through trial-and-error learning.
- **Continuous Growth:** Constantly evolving its curriculum, tools, and mentorship offerings to keep pace with emerging technologies and student feedback.

Through this, NullClass strives to be **more than a learning platform**—a launchpad for the innovators and professionals of tomorrow.

1.4 Services

1.4.1 Executive Summary

In today's rapidly evolving technology landscape, **practical skills and real-time project experience** have become more essential than ever for aspiring professionals. Recognizing this critical need, **NullClass** has emerged as a leading ed-tech platform offering **virtual internships and project-based learning** opportunities to bridge the gap between theoretical knowledge and industry expectations.

NullClass addresses the common challenge faced by students—**lack of hands-on exposure**—by providing curated internship experiences that replicate real-world working environments. These experiences are structured to be **task-driven, mentor-guided, and skill-focused**, ensuring learners not only grasp concepts but also know how to apply them in practical settings.

The company offers internships in **Data Analytics, AI/ML, Web and App Development, Cybersecurity, Cloud Computing**, and more. Each internship is designed with **weekly deliverables, real datasets, live support**, and performance evaluation metrics. This ensures that learners develop confidence, critical thinking skills, and technical fluency, all of which are key to excelling in today's competitive job market.

NullClass also leverages tools like **Slack, GitHub, Google Meet**, and cloud-based platforms to mimic industry workflows, giving students a clear picture of what it's like to work in tech teams. Their unique approach to **learning-by-doing** has helped thousands of learners build portfolios, gain practical insights, and step confidently into their careers.

In summary, NullClass is not just an internship provider—it's a **career accelerator** that empowers learners through real-world exposure, personalized mentorship, and a commitment to transforming education into action.

1.4.2 Virtual Internships

NullClass provides students with the opportunity to work on real-world industry projects from the comfort of their homes. These internships are:

- **Domain-Specific:** Internships are offered in fields like Data Analytics, Artificial Intelligence, Web Development, Mobile App Development, Cybersecurity, and Cloud Computing.
- **Time-Bound:** Typically span over 4 to 6 weeks with weekly deliverables and evaluation.
- **Mentored:** Students receive feedback and support from assigned mentors via Slack or Google Meet.
- **Certified:** Interns are awarded an Internship Completion Certificate and, in some cases, a Letter of Recommendation based on performance.

1.4.3 Project-Based Learning Modules

These modules are designed to simulate real corporate tasks. Each module includes:

- **Defined Problem Statements:** Learners are given real-world problems and scenarios, like building dashboards, developing websites, or implementing machine learning algorithms.
- **Tech Stack Exposure:** Students get hands-on experience with tools and platforms like **Power BI, Python, TensorFlow, SQL, React, Node.js**, etc.

- **Step-by-Step Guidance:** Learners are provided documentation, tutorials, and milestone goals to help them progress efficiently.
- **Outcome-Based Evaluation:** Each learner's output is assessed based on completion, accuracy, and application of concepts.

1.4.4 Conclusion

NullClass is redefining how students and early professionals gain real-world experience by integrating learning with doing. With its focused approach on **project-based internships, personalized mentorship, and industry-relevant training**, the platform serves as a powerful bridge between academia and the demands of the tech industry.

Through its dynamic ecosystem, NullClass empowers learners to **apply theoretical knowledge to practical scenarios**, build a strong portfolio, and emerge as confident, job-ready professionals. The company's commitment to innovation, accessibility, and learner success positions it as a **pioneer in experiential tech education**.

In essence, NullClass is more than a learning platform—it is a launchpad for students to explore, build, and grow into the future tech leaders of tomorrow.

1.5 Software Technologies

NullClass adopts a diverse and modern tech stack to facilitate experiential learning and real-world project development for students. The platform emphasizes hands-on exposure to both foundational and cutting-edge technologies across various domains. These tools and platforms ensure that students not only learn concepts but also apply them in practical, scalable, and industry-standard environments.

Some of the key technologies used and taught at NullClass include:

- i. Programming Languages:** Python, JavaScript, Java, SQL, HTML, CSS
- ii. Data Analysis & Visualization:** Power BI, Microsoft Excel, Tableau, Google Data Studio
- iii. Web Development Frameworks:** React.js, Node.js, Express.js, Django
- iv. Database Management:** MySQL, MongoDB, Firebase, PostgreSQL
- v. Cloud Platforms:** Google Cloud Platform, AWS Educate, Firebase Hosting
- vi. DevOps & Version Control Tools:** Git, GitHub, GitLab, Docker (for advanced DevOps exposure)
- vii. Artificial Intelligence & Machine Learning:** Scikit-learn, TensorFlow, Pandas, NumPy, Matplotlib
- viii. Big Data Technologies:** Apache Spark, Hadoop (conceptual exposure in data handling)
- ix. Dashboarding & Business Intelligence:** Power BI, Google Looker Studio, DAX

CHAPTER 2

ABOUT COMPANY DEPARTMENT

2.1 Overview of Department

The **Data Analytics Department** at **NullClass** plays a pivotal role in delivering practical, project-based learning experiences that mirror real-world data handling, analysis, and visualization workflows. This department is responsible for guiding students through internships that emphasize **data-driven decision-making**, **business intelligence tools**, and **hands-on dashboard development**.

The department ensures that interns receive a structured learning path, including:

- Exposure to real-world datasets such as **Twitter metrics**, **e-commerce data**, or **IoT logs**
- Weekly deliverables that simulate actual industry projects
- One-on-one mentorship and feedback
- Usage of tools like **Power BI**, **Excel**, and **SQL** for practical training

The department aims to cultivate analytical thinking, storytelling through data, and proficiency in industry-relevant tools—essential for careers in data analysis, business intelligence, and data science.

2.2 Organizational Structure

The department follows a flat and collaborative structure that encourages communication and learning. The core roles involved in the internship experience include:

Data Science Mentor / Analytics Lead : Guides interns in understanding project goals, task breakdown, and best practices in data modeling and visualization.

Internship Coordinator : Manages the overall workflow, reviews progress, assigns deliverables, and serves as a point of contact between interns and NullClass management.

Technical Support Team : Assists with setup issues, dataset accessibility, tool installation, and resolving technical roadblocks during project execution.

Interns / Data Analyst Interns : Learners like myself, responsible for completing assigned tasks, building dashboards, generating insights, and participating in reviews and learning sessions.

CHAPTER 3

TASKS PERFORMED

3.1 Work Schedule

To ensure the systematic execution of the “Twitter Analytics Dashboard” project, a detailed work schedule has been designed. This schedule spans four months and divides the tasks into weekly milestones, each focusing on specific aspects of the project. The structured plan allows for efficient resource allocation, progress tracking, and milestone validation.

In Table 3.1, the work schedule is provided, outlining the timeline, weekly tasks, and corresponding milestones. This serves as a roadmap to achieve the project objectives in a timely and organized manner.

Table 3.1 Work Schedule

Month	Week	Task
Month 1	Week 1	Orientation, dataset overview, and Power BI setup
Month 1	Week 2	Explored tweet data structure and metrics
Month 1	Week 3	Cleaned dataset using Excel and Power Query
Month 1	Week 4	Imported data into Power BI and created initial visuals
Month 2	Week 1	Added slicers for tweet type and date filtering
Month 2	Week 2	Created DAX measures for engagement rate and CTR
Month 2	Week 3	Designed visuals for top tweets and impressions
Month 2	Week 4	Implemented interaction features and visual formatting
Month 3	Week 1	Analyzed engagement trends and time-based metrics
Month 3	Week 2	Created comparison visuals (likes vs replies, etc.)
Month 3	Week 3	Enhanced visuals with conditional formatting
Month 3	Week 4	Added tooltips, titles, and improved UX

Continued on next page

Table 3.1 – *Continued from previous page*

Month	Week	Task
Month 4	Week 1	Finalized dashboard layout and visual flow
Month 4	Week 2	Derived insights and observations from dashboard
Month 4	Week 3	Prepared final Power BI file and project documentation
Month 4	Week 4	Submitted project and completed internship report

3.2 Introduction

The internship project titled "**Twitter Analytics Dashboard**" aimed to build a real-time, interactive dashboard to analyse and visualize tweet-level performance data using **Power BI**. The primary objective was to convert raw Twitter data into meaningful insights through dynamic visualizations, calculated metrics, and user-friendly report navigation.

The project involved working with a dataset containing key performance indicators such as **impressions, engagements, likes, replies, retweets, link clicks, media views**, and multiple timestamp columns. These metrics were used to evaluate user interaction and content effectiveness across different tweet types and time periods.

The focus of the project was not just on visualizing data but also on **interpreting trends, monitoring engagement performance**, and helping users **understand audience behavior** based on content and timing. By the end of the internship, a comprehensive and well-structured dashboard was created, offering clear insights to support data-driven decisions in social media strategy.

3.3 System Requirements

The system requirements for the "Twitter Analytics Dashboard" project are divided into functional and non-functional categories. These requirements ensure that the solution meets the objectives effectively and operates seamlessly under various conditions.

3.3.1 Functional Requirements

- The system must load and display tweet data dynamically in Power BI.
- Users should be able to filter data by **date, tweet type, and engagement metrics**.
- The dashboard must display key KPIs like **engagement rate, CTR, top tweets, and trend lines**.

3.3.2 Non-Functional Requirements

- The dashboard must be **responsive** and handle medium-sized datasets efficiently.
- Data visualizations should be **interactive** and update seamlessly with slicer changes.
- The system must ensure **clarity, consistency, and ease of navigation**.
- All metrics should be **accurate**, calculated using **DAX** formulas.inputs.
- The report file should be **exportable** and **shareable** without data loss.

3.3.3 Hardware and Software Requirements

To successfully implement the **Twitter Analytics Dashboard** project, it is essential to define the **hardware and software resources** required for **development, testing, analysis, and final dashboard deployment**. These requirements ensure the system is capable of handling moderately large datasets, performing calculations using DAX, creating responsive visuals, and rendering insights efficiently in real time.

The **hardware requirements** are selected to guarantee smooth performance while using Power BI Desktop, Microsoft Excel, and data-processing tools. Adequate **processing power, RAM, and disk space** ensure the system can handle multiple report pages, data model relationships, and visuals without lag.

The **software requirements** specify the essential tools used for data loading, transformation, analysis, visualization, and communication with mentors. These tools also support the overall workflow of the internship, from the **initial dataset understanding** to **final dashboard presentation** and **project documentation**.

In Table 3.2, the detailed hardware and software requirements are provided to ensure the project's technical feasibility and smooth operation.

Table 3.2 Hardware and Software Requirements

Component	Specification
Processor	Minimum Dual-Core (i5 or equivalent)
Memory (RAM)	8 GB or higher
Storage	256 GB HDD/SSD with MS Office installed
Operating System	Windows 10 or higher
Software Tools	Power BI Desktop, Microsoft Excel
Internet	Stable internet connection for data download and mentor support

3.4 System Design

The system design outlines the architecture and workflow to achieve the goals of the “Twitter Analytics Dashboard” project. This design follows a modular and scalable approach, ensuring smooth integration and future extendability. Below is the breakdown of the design components:

3.4.1 Data Collection and Import

The dataset provided by NullClass contained tweet-level data with metrics like:

- Impressions
- Engagements
- Likes
- Retweets
- Replies
- Link Clicks
- Media Views
- Tweet Timestamps (date and time columns)

This data was initially explored and preprocessed using **Microsoft Excel**, and later imported into **Power BI Desktop** for visualization

Build Real-Time Twitter Analytics Dashboard

AutoSave

Off

File

Home

Insert

Page Layout

Formulas

Data

Review

View

Developer

Help

Sharing

Calibri

11

</

Figure 3.1 Data Fetched from raw Excel sheet

3.4.2 Data Cleaning and Preprocessing

Once the raw data is fetched, it needs to be cleaned and structured to make it suitable for processing and classification. Data cleaning is critical in removing irrelevant information and retaining only what is needed for event recognition. Data cleaning was performed using both **Excel** and **Power Query Editor** in Power BI. Tasks included:

- Removing unnecessary columns
- Converting timestamp fields into readable date/time formats
- Handling null or missing values
- Renaming columns for clarity
- Filtering out test or invalid entries

Build Real-Time Twitter Analytics Dashboard

File Home Help Table tools Column tools

Name: Tweet Format: Text Summarization: Don't summarize Data category: Uncategorized

Structure: Formatting: Properties: Sort by column: Sort Data groups: Manage relationships: New column: Calculations

Tweet	time	impressions	engagements	engagement rate	retweets	replies	likes	user profile clicks	url clicks	hashtag clicks	detail expands
euismod scelerisque quam ti	2020-06-30 17:14 +0000	184	2	0.010869565	0	0	2	0	0	0	0
aenean lectus pellentesque e	2020-06-30 13:55 +0000	301	3	0.009966777	0	1	2	0	0	0	0
sed accumsan felis ut at dolo	2020-06-30 12:13 +0000	528	0	0	0	0	0	0	0	0	0
nulla ultrices aliquet maecen	2020-06-30 10:51 +0000	77	2	0.025974026	0	1	1	0	0	0	0
penatibus et magnis dis parti	2020-06-30 09:42 +0000	63	1	0.015873016	0	1	0	0	0	0	0
donec odio justo sollicitudin	2020-06-30 09:41 +0000	50	0	0	0	0	0	0	0	0	0
proin interdum mauris non li	2020-06-30 09:39 +0000	104	2	0.019230769	0	0	2	0	0	0	0
nam dui proin leo odio portti	2020-06-30 09:00 +0000	65	5	0.076923077	0	2	3	0	0	0	0
velit nec nisi vulputate nonur	2020-06-29 18:55 +0000	542	0	0	0	0	0	0	0	0	0
quis augue luctus tincidunt n	2020-06-29 17:54 +0000	502	0	0	0	0	0	0	0	0	0
posuere cubilia curae nulla d	2020-06-29 17:54 +0000	250	1	0.004	0	0	1	0	0	0	0
venenatis tristique fusce con	2020-06-29 17:52 +0000	486	0	0	0	0	0	0	0	0	0
odio condimentum id luctus	2020-06-29 13:46 +0000	234	2	0.008547009	0	1	1	0	0	0	0
posuere cubilia curae nulla d	2020-06-28 20:55 +0000	153	2	0.013071895	0	1	1	0	0	0	0
quis turpis eget elit sodales	2020-06-28 15:44 +0000	257	1	0.003891051	0	0	1	0	0	0	0
vivamus metus arcu adipiscing	2020-06-27 15:32 +0000	5	0	0	0	0	0	0	0	0	0
dis parturient montes nascet	2020-06-27 14:16 +0000	22	2	0.090909091	0	0	2	0	0	0	0
vulputate nonummy maecen	2020-06-26 21:43 +0000	551	1	0.001814882	0	0	1	0	0	0	0
sapien arcu sed augue aliqu	2020-06-24 19:51 +0000	28	0	0	0	0	0	0	0	0	0
scelerisque mauris sit amet e	2020-06-24 17:14 +0000	676	0	0	0	0	0	0	0	0	0
feugiat et eros vestibulum ac	2020-06-24 15:02 +0000	870	3	0.003448276	0	1	2	0	0	0	0
consectetur adipiscing elit p	2020-06-23 17:23 +0000	206	2	0.009708738	0	1	1	0	0	0	0
phasellus id sapien in sapien	2020-06-22 18:03 +0000	91	1	0.010989011	0	0	1	0	0	0	0
massa id lobortis convallis to	2020-06-22 18:01 +0000	206	0	0	0	0	0	0	0	0	0
sit amet consectetur adipisc	2020-06-22 13:52 +0000	166	1	0.006024096	0	0	1	0	0	0	0
nulla suscipit ligula in lacus	2020-06-19 17:48 +0000	366	0	0	0	0	0	0	0	0	0
integer ac neque duis bibenc	2020-06-19 16:24 +0000	34	1	0.029411765	0	0	1	0	0	0	0

Figure 3.2 Cleaned Data(1)

File Home Help Table tools Column tools

Name: IsEvenDate Format: Whole number Summarization: Sum Data category: Uncategorized

Structure: Formatting: Properties: Sort by column: Sort Data groups: Manage relationships: New column: Calculations

1 IsEvenDate = IF(MOD(SocialMedia[Day], 2) = 0, 1, 0)

media views	media	Year	Month	Day	Quarter	Month	Day	Convert	Convert	Hour	Total	Work	Show	IsEven	IsOd	High	Twes	Total	IsEvenDate
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	22:44:00	22	2	26	0	1	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	19:25:00	19	2	28	0	0	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	17:43:00	17	0	31	0	1	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	16:21:00	16	1	19	0	0	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	15:12:00	15	0	25	0	0	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	15:11:00	15	0	31	0	1	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	15:09:00	15	2	20	0	1	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	14:30:00	14	3	18	0	0	0	Normal	None	0	1
0	0	2020	6	30	Q2	June	Tuesday	30 June 20:	00:25:00	0	0	26	0	1	0	Normal	None	0	1
0	0	2020	6	29	Q2	June	Monday	29 June 20:	23:24:00	23	0	16	0	1	1	Normal	None	0	0
0	0	2020	6	29	Q2	June	Monday	29 June 20:	23:24:00	23	1	24	0	1	1	Normal	None	0	0
0	0	2020	6	29	Q2	June	Monday	29 June 20:	23:22:00	23	0	20	0	1	1	Normal	None	0	0
0	0	2020	6	29	Q2	June	Monday	29 June 20:	19:16:00	19	1	19	0	1	1	Normal	None	0	0
0	0	2020	6	29	Q2	June	Monday	29 June 20:	02:25:00	2	1	30	0	0	1	Normal	None	0	0
0	0	2020	6	28	Q2	June	Sunday	28 June 20:	21:14:00	21	1	23	0	0	0	Normal	None	0	1
0	0	2020	6	27	Q2	June	Saturday	27 June 20:	21:02:00	21	0	23	0	0	1	Normal	None	0	0
0	0	2020	6	27	Q2	June	Saturday	27 June 20:	19:46:00	19	2	20	0	1	1	Normal	None	0	0
0	0	2020	6	27	Q2	June	Saturday	27 June 20:	03:13:00	3	1	18	0	0	1	Normal	None	0	0
0	0	2020	6	25	Q2	June	Thursday	25 June 20:	01:21:00	1	0	25	0	1	1	Normal	None	0	0
0	0	2020	6	24	Q2	June	Wednes	24 June 20:	22:44:00	22	0	16	0	1	0	Normal	None	0	1
0	0	2020	6	24	Q2	June	Wednes	24 June 20:	20:32:00	20	2	24	0	1	0	Normal	None	0	1
0	0	2020	6	23	Q2	June	Tuesday	23 June 20:	22:53:00	22	1	17	0	1	1	Normal	None	0	0
0	0	2020	6	22	Q2	June	Monday	22 June 20:	23:33:00	23	1	29	0	0	0	Normal	None	0	1
0	0	2020	6	22	Q2	June	Monday	22 June 20:	23:31:00	23	0	30	0	1	0	Normal	None	0	1
0	0	2020	6	22	Q2	June	Monday	22 June 20:	19:22:00	19	1	26	0	1	0	Normal	None	0	1
0	0	2020	6	19	Q2	June	Friday	19 June 20:	23:18:00	23	0	20	0	1	1	Normal	None	0	0
0	0	2020	6	19	Q2	June	Friday	19 June 20:	21:54:00	21	1	23	0	1	1	Normal	None	0	0

Figure 3.3 Cleaned Date(2)

3.4.3 Data Modeling

Relationships between various columns were defined, and data types were correctly assigned. Some key calculated columns and DAX measures were created, such as:

- Engagement Rate = Engagements / Impressions
- Click Through Rate (CTR) = Link Clicks / Impressions
- Total Interactions = Likes + Replies + Retweets + Clicks

This stage enabled advanced analytical capabilities in the dashboard.

3.4.4 Dashboard Design and Interactivity

The dashboard was thoughtfully designed using Power BI to present tweet-level insights in a clean, intuitive, and visually appealing format. It included a set of **KPI cards** highlighting total impressions, engagements, likes, retweets, replies, and CTR (Click-Through Rate). A variety of visualizations such as **bar charts, line graphs, pie charts, and area plots** were used to show trends over time, performance by tweet types, and comparisons between engagement metrics. Special sections like **Top Performing Tweets** showcased the most impactful tweets based on engagement rate and impressions, while **time-based visuals** helped track daily or weekly trends. The layout was structured to maintain readability, consistent color coding, and a logical flow of insights from overview to detailed analysis.

To enhance user experience, **Power BI's interactivity features** were implemented, including slicers for tweet type, date range, and engagement metric filters. This allowed users to **dynamically explore** the data and gain specific insights based on their selection. **Hover tooltips** were added to each chart and visual, offering additional context such as tweet content and detailed interaction stats. The dashboard's interactive elements made it highly responsive.

3.5 Implementation

The implementation phase involved systematically building the Twitter Analytics Dashboard in **Power BI**, transforming raw tweet data into interactive and insightful visualizations. The process was executed in a step-by-step manner, covering data import, modeling, calculation, design, testing, and delivery.

3.5.1 Data Import and Preprocessing

The cleaned dataset, initially processed in Microsoft Excel, was imported into Power BI Desktop. This dataset included multiple tweet-level metrics such as impressions, engagements, link clicks, media views, retweets, replies, and likes. The Power Query Editor was used for additional transformations such as renaming columns, converting timestamp formats, and filtering unnecessary data to ensure consistency and usability within the data model.

3.5.2 Data Modeling and Relationships

Once the data was imported, the next step was to establish a well-defined data model. Each column was assigned an appropriate data type, and unnecessary relationships or duplicated data columns were removed. **Single-table modeling** was used as the dataset was flat, eliminating the need for complex relationship mapping. This streamlined the dashboard performance and simplified metric creation.

3.5.3 Creation of Calculated Measures

To derive actionable insights, several DAX (Data Analysis Expressions) measures were created. These included:

- Engagement Rate = Engagements / Impressions
- Click Through Rate (CTR) = Link Clicks / Impressions
- Total Interactions = Likes + Replies + Retweets + Link Clicks

These measures formed the core of analytical insights and were used across multiple visuals to track content performance.

```
1 TimeFilterForEngagement =  
2 VAR CurrentHour = HOUR(NOW())  
3 RETURN  
4     IF(  
5         (CurrentHour >= 7 && CurrentHour <= 11) || (CurrentHour >= 12 && CurrentHour <= 18),  
6         1,  
7         0  
8     )  
9
```

Figure 3.4 DAX Measure created for time filter

3.5.4 Visual Design and Layout

The dashboard layout was designed to be both user-friendly and aesthetically appealing. The top section displayed high-level KPIs such as Total Impressions, Engagements, CTR, and Top Tweets. Below this, a variety of charts and visuals were used to represent performance trends, tweet type comparisons, and daily/weekly engagement breakdowns. Clear headings, icons, and consistent color coding were maintained to enhance user comprehension.

3.5.5 Adding Filters and Interactivity

To enhance the analytical experience, slicers and filters were implemented. Users could filter the data by tweet type, specific date ranges, or interaction metric. These slicers made the dashboard highly interactive and allowed users to deep-dive into any specific aspect of the data. Tooltips were enabled to provide contextual data on hover, making the visual interactive.

3.6 Platform

The Twitter Analytics Dashboard project was built using Power BI Desktop, supported by Microsoft Excel and collaboration tools like Slack and Google Meet. These platforms ensured smooth data handling, visualization, and communication throughout the internship.

3.6.1 Programming Language:

- DAX (Data Analysis Expressions): Used for creating measures and KPIs such as Engagement Rate and CTR.

3.6.2 Library and Tools

- Power BI Desktop – Dashboard creation and visualization
- Microsoft Excel – Data cleaning and formatting
- Power Query Editor – Data transformation within Power BI
- DAX – Creating dynamic calculated measures

CHAPTER 4

RESULTS

The final outcome of the Twitter Analytics Dashboard project was a fully functional, visually engaging, and interactive Power BI report. The dashboard successfully transformed raw Twitter data into actionable insights that could help assess tweet performance, user engagement trends, and content effectiveness over time.

4.1 Categorization of Events

The final Power BI dashboard provided a **visually rich and interactive platform** to explore tweet performance using real-time metrics. At the top of the report, **KPI cards** highlighted key figures such as total impressions, total engagements, likes, retweets, replies, engagement rate, and click-through rate (CTR). Slicers were added to the side panel, enabling users to filter the data by **tweet type**, **time period**, and **specific interaction metrics**, making the dashboard highly interactive. Conditional formatting, tooltips, and consistent layout styling enhanced the overall user experience and made insight extraction both intuitive and efficient.

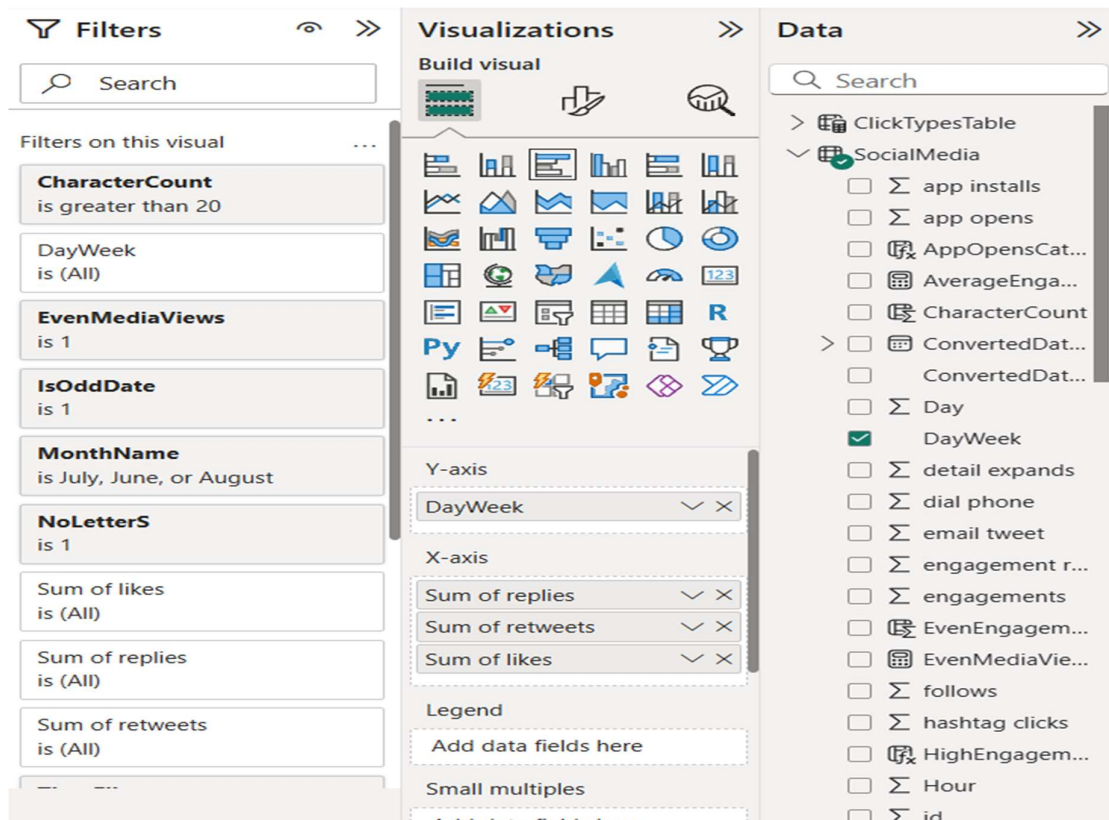


Figure 4.1 Visualization Pane with Filtered Data and Field Selections in Power BI

4.2 Observations and Findings

The insights derived from the dashboard revealed several patterns in tweet engagement behavior. Tweets that contained **media elements** such as images or videos consistently received higher engagement rates compared to plain text tweets, indicating the importance of visual content. **Engagement activity** was observed to peak during **evening hours and weekends**, suggesting an optimal posting window for maximizing visibility. A small subset of tweets generated the majority of total impressions and interactions, highlighting the presence of **high-impact content** that resonated well with the audience. Among all interaction types, **likes and retweets** were the most dominant, while **link clicks and replies** were relatively lower, indicating a preference for quick engagement over deeper interactions. Additionally, the **Click Through Rate (CTR)** was found to be highly dependent on tweet structure, especially the placement and context of embedded links.

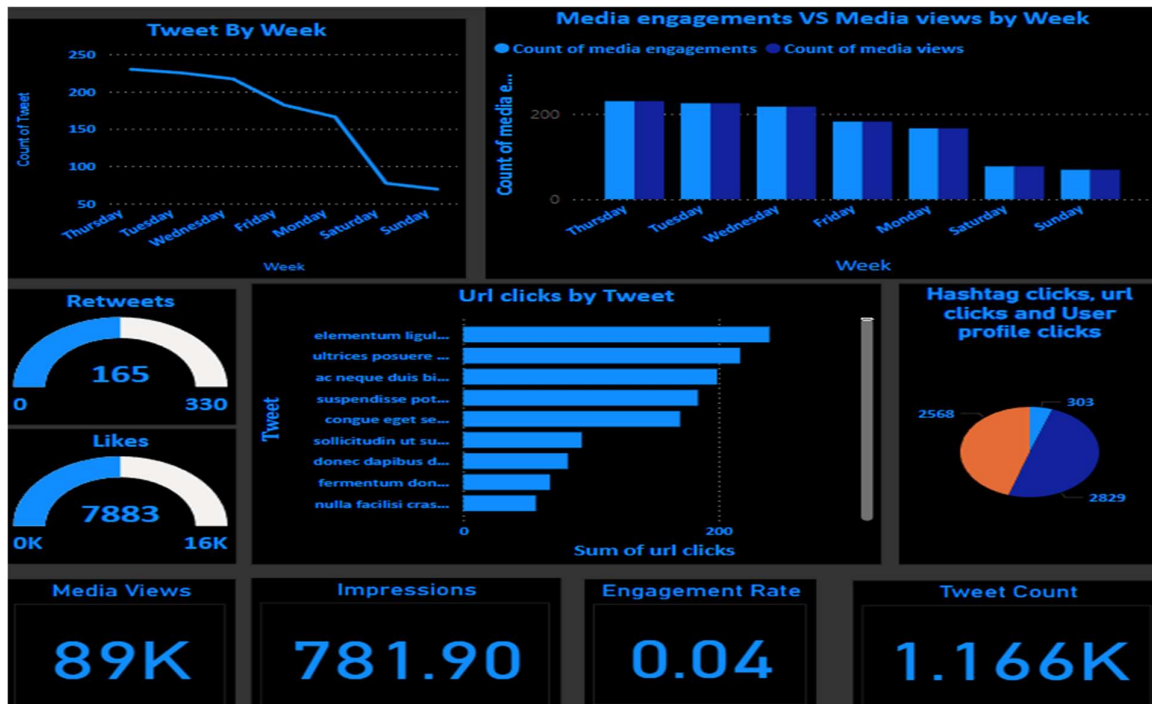


Figure 4.2 Dashboard showing KPI card , bar charts and pie carts

4.3 Final Outcome

The final deliverable of the training project was a fully interactive Power BI dashboard titled "*Twitter Analytics Dashboard*." It was submitted in .pbix format and evaluated by mentors for its clarity, visual impact, and user interactivity. The dashboard showcases key metrics such as tweet count, impressions, engagement rate, likes, retweets, media views, and link clicks—broken down by day of the week for deeper behavioral insight.

Build Real-Time Twitter Analytics Dashboard

Various visualizations like bar charts, line graphs, pie charts, and KPIs were used to present real-time insights effectively. A supporting document was also submitted, summarizing the derived insights and offering a visual walkthrough of the dashboard's components, thereby demonstrating practical proficiency in DAX calculations and storytelling through data.



Figure 4.3 Twitter Analytics Dashboard – Final Output of the Training Project



Figure 4.4 Twitter Analytics Dashboard – Final Output of the Training Project

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