

# Social Media Analysis Report - Instagram & Facebook Performance

[Project Link](#)

## Executive Summary

This project analyses **impressions** across Instagram and Facebook, turning raw social media data into **actionable insights** using **Power BI** and **Python**.

The goal was simple: **figure out what actually drives engagement**, and help creators and marketing teams make smarter, data-backed decisions about **what to post, when to post, and who to target**.

## Instagram – Data Transformation Summary

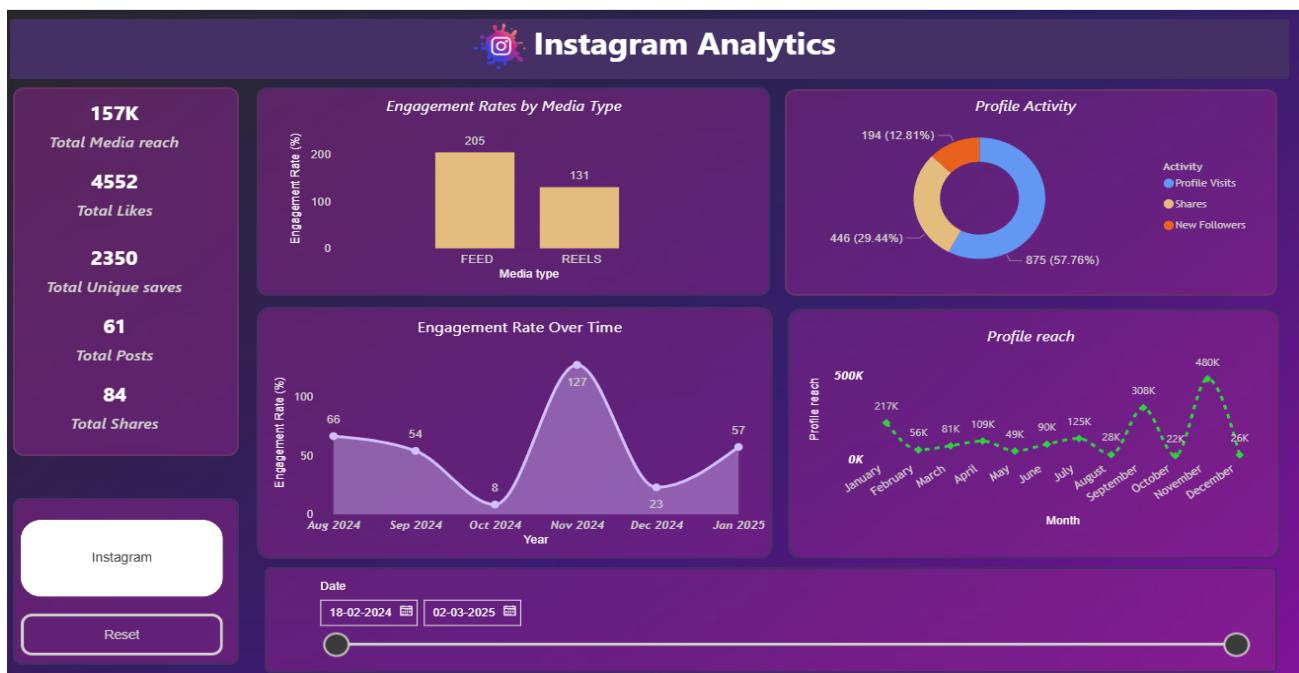
- Converted date and numeric columns to **proper types** to accurately represent the data.
- Removed null and invalid records.
- Created a custom **Profile Activity** table for breakdown visuals.
- Built **DAX measures** for **engagement, post type interaction, and trends**.
- Set up a **1-to-many relationship (single-directional)** between **Profile Overview** and **Post Engagement** via the Date column for slicer filtering.

## Feature Engineering

- Engagement Rate** -  $(\text{Likes} + \text{Comments} + \text{Shares} + \text{Saves}) \div \text{Reach} \times 100$
- Interaction Rate** -  $(\text{Total Reactions} + \text{Comments} + \text{Shares}) \div \text{Post Impressions} \times 100$
- Save Rate** - Unique Saves  $\div$  Reach
- Activity Score** - Profile Impressions + Shares + Engagement + Profile Visits + Reach + Reel Shares + New Followers
- Time-based features** - year, month, weekday.

These features allow performance to be evaluated in relative terms rather than raw volume.

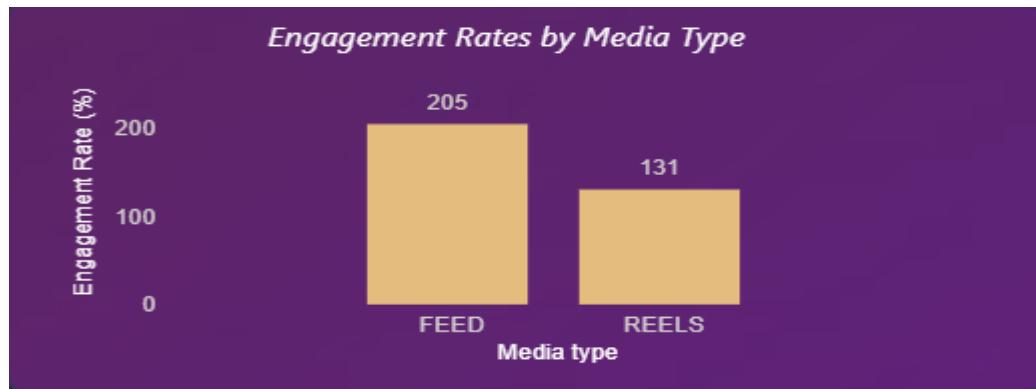
## Instagram Dashboard Insights



## *Instagram Performance Highlights*

- **Total Media Reach:** 157K | **Total Posts:** 61
- **Total Likes:** 4,552 | **Total Shares:** 84 | **Total Saves:** 2,350
- **Average Engagement Rate:** 5.5%

## *Engagement by Post Type*



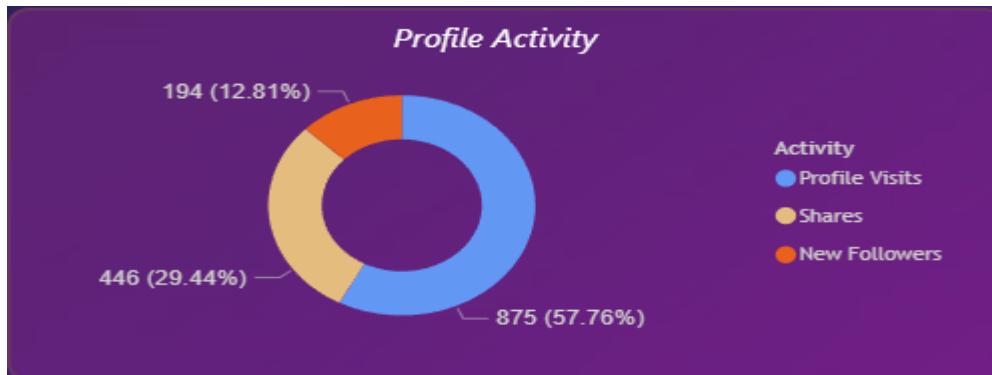
- Static Feed posts tend to have **higher average engagement (205)** compared to reels (131) which suggests that **text-based visuals** resonate better with the audience.

## *Engagement Over Time*



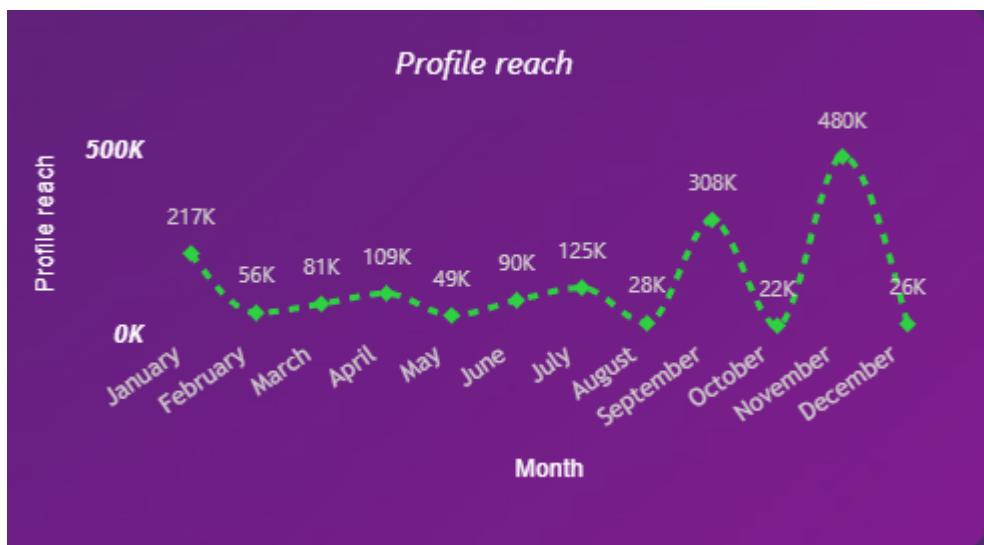
- The highest engagement spike occurred in **November 2024 (127%)** indicating a possible viral post or highly resonant campaign.
- In contrast engagement dipped to its lowest in **October 2024 (8%) and December 2024 (23%)** signalling either reduced audience activity or underperforming content.

## Profile Activity Breakdown



- Profile Visits form the majority of interactions (**57.76%**), followed by shares (**29.44%**) and clicking follow (**12.81%**)
- This indicated that the **content presented is good at sparking curiosity** but could be further enhanced to boost conversion into followers.

## Follower & Reach Trends



- Profile reach fluctuated moderately between months but showed an **upward trend between August and November, 2024** with a **peak in October**.

## Facebook – Data Transformation Summary

- Standardized data types for reach, engagement, reactions and dates.
- Removed null and invalid records.
- Created a custom Interaction Type table to enable donut chart breakdowns.
- Built DAX measures for Net Likes per Day, Interaction Rate and Growth Metrics.
- Enabled a date slicer for dynamic time-based filtering across visuals.

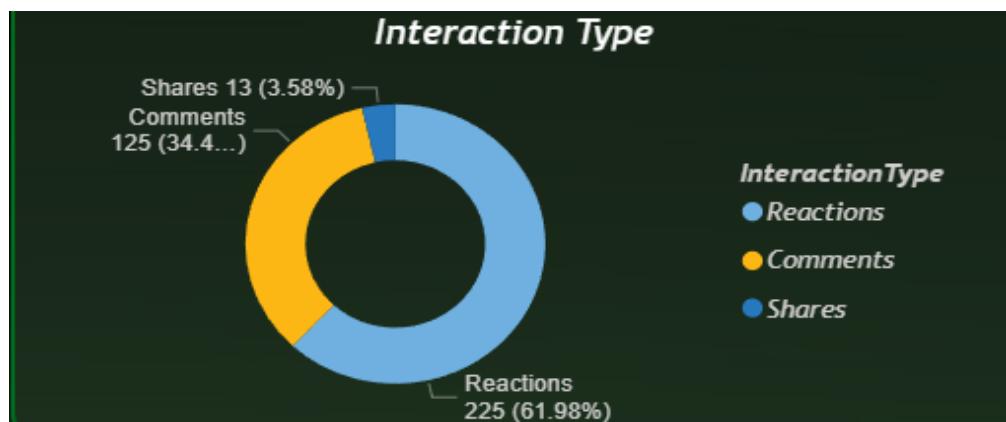
# Facebook Dashboard Insights



## Facebook Performance Highlights

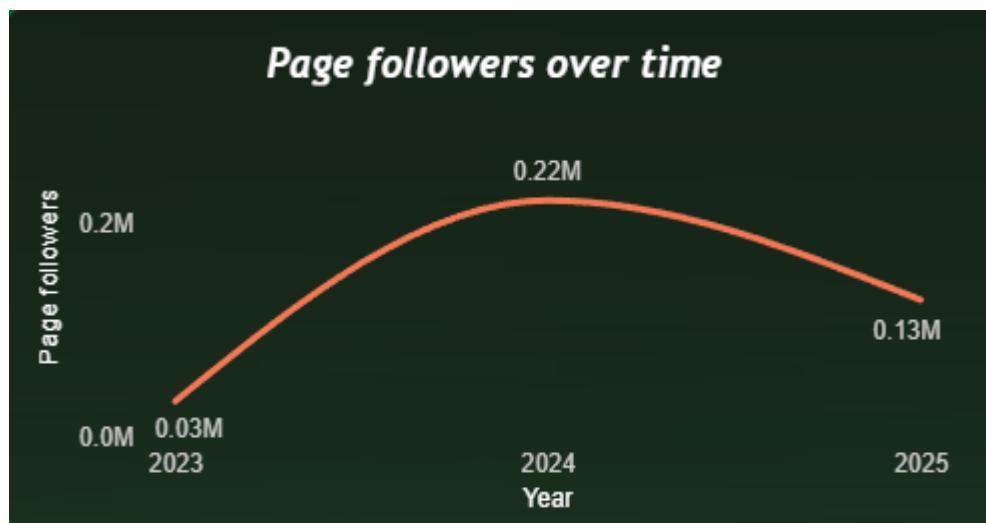
- Total Page Followers:** 384K | **Total Profile Reach:** 2M | **Total Post Reactions:** 225
- Total Likes:** 328K | **Average Engagement Rate:** 3.96%
- Average Net Likes per Day:** 2.86 | **Average Post Interaction Rate:** 1.44%

## Interaction Breakdown



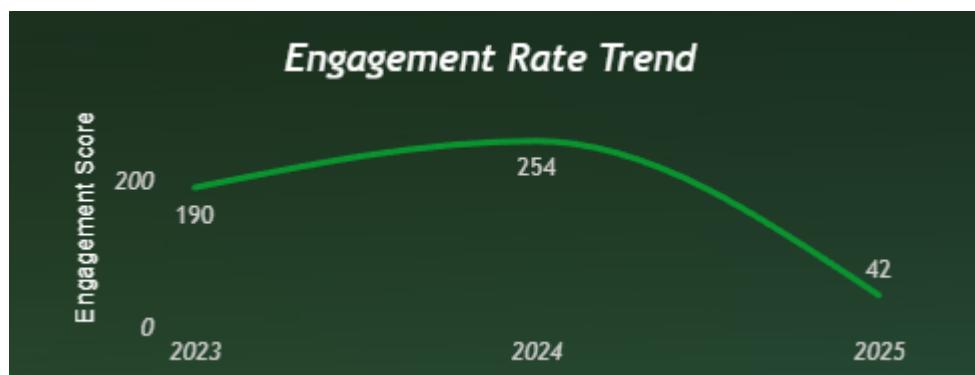
- The vast majority of interaction in the profile come from **Reactions (61.98%)**, followed by **Comments (34.44%)**, and **Shares (3.58%)**.
- This indicates the content is accepted among followers, but the content could be further enhanced to produce a stronger call to action which would drive up the shares.

## *Followers Over Time*



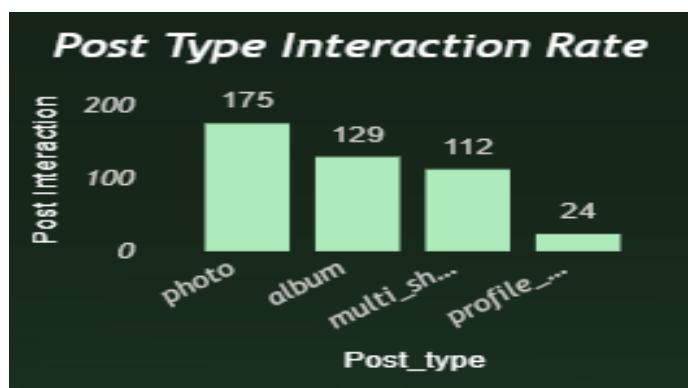
- Follower growth peaked at **0.22M** in 2024 coming in from 2023 (**0.03M**), but saw a slight dip in early 2024.
- This could be due to either **Algorithmic changes, seasonal audience behaviour or just inconsistent content push.**

## *Engagement Trend*



- There is a peak at **254** in 2024, followed by a dip to **42** in 2025. This sharp decline suggests a need for re-evaluation of content strategy.

## *Post Type Performance*



- When comparing the performance of post type, we understand that **photos (175)** perform best, followed by **albums (129)** and **multi-share content (112)**.
- The least engaging types were **video initiatives (1)** and **profile media**.

## Python Analysis Summary

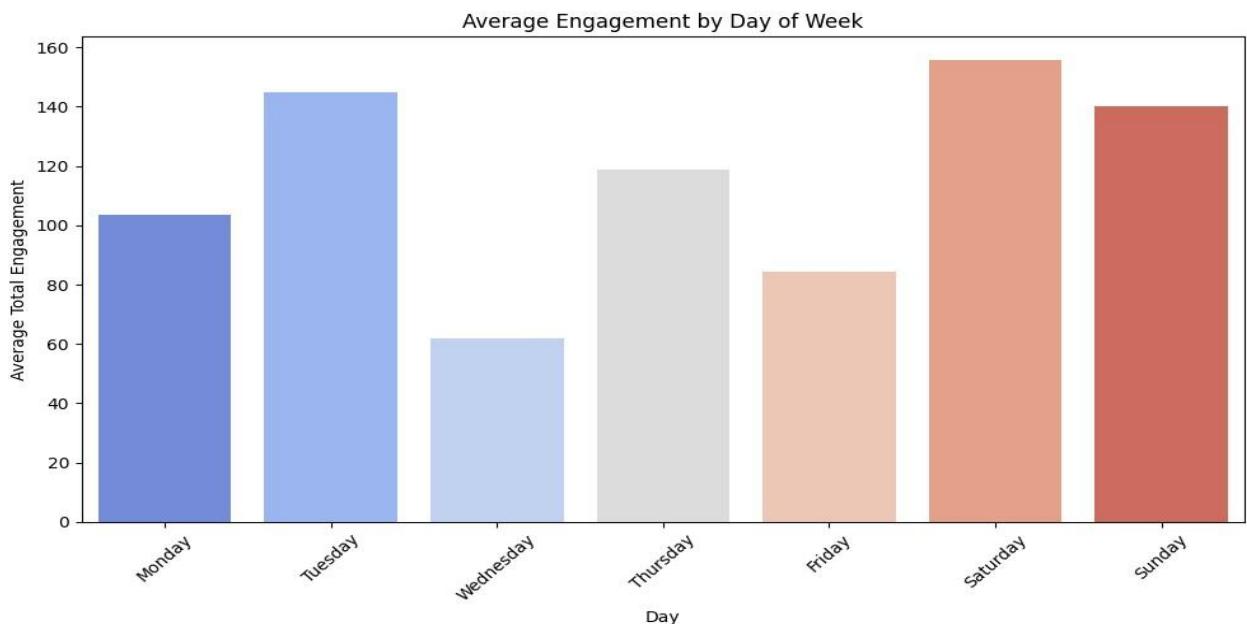
I performed exploratory data analysis using Python (Pandas, Matplotlib, Seaborn) to understand engagement trends across Instagram posts.

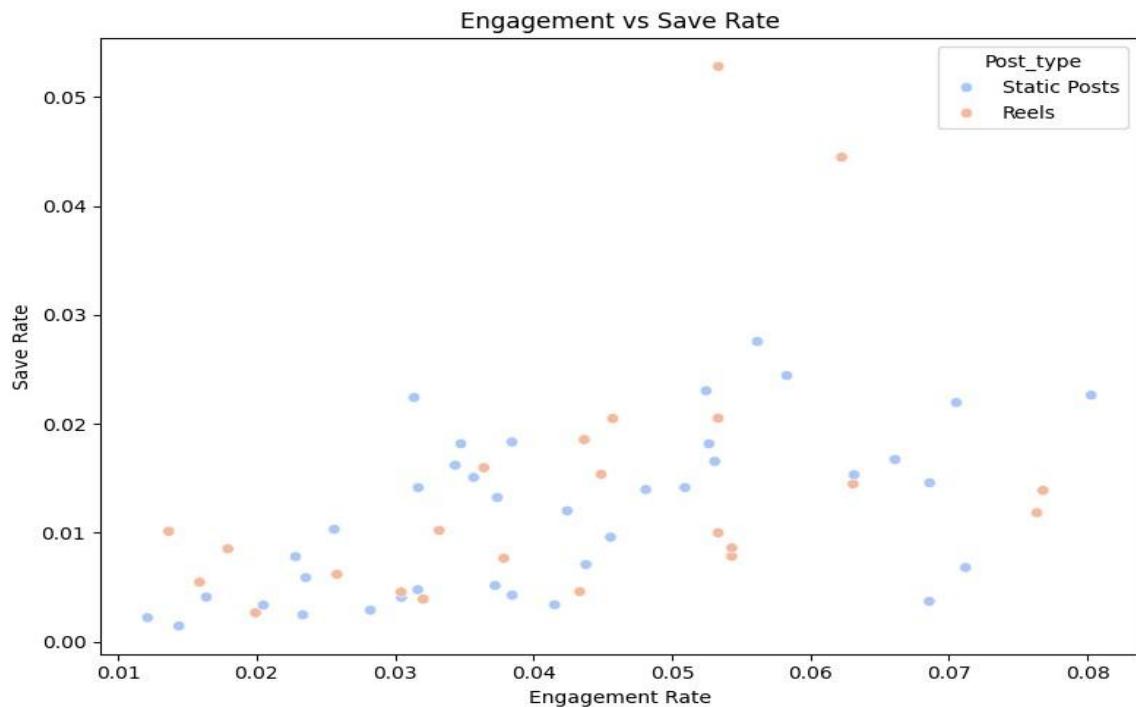
### Data Transformation Steps

- Loaded the Instagram Post Engagement sheet.
- Removed unnecessary columns like RowHash.
- Performed basic data analysis such as (.shape, describe(), .isnull().sum(), value\_counts() etc..)
- Created new columns- (Total\_Engagement: Sum of likes, comments, and shares.), (Engagement\_Rate: Engagement divided by reach.), (Post\_type: Simplified to Static Posts or Reels.), (Save\_Rate: Unique saves divided by reach.)

### Insights Identified

- Average Engagement:** 120 interactions per post.
- Top Performing Post:** A static post on 16 Nov 2024 with 470 engagements.
- Best Days for Engagement:** Saturday and Tuesday showed the highest average engagement across posts.
- Post Format Comparison:** Static Posts outperformed Reels in average engagement.
- Save vs Engagement Correlation:** Moderate positive correlation with static posts showing stronger save rates.





## Impact:

1. **What are some key metrics you would track to measure the performance of Facebook and Instagram posts?**
  - Engagement Rate (likes + comments + shares / reach)
  - Reach and Impressions
  - Saves and Shares
  - Video Views
  - Follower Growth Over Time
2. **How would you determine if an Instagram Reel is performing well?**
  - I would compare engagement rates and save rates to the average across all post types
  - I would also look at video views, reach and shares which would help me gauge if a post has gone viral
  - I would also identify spikes or unusual anomalies to understand their content context.
3. **How would you A/B test different ad creatives on Facebook?**
  - To A/B test ad creatives on Facebook, I would start by randomly splitting the audiences into 2 groups to eliminate bias.
  - Group A would see one version of the Ad (Creative A) and Group B will see the other version (Creative B).
  - I would then monitor Key performance indicators (KPI's) such as click through rate (CTR), Cost per engagement (CPE) and conversion rates across both groups.
  - This data would help me perform statistical tests such as the Student T test with (significance level of  $p = 0.05$ ) to determine if the observed differences in the performance between the two creatives is actually statistically significant and does not happen due to random chance.
  - This Inferential approach helps us make confident, data backed, statistically validated decisions on which creative is more effective before scaling the campaign.

#### **4. What insights can you gain from the provided dataset?**

##### **Instagram Insights:**

- Static Posts Outperform Reels in Engagement
- Engagement spiked in November 2024 (127%)
- Lowest engagement in October (8%) and December (23%)
- High save-to-reach ratio indicates valuable content

##### **Facebook Insights:**

- Page followers remained stable
- Top-performing posts had more shares
- Visual content outperformed text-only posts

#### **5. What additional analyses would you recommend?**

- Best Time to Post- Check which hours and days bring the most engagement to schedule posts more effectively.
- Demographic-Based Engagement Trends- If detailed age or gender data is available, analyze how different groups interact with content.
- Predictive Modelling - Use past post data (like post type, day, reach, etc.) to build a Machine Learning model that can predict which posts might perform well before publishing.

## **Conclusion:**

This project demonstrates how disciplined data analysis can turn social media performance from guesswork into a repeatable decision system. By integrating Power BI dashboards with Python-based exploratory analysis, the project translates millions of impressions and interactions into clear, evidence-backed guidance on content format, posting timing, and audience behaviour across Instagram and Facebook.

More importantly, the analysis moves beyond surface-level metrics to reveal *why* certain posts perform better, identifying actionable patterns such as format effectiveness, engagement volatility, save behaviour and conversion drop-offs. These insights enable marketing teams and content creators to optimize strategy proactively rather than reactively, improving reach quality, engagement efficiency and downstream conversion potential.

Overall, this solution showcases how analytics can directly support marketing strategy by aligning creative decisions with measurable outcomes, while providing a scalable framework that can be extended into A/B testing, predictive modelling, and campaign optimization in real-world business settings