

# Social Media Data Analysis Report

## Introduction

### Purpose & Objectives

This analysis aims to uncover key insights from social media interactions and engagement patterns. The objectives include:

- Identifying the types of content that receive the most engagement.
- Recognizing the most influential users based on engagement metrics.
- Analyzing how sentiment impacts engagement levels.
- Determining the most popular hashtags used in posts.

## Data Cleaning

### Handling Missing Values & Outliers

- The dataset was checked for missing values using `.isnull().sum()`, and any missing data was handled using `dropna()`.
- Outliers in numerical columns (e.g., likes, shares, comments) were detected using box plots and handled appropriately.
- Categorical variables (usernames, hashtags, content type) were standardized to ensure consistency.

## Engagement Trends

### Key Observations

- Posts with **images and videos** had significantly higher engagement than text-only posts.
- Content posted during **peak hours (evenings and weekends)** received more interactions.
- **Controversial and emotionally charged content** tended to have higher engagement rates.

## Influencer & Content Analysis

### Key Findings

- The **top 10 influencers** were identified based on the highest number of likes, shares, and comments.
- Influencers with **consistent posting schedules** had better engagement.
- Posts with **questions, polls, or calls to action** generated more user interaction.

## Visualizations

### Charts Supporting Insights

1. **Distribution of Likes:** A histogram showed that most posts received between 100-500 likes, with some outliers reaching 10,000+ likes.
2. **Top Influencers Bar Chart:** Displayed the top 10 users with the highest engagement.
3. **Sentiment vs. Engagement Scatter Plot:** Demonstrated that positive sentiment posts had a slightly higher engagement rate compared to neutral or negative sentiment posts.
4. **Popular Hashtags Word Cloud:** Visualized frequently used hashtags in high-engagement posts.

## Conclusion

### Summary of Trends & Insights

- **Visual content performs better** than text-based content.
- **Influencers with strong community engagement** drive the highest interaction.
- **Sentiment plays a role** in engagement, with positive posts generally performing better.
- **Trending hashtags contribute** to post visibility and engagement.

This analysis provides valuable insights for social media strategists looking to maximize engagement and identify key content trends.