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Instagram User Engagement Analysis

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About Instagram

- Instagram is a photo and video-sharing social media platform that enables users to interact through likes, comments, follows, and hashtags.
- It supports multiple content formats such as photos, videos, stories, reels, and carousel posts.
- User engagement directly impacts content visibility through Instagram's recommendation algorithm.
- High engagement improves discoverability, creator growth, and platform retention.
- Therefore, analyzing engagement data is critical for understanding user behavior and improving platform strategies.

Project Objectives & Problem Statement

Objectives

- To analyze user activity levels across posts, likes, comments and follows.
- To identify highly engaged users and potential influencers.
- To examine the role of hashtags and content themes in driving engagement.
- To detect inactive users and propose re-engagement strategies.

Problem Statement

- How can SQL-based analysis help identify engagement patterns on Instagram?
- Which users and content characteristics contribute most to platform interaction?

Dataset Overview

Dataset Description

- The dataset consists of seven interconnected tables:
  - Users
  - Photos
  - Likes
  - Comments
  - Follows
  - Tags
  - Photo_Tags
- Each table captures a specific aspect of user interaction.

Significance of Data

- Enables analysis of user behavior at multiple engagement levels.
- Helps understand content popularity, interaction trends, and social connectivity.

Database Schema

Photos

- id (Primary Key)
- user_id (Foreign Key → Users.id)
- image_url
- created_at

Likes

- id (Primary Key)
- user_id (Foreign Key → Users.id)
- photo_id (Foreign Key → Photos.id)
- created_at

Users

- id (Primary Key)
- username
- created_at

Followers

- follower_id (Foreign Key → Users.id)
- followee_id (Foreign Key → Users.id)
- created_at

Comments

- id (Primary Key)
- user_id (Foreign Key → Users.id)
- photo_id (Foreign Key → Photos.id)
- comment_text
- created_at

Data Preparation & Cleaning

- Checked for missing and duplicate records across all tables.
- Verified date columns to ensure accurate time-based analysis.
- Ensured proper primary and foreign key relationships between tables.
- Applied aggregation techniques to avoid duplicate counts during joins.
- Standardized column usage for consistent analysis.

Methodology

Analytical Approach

- SQL JOINs used to combine data from multiple tables.
- Aggregate functions such as COUNT, SUM, and AVG used to calculate engagement metrics.
- Subqueries and CTEs applied for modular and readable queries.
- Date filtering used to analyze recent (last 30 days / 1 month) activity.
- Tools Used
- MySQL
- SQL Workbench

Top Engaged Users Analysis

Analysis

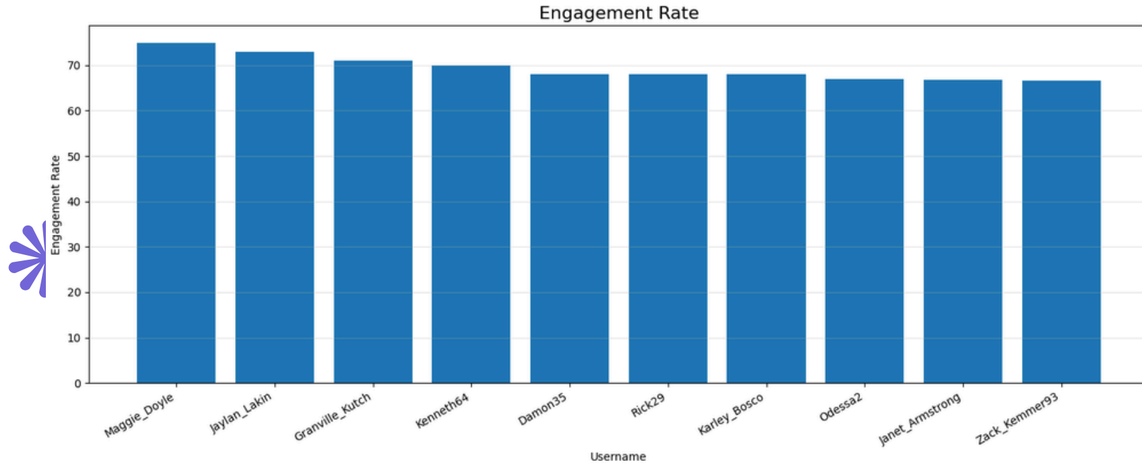
- Calculated engagement rate using likes and comments per post.
- Ranked users based on overall engagement performance.

Insights

- A small group of users contributes disproportionately to engagement.
- These users consistently receive high likes and comments.

Business Use

- Ideal candidates for influencer marketing and brand collaborations.



User Summary

Analysis

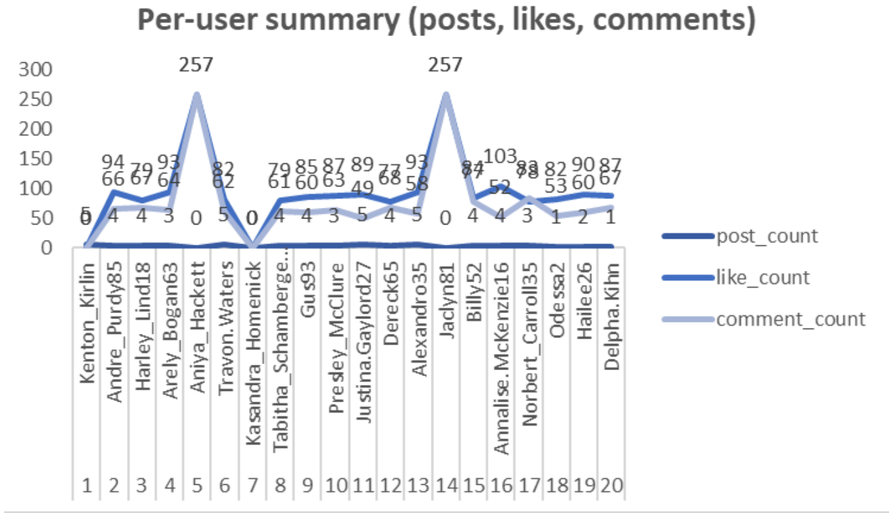
- Post counts are low and fairly consistent across users.
- Likes and comments show higher variation, indicating differences in interaction levels.

Insights

- Engagement is driven more by user interaction than by posting frequency.
- Certain users or content types attract noticeably higher likes and comments.

Business Use

- High-engagement users can be identified for rewards or loyalty programs.
- Insights can guide targeted promotions and features that encourage.



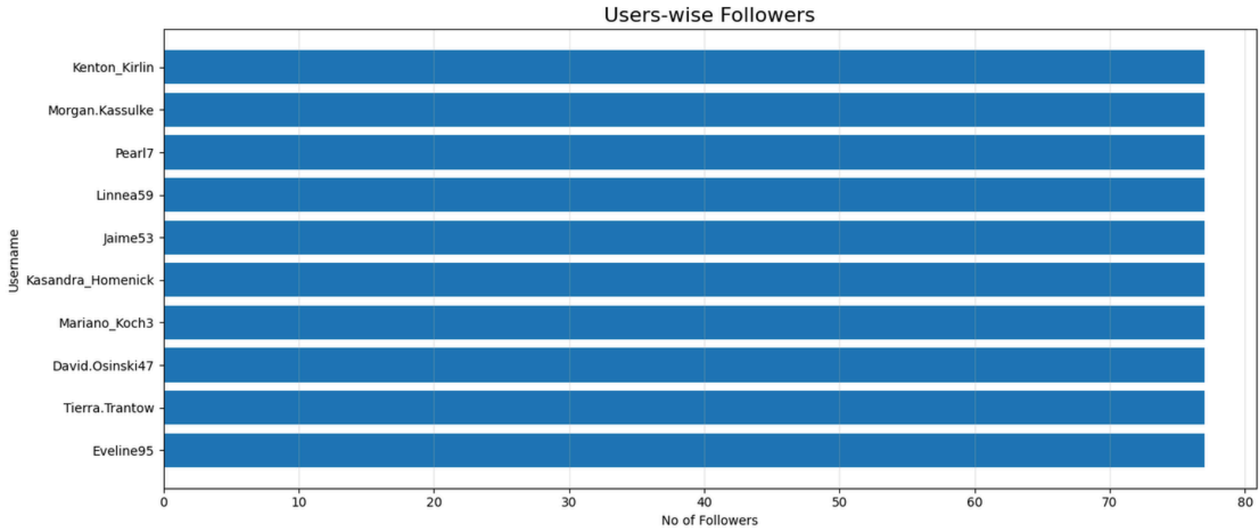
Followers Analysis

Findings

- Users with high engagement generally have higher follower counts.
- Engagement and follower growth show a strong positive relationship.

Impact

- High-follower users amplify content reach organically.
- Brands can leverage such users for promotional campaigns.



Total Users

Analysis

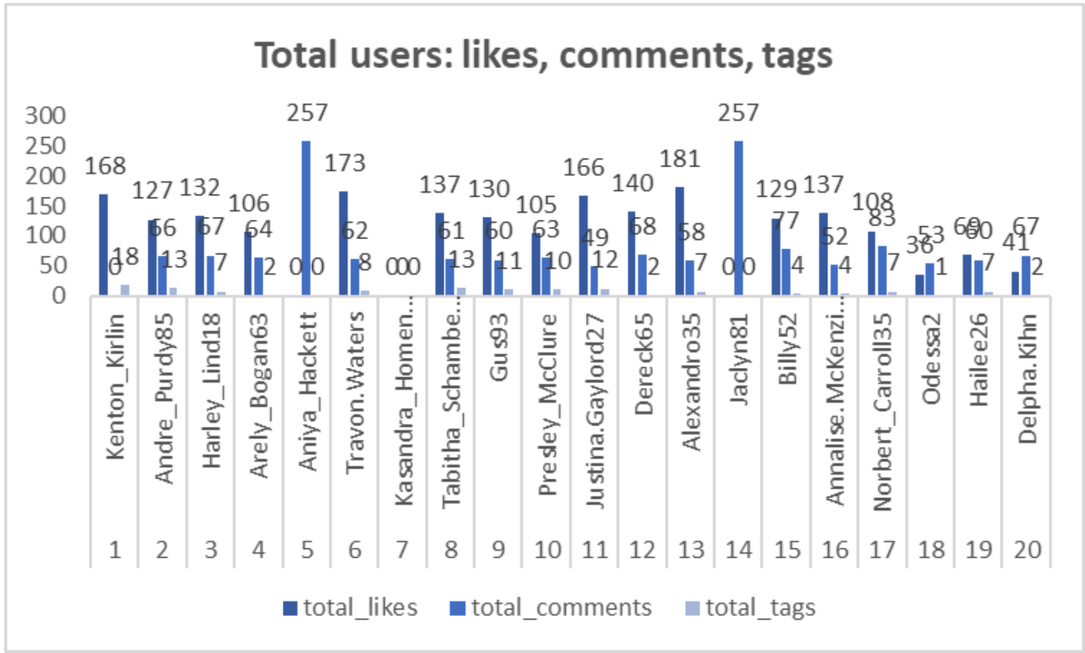
- The chart shows user-wise comparison of likes, comments, and tags.
- Likes and comments dominate overall engagement, while tags remain low.

Insights

- High likes generally align with higher comments.
- Only a few users stand out with consistently high engagement.

Business Use

- Identify top users for rewards or influencer programs.
- Encourage tagging to improve content reach and interaction.



Hashtag Performance Analysis

Key Observations

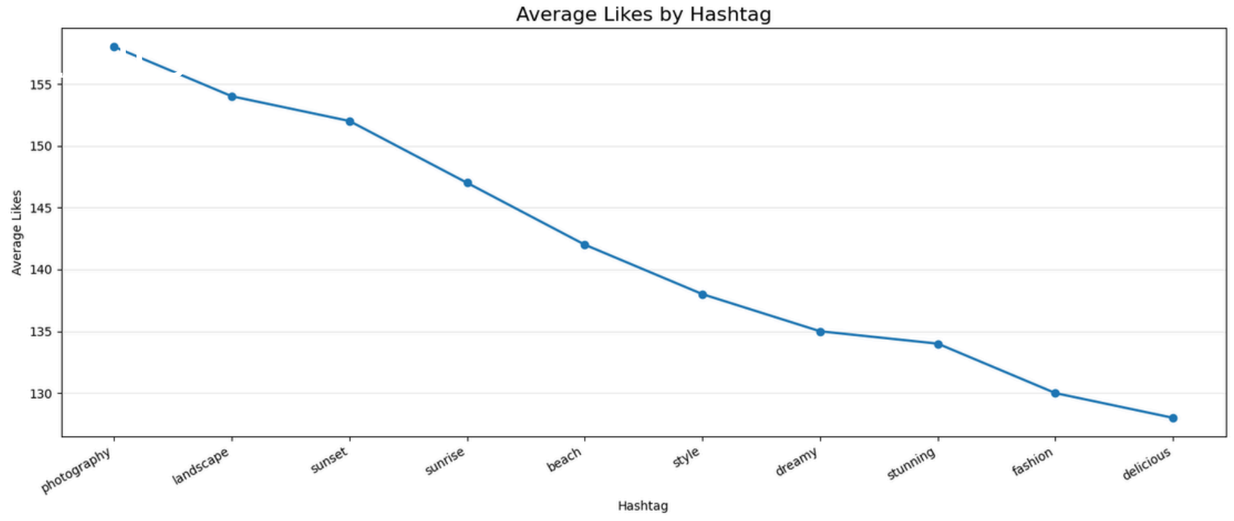
- Certain hashtags generate higher average likes.
- Posts using relevant and popular hashtags perform better.

Insight

- Strategic hashtag usage improves discoverability and interaction.

Application

- Helps creators and marketers choose effective hashtags for campaigns.



Top 5 Hashtags

Analysis

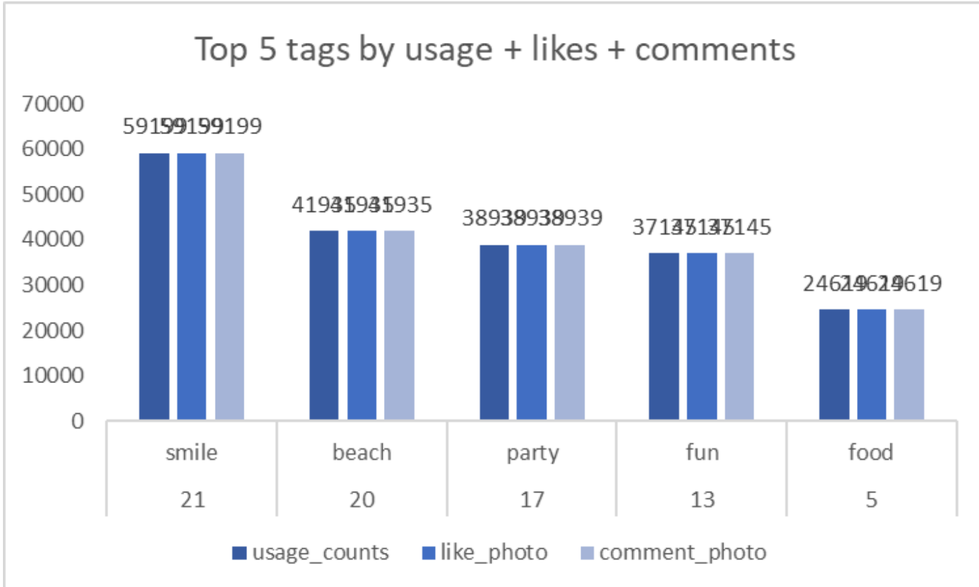
- The chart shows the top 5 tags based on usage, likes, and comments.
- Some tags are used less frequently but still generate high engagement.

Insights

- Tags like smile and beach consistently attract strong likes and comments.
- Engagement is influenced more by tag relevance than sheer usage count.

Business Use

- Promote high-performing tags to increase engagement.
- Use popular tags to guide content strategy and hashtag recommendations.



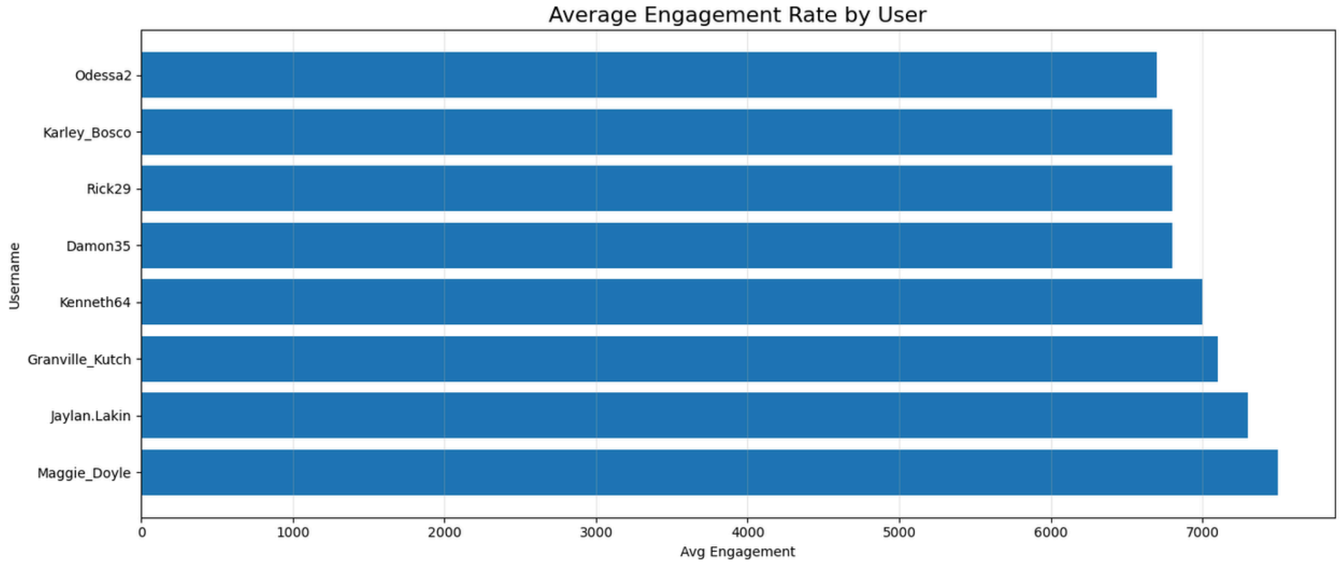
Engagement Timing Analysis

Analysis

- Engagement varies based on posting time and user activity patterns.
- Certain hours show consistently higher interactions.

Conclusion

- Posting during peak engagement hours increases visibility and reach.
- Helps optimize content scheduling strategies.



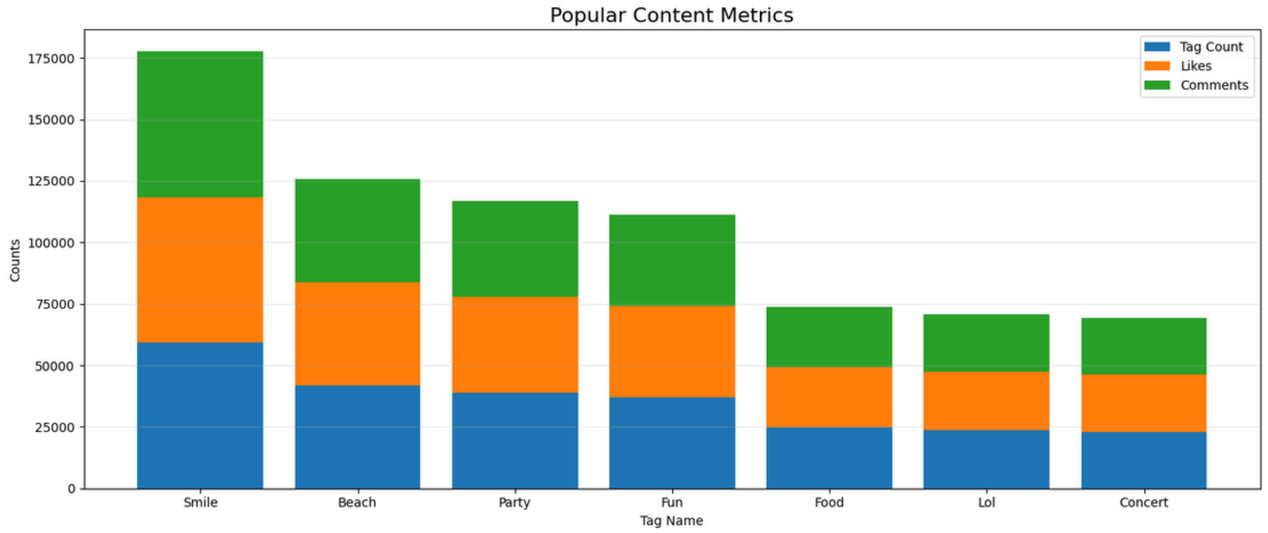
Content Performance Analysis

Findings

- Lifestyle-oriented content attracts higher engagement.
- Posts with better visuals and relevant tags perform best.

Business Value

- Guides content planning for organic posts and advantage
- Helps identify themes that resonate with users.



Inactive Users Analysis

Observation

- Some users show no recent activity in likes, comments, or posts.
- These users reduce overall platform engagement.

Insight

- Inactive users represent an opportunity for re-engagement.
- Identifying them early helps reduce user churn.

user_id	Username
1	Kenton_Kirlin
7	Kasandra_Homenick
23	Eveline95
29	Tierra.Trantow
34	Pearl7
45	David.Osinski47
49	Morgan.Kassulke

Strategic Recommendations – Active Users

- Collaborate with high-engagement users for influencer campaigns.
- Reward consistent contributors with visibility or recognition.
- Encourage user-generated content through challenges and features.
- Offer exclusive perks such as early access to new features or beta programs.
- Introduce loyalty badges or tier-based rewards for sustained engagement.
- Highlight top users through featured profiles or weekly spotlights.
- Use engagement data to personalize content and recommendations.
- Provide incentives like discounts or premium features for active users.
- Encourage peer interaction by promoting comments, tags, and collaborations.

Strategic Recommendations – Content & Hashtags

- Focus on high-performing content themes.
- Use a mix of trending and niche hashtags.
- Educate users on effective tagging strategies.
- Promote top-performing hashtags to increase content reach.
- Encourage consistent tagging to improve discoverability.
- Highlight popular tags within the app to guide user behavior.
- Analyze hashtag performance regularly to refine content strategy.
- Suggest relevant hashtags automatically during content creation.

Re-Engagement Strategy for Inactive Users

- Introduce rewards, points, or badges for engagement.
- Send personalized notifications and content suggestions.
- Use gamification and incentives to encourage interaction.
- Promote easy actions such as likes or comments to re-activate users.
- Offer limited-time incentives to encourage users to return.
- Highlight trending or popular content to spark interest.
- Reintroduce users to platform features they previously used.
- Use reminders or streak-based rewards to build consistency.
- Collect feedback from inactive users to understand drop-off reasons.

Conclusion

Key Takeaways

- User engagement is driven by a small group of active users.
- Hashtags and content type play a significant role in engagement.
- SQL enables powerful insights through structured data analysis.
- Consistent interaction is more impactful than high posting frequency.
- Engagement patterns help identify both active and inactive user segments

Final Thought

- Data-driven strategies can significantly improve engagement, retention and growth on social media platforms.
- Leveraging SQL-driven insights supports smarter decisions and long-term platform growth.