Instagram User Analytics

Project Description:

This project focused on analysing user behaviour and engagement on the Instagram platform using SQL and MySQL Workbench. The objective was to extract meaningful insights from user interaction data to support decision-making across multiple teams, including product, marketing, and development.

Key responsibilities included tracking how users interact with features such as posts, likes, and account activity. By answering targeted questions posed by the management team, I provided insights that influenced product roadmap decisions, marketing strategies, and user experience improvements.

This analysis played a vital role in:

- Identifying trends in user engagement and content preferences
- Segmenting users based on activity and retention behaviour
- Supporting the product team with data-driven recommendations for feature enhancements
- Helping marketing and development teams optimize campaigns and user flows

Tools & Skills Used:

- SQL
- MySQL Workbench
- Data Cleaning & Aggregation
- User Interaction Analysis
- Business Intelligence & Reporting

This project demonstrated how structured data analysis can guide the growth of one of the world's most widely used social media platforms.

A) Marketing Analysis:

1. **Loyal User Reward:** Users who have been using the platform for the longest time.

SELECT username, created_at from users order by created_at asc limit 5;

```
4
5     /*1. Loyal User Reward: User's who have been using the platform for the longest time.*/
6
7 •   SELECT  username, created_at from users order by created_at asc limit 5;
8
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

username	created_at
Darby_Herzog	2016-05-06 00:14:21
Emilio_Bernier52	2016-05-06 13:04:30
Elenor88	2016-05-08 01:30:41
Nicole71	2016-05-09 17:30:22
Jordyn.Jacobson2	2016-05-14 07:56:26

Key Insight:

These users have been active since the earliest days of the platform, making them **long-term loyal users.** They are ideal candidates for a **loyalty reward program,** early access to new features, or exclusive recognition to encourage retention and advocacy.

Business Impact:

- Boosts user satisfaction and loyalty
- Encourages continued platform use
- Strengthens community by recognizing long-time supporters

2. **Inactive User Engagement:** Users who have never posted a single photo on Instagram.

SELECT u.username

FROM users AS u

LEFT JOIN photos AS p ON p.user_id = u.id

WHERE p.user_id IS NULL

ORDER BY u.username;

```
8
9     /*2. Inactive User Engagement: User's who have never posted a single photo on Instagram.*/
10
11 •   SELECT u.username
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

username
Aniya_Hackett
Bartholome.Bernhard
Bethany20
Darby_Herzog
David.Osinski47
Duane60
Esmeralda.Mraz57
Esther.Zulauf61
Franco_Keebler64
Hulda.Macejkovic
Jaclyn81
Janelle.Nikolaus81
Jessyca_West

Key Insight:

These users have signed up but **have not engaged by uploading content,** indicating a lack of activity or interest. This segment represents **inactive or disengaged users.**

Business Implications:

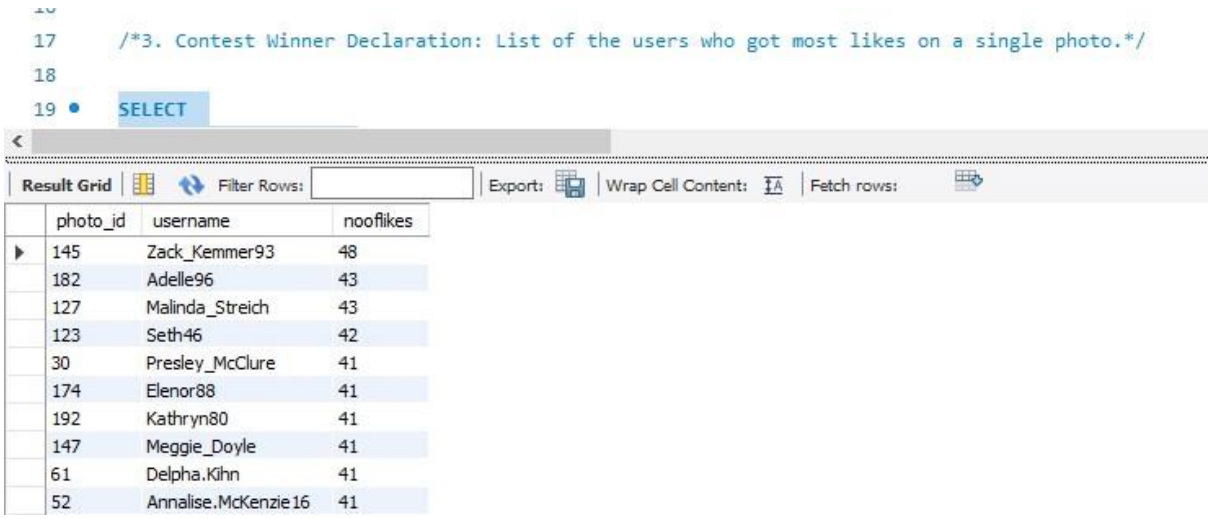
- Opportunity to re-engage users through **targeted email campaigns** or **in-app nudges** encouraging first-time posting.
- Understand friction points in the user journey – maybe the posting process isn't intuitive or users don't find value in sharing.
- Tailor onboarding experiences to better highlight photo-sharing features.

Actionable Recommendations:

- Offer incentives (badges, shout-outs, contests) to encourage first posts.
- Simpligy or gamify the content posting process.
- User personalized reminders to drive initial engagement

3. Contest Winner Declaration: List of the users who got most likes on a single photo.

```
SELECT
  likes.photo_id,
users.username,
  COUNT(likes.user_id) AS nooflikes FROM
  likes
  INNER JOIN photos ON likes.photo_id = photos.id
  INNER JOIN users ON photos.user_id = users.id GROUP
BY
  likes.photo_id,
users.username ORDER
BY
  nooflikes DESC;
```



```
17    /*3. Contest Winner Declaration: List of the users who got most likes on a single photo.*/
18
19 •  SELECT
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

photo_id	username	nooflikes
145	Zack_Kemmer93	48
182	Adelle96	43
127	Malinda_Streich	43
123	Seth46	42
30	Presley_McClure	41
174	Elenor88	41
192	Kathryn80	41
147	Meggie_Doyle	41
61	Delpha.Kihn	41
52	Annalise.McKenzie16	41

Key Insight:

This analysis highlights **the top users whose photos have received the highest number of likes,** identifying potential content creators or influencers within the platform.

Business Value:

- **Declare winners for a like-based contest** or campaign.
- Spot **high-engagement users** for potential partnerships, influencer outreach, or feature promotion.
- Analyse what type of content drives the most interaction.

Actionable Recommendations:

- Feature these users or their content on Instagram's explore page or in app stories.
- Engage them for UGC (user-generated content) promotions.
- Study these top-liked posts to **replicate success patterns** (content type, timing, captioning style, etc.)

4. Hashtag Research: Top five most commonly hashtags used on the Instagram.

```
SELECT
t.tag_name,
COUNT(p.photo_id) AS ht  FROM
photo_tags p
INNER JOIN tags t ON t.id = p.tag_id
GROUP BY
t.tag_name  ORDER
BY
ht DESC
LIMIT 5;
```

```
32
33      /*4. Hashtag Research: Top five most commonly hashtags used on the Instagram*/
34
35  •   SELECT
36          t.tag_name,
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

tag_name	ht
smile	59
beach	42
party	39
fun	38
concert	24

Key Insight:

These hashtags are the **most popular and widely used** by Instagram users, indicating trending topics, common interest, or high-engagement themes on the platform.

Business Implications:

- Helps the **marketing team** target popular hashtag communities for promotions or campaigns.
- Guides **content creators** on which hashtags can **boost visibility** and reach.
- Offers direction for **hashtag-based recommendations,** trends tracking, or search optimization.

Actionable Recommendations:

- Promote these hashtags in app features like ”Trending Now” or “Suggested Tags”.
- Encourage new users to use these hashtags to **increase engagement** on their first posts.
- Create targeted challenges or contests using the top hashtags to **drive user participation.**

5. Ad Campaign Launch: Provide insights on when to schedule an ad Campaign?

SELECT DATE_FORMAT((created_at), '%W') AS dayy, count(username) FROM users GROUP BY 1 ORDER BY 2 DESC;

```
46
47      /*5. Ad Campaign Launch: Provide insights on when to schedule an ad campaign?*/
48
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

signup_day	total_users
Thursday	16
Sunday	16
Friday	15
Tuesday	14
Monday	14
Wednesday	13
Saturday	12

Key Insight:

The result highlights the **days of the week with the highest user activity** (sign-ups), helping determine when users are most likely to be active on the platform.

Business Implications:

- Ad campaigns launched on **high-signup days** are likely to receive **more visibility and engagement.**
- Improves **ad reach efficiency** by targeting users when they are most active or newly joining.

Actionable Recommendations:

- Schedule **ad launches or promotions** on the **top 2 days** with the highest user sign-ups.
- Align **marketing emails, push notifications, or influencer posts** with these peak days.
- Consider running **A/B tests** on different weekdays to confirm performance.

B) Investor Metrics:

1. **User Engagement:** Calculating the average number of posts per user on Instagram. Also, finding total number of photos on Instagram/ total number of users.

WITH base AS(

SELECT u.id AS userid, COUNT(p.id) AS photoid FROM users u LEFT JOIN photos p ON p.user_id=u.id GROUP BY u.id)

SELECT SUM(photoid) AS totalphotos, COUNT(userid) AS total_users, SUM(photoid)/ COUNT(userid) AS photoperuser FROM base;

```
51
52  /*B) Investor Metrics:
53  1. User Engagement: Calculating the average number of posts per user on Instagram. Also, finding total number of
54  photos on Instagram/ total number of users.*/
55
56  SELECT * FROM photos, users;
57  WITH base AS(
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

totalphotos	total_users	photoperuser
257	100	2.5700

Key Insight:

- **Total Photos:** Shows the overall volume of content generated.
- **Total Users:** Total user base considered in the analysis.
- **Average Posts per User:** Indicates how actively users are posting on Instagram.

Business Implications:

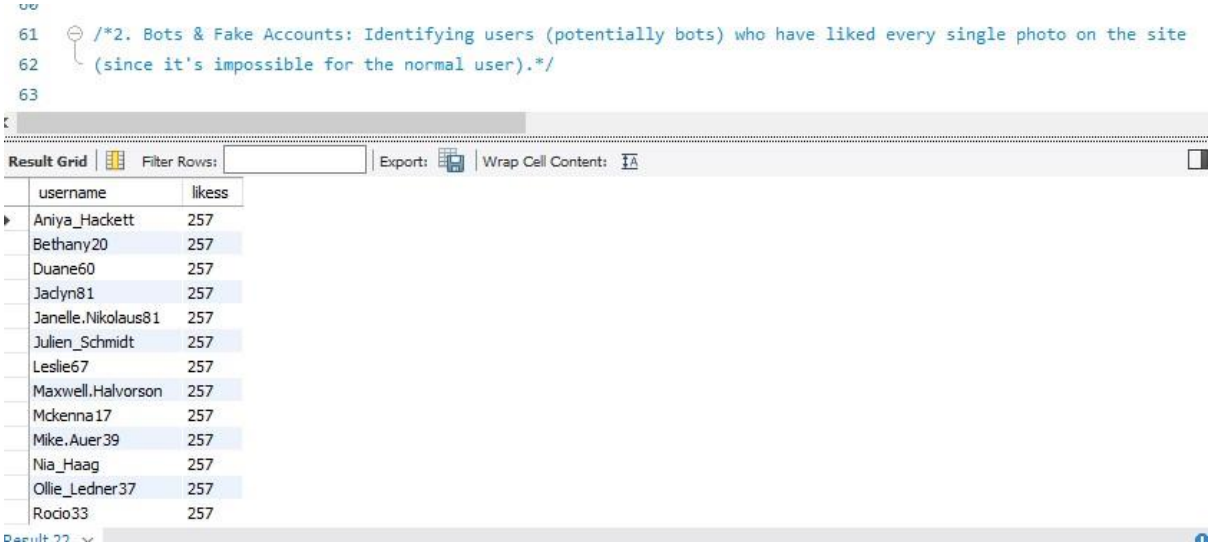
- A higher average suggests **that strong user engagement** and platform stickiness.
- A lower average may signal **passive users,** indicating a need for better content creation incentives.

Actionable Recommendations:

- If average post count is low, introduce **engagement-boosting features** like badges, posting streaks, or first-post rewards.
- Use this metric as a **benchmark** to track changes after running content or engagement campaigns.
- Segment by user types (new vs. old, active vs. inactive)m to **personalize re-engagement strategies.**

2. **Bots & Fake Accounts:** Identifying users (potentially bots) who have liked every single photo on the site (since it's impossible for the normal user).

```
WITH base AS(
SELECT u.username, COUNT(l.photo_id) AS likess FROM likes l INNER JOIN users u
ON u.id= l.user_id
GROUP BY u.username)
SELECT username, likess FROM base WHERE likess= (SELECT COUNT(*) FROM photos)
ORDER BY username;
```



Key Insight:

- The result lists users who have **liked 100% of all photos** on the platform.
- This is likely the behavios of **bots, fake accounts, or automation tools,** not regular users.

Business Implications:

- Helps identify and flag **suspicious or non-human activity.**
- Important for **maintaining data integrity,** especially when measuring engagement metrics.
- These accounts can skew analytics and must be **monitored or removed.**

Actionable Recommendations:

- Flag and review these accounts for potential **bot activity.**
- Improve platform security with **CAPTCHAs or behavioural checks.**
- Adjust engagement KPIs to **exclude outliers** for more accurate reporting.

Over All Business Impact Summary:

- **Enhanced decision-making** across product, marketing, and user growth teams.
- Supported strategic planning with clear data on user behaviour, content performance, and platform health.
- Helped in **detecting anomalies,** boosting engagement, and creating **data-driven campaigns.**