Project Report: Instagram User Engagement Analysis

Project Description

The purpose of this project is to provide data-driven insights on Instagram user behavior to assist the product, marketing, and investor teams in making informed business decisions. Utilizing SQL and MySQL Workbench, the analysis identifies patterns and trends in user engagement, helping the product team decide on new features, the marketing team to optimize campaign timing, and investors to assess platform activity and authenticity. The analysis will address key business questions, from identifying loyal users and engagement patterns to detecting potential bot accounts.

Approach

The project follows a structured approach to extract insights from Instagram user data:

1. **Database Setup**: The provided SQL script was used to create and populate the Instagram-like database with tables, including users, photos, comments, likes, follows, tags, and photo_tags.
2. **SQL Query Development**: Each business question was addressed with a specific SQL query, targeting relevant tables and applying joins, aggregations, and filtering to extract accurate insights.
3. **Report Creation**: Outputs from SQL queries were compiled into this report along with insights and recommendations based on the findings.

Tech-Stack Used

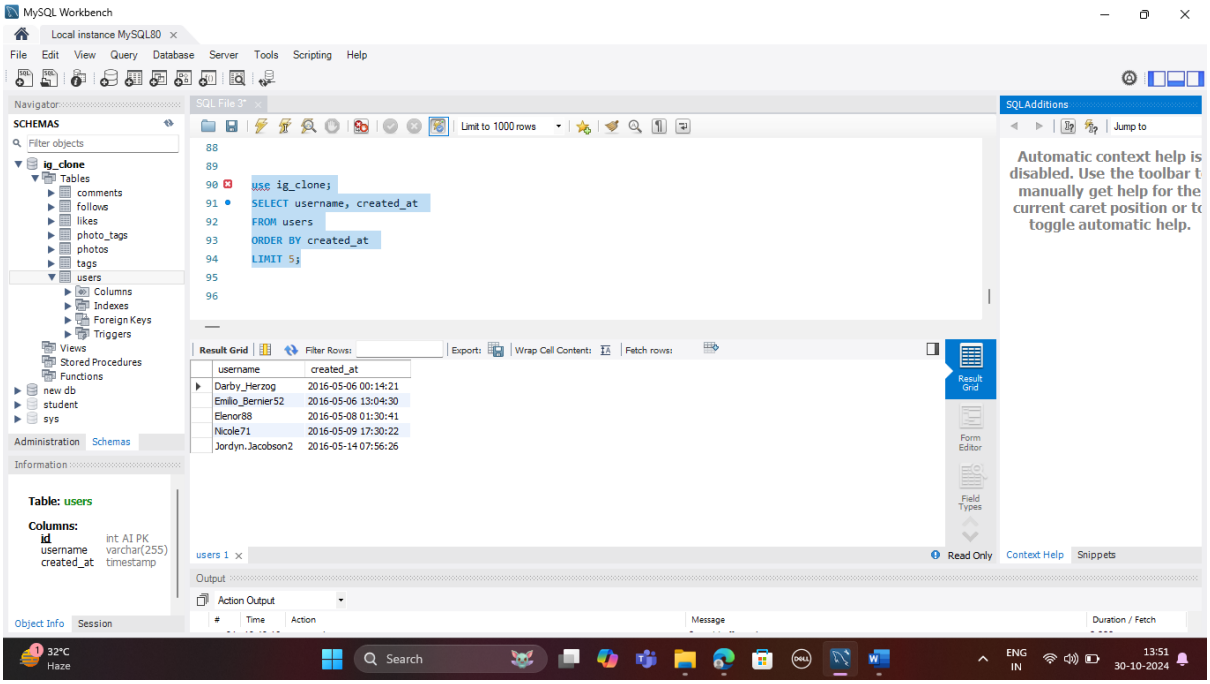
- **MySQL Workbench**: Used for database setup, running SQL queries, and analyzing query outputs.
- **SQL**: Structured Query Language (SQL) was used to extract data from tables efficiently, ensuring correct filtering, grouping, and ordering of results.

Reason for Choice: MySQL Workbench provides a reliable and intuitive interface for executing SQL commands and visualizing data, which is ideal for analysis projects.

SQL Tasks and Findings

A) Marketing Analysis

1. **Loyal User Reward**
    - **Objective**: Identify the five oldest users on Instagram to reward them for their loyalty.
    - **SQL Query**:



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

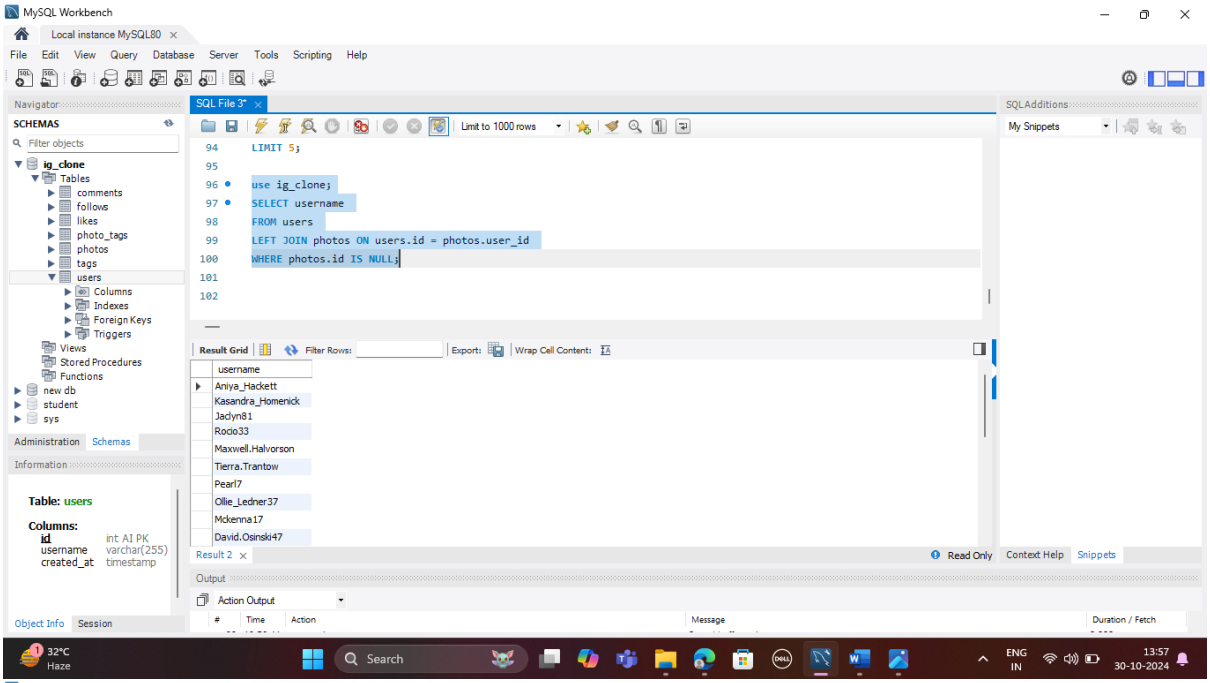
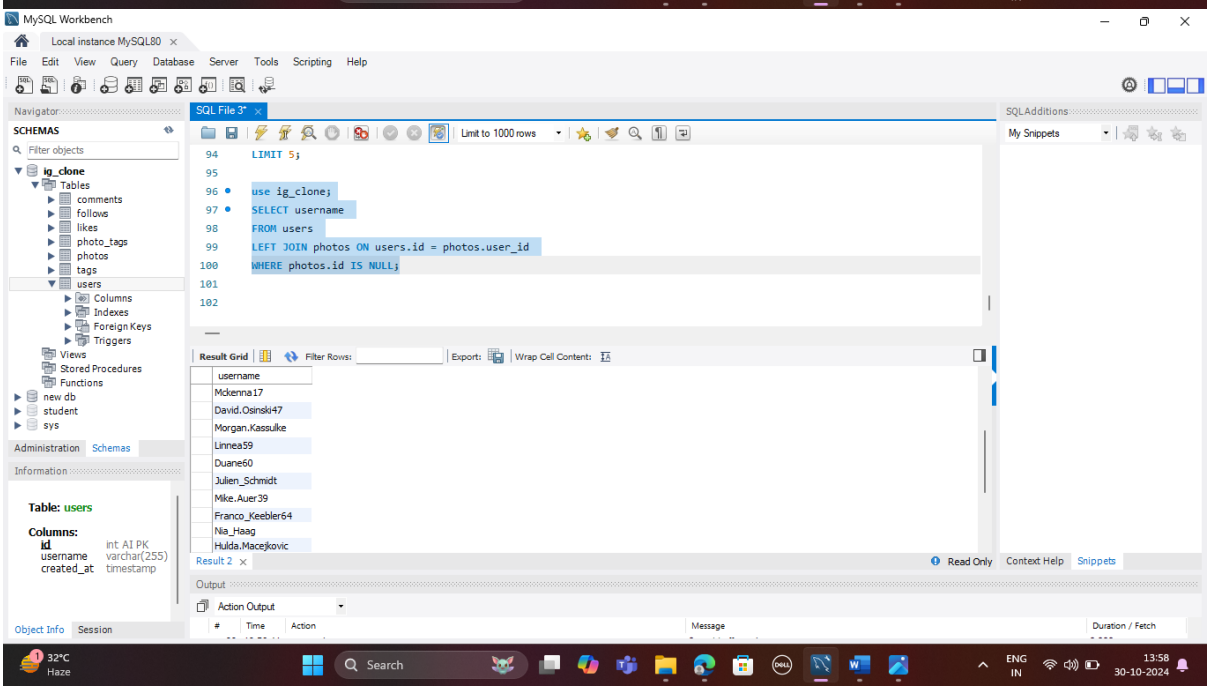
Nicole71 2016-05-09 17:30:22

Jordyn.Jacobson2 2016-05-14 07:56:26

Insight: These users have shown long-term loyalty, making them suitable candidates for special rewards or recognition campaigns.

2. **Inactive User Engagement**

- **Objective**: Identify users who have never posted a photo, as potential candidates for engagement campaigns.
- **SQL Query**:

- 
MySQL Workbench
Local instance MySQL80
File Edit View Query Database Server Tools Scripting Help
SCHEMAS
ig_clone
Tables
comments
follows
likes
photo_tags
photos
tags
users
Columns
Indexes
Foreign Keys
Triggers
Views
Stored Procedures
Functions
new db
student
sys
Table: users
Columns:
id int AI PK
username varchar(255)
created_at timestamp
SQL File 3*
94 LIMIT 5;
96 use ig_clone;
97 SELECT username
98 FROM users
99 LEFT JOIN photos ON users.id = photos.user_id
100 WHERE photos.id IS NULL;
Result Grid
username
Aniya_Hackett
Kasandra_Homenick
Jadyn81
Rocio33
Maxwell.Halvorson
Tierra.Trantow
Pearl7
Ollie_Ledner37
Mckenna17
David.Osinski47
Result 2
Output
Action Output
Search
32°C Haze
ENG IN
13:57 30-10-2024
- 
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Mckenna17
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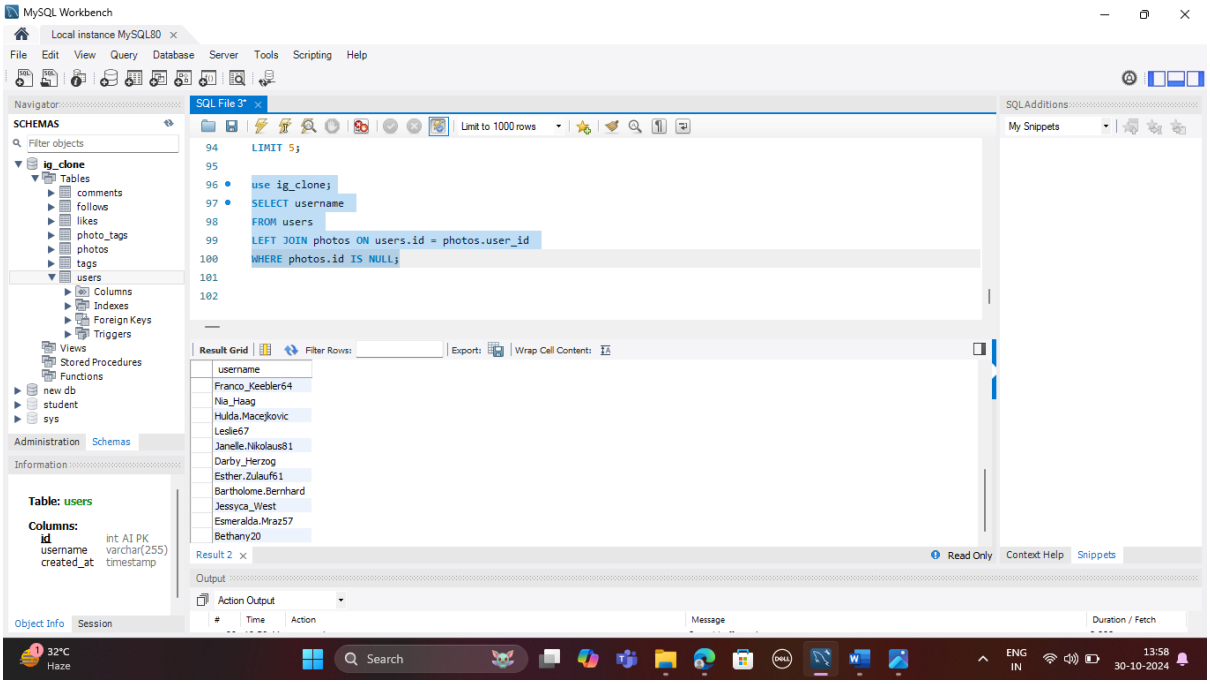
Morgan.Kassulke
Linnea59
Duane60
Julien_Schmidt
Mike.Auer39
Franco_Keebler64
Nia_Haag
Hulda.Macejkovic
Result 2
Output
Action Output
Search
32°C Haze
ENG IN
13:58 30-10-2024

- 

Aniya_Hackett

Bartholome.Bernhard

Bethany20

Darby_Herzog

David.Osinski47

Duane60

Esmeralda.Mraz57

Esther.Zulauf61

Franco_Keebler64

Hulda.Macejkovic

Jaclyn81

Janelle.Nikolaus81

Jessyca_West

Julien_Schmidt

Kasandra_Homenick

Leslie67

Linnea59

Maxwell.Halvorson

Mckenna17

Mike.Auer39

Morgan.Kassulke

Nia_Haag

Ollie_Ledner37

Pearl7

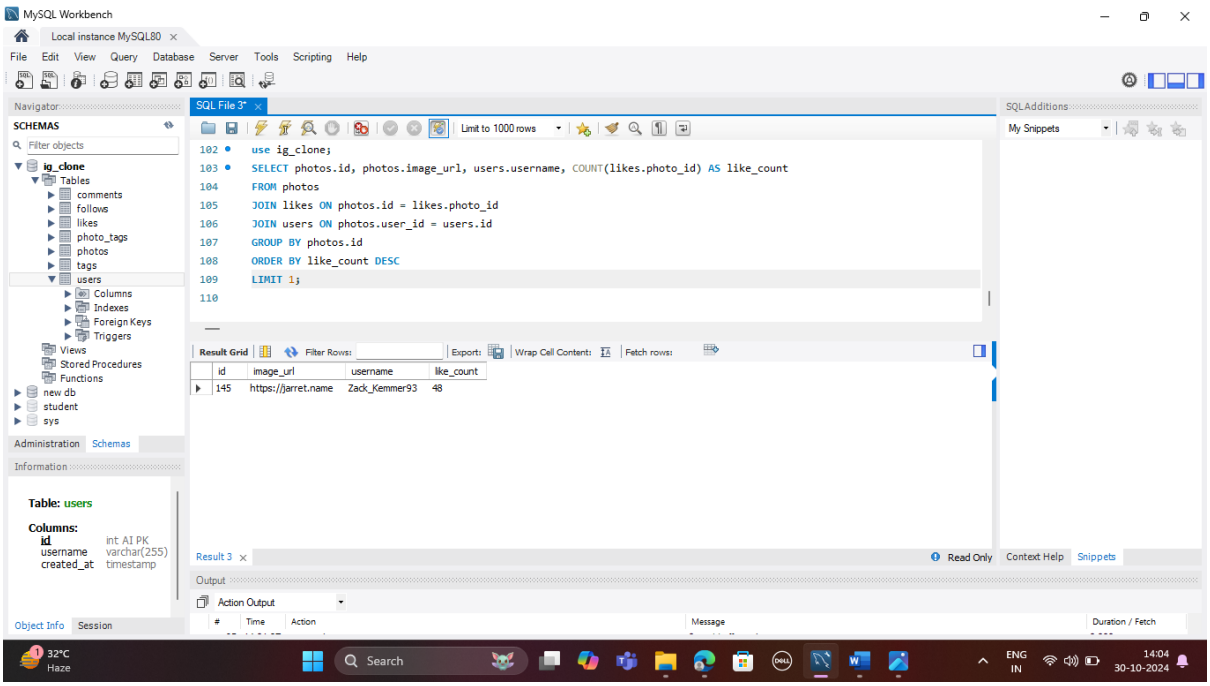
Rocio33

Tierra.Trantow

Insight: Targeting these inactive users with incentives (e.g., special badges for first posts) could increase engagement.

3. **Contest Winner Declaration**

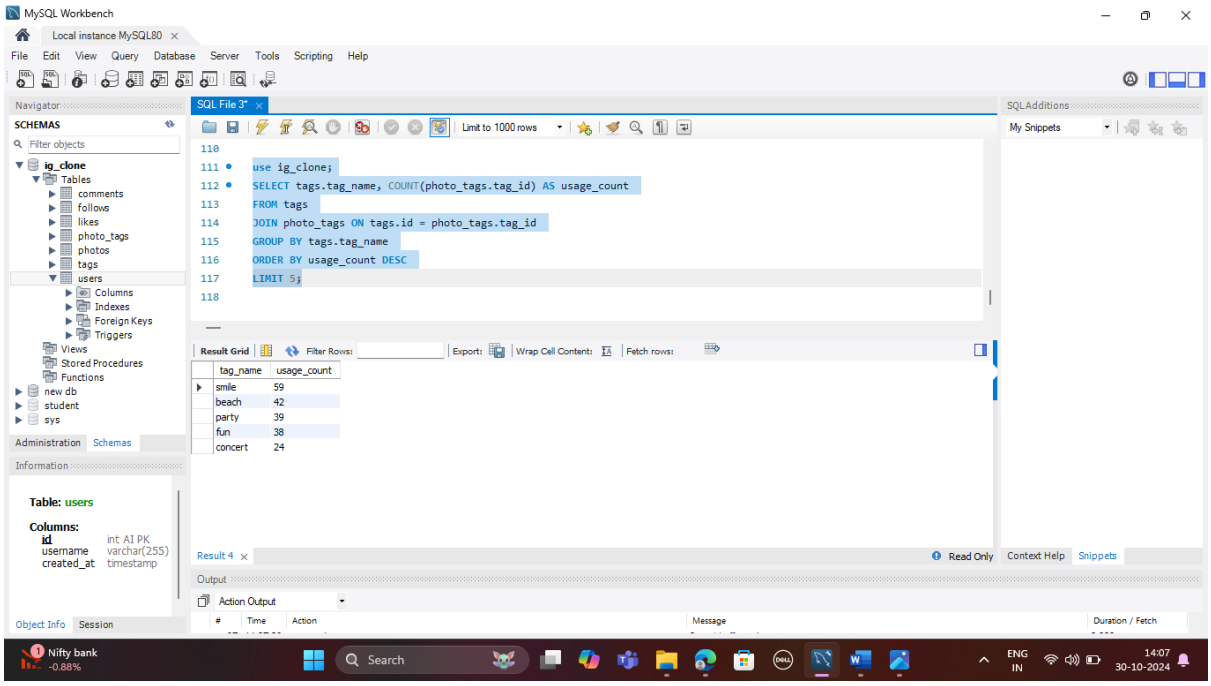
- **Objective**: Identify the user with the most-liked photo for a contest.
- **SQL Query**:
-



145	https://jarret.name	Zack_Kemmer93	48

Insight: This highly liked post can be used in promotions or as a case study for content strategies.

4. **Hashtag Research**

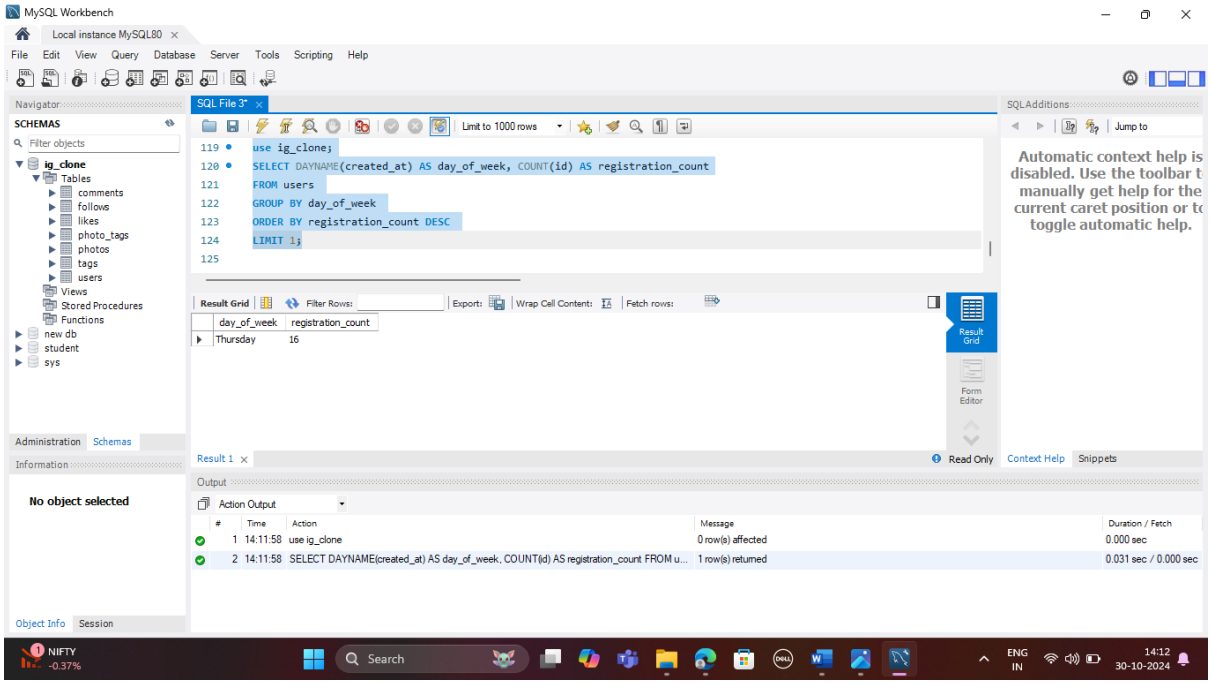
- **Objective**: Identify the top 5 most-used hashtags for effective campaign planning.
- **SQL Query**:
- 

smile	59
beach	42
party	39
fun	38
concert	24

Insight: The identified hashtags can enhance brand reach and visibility for future partner campaigns.

5. **Ad Campaign Launch**

- **Objective**: Determine the best day to launch ad campaigns based on user registration trends.
- **SQL Query**:



-
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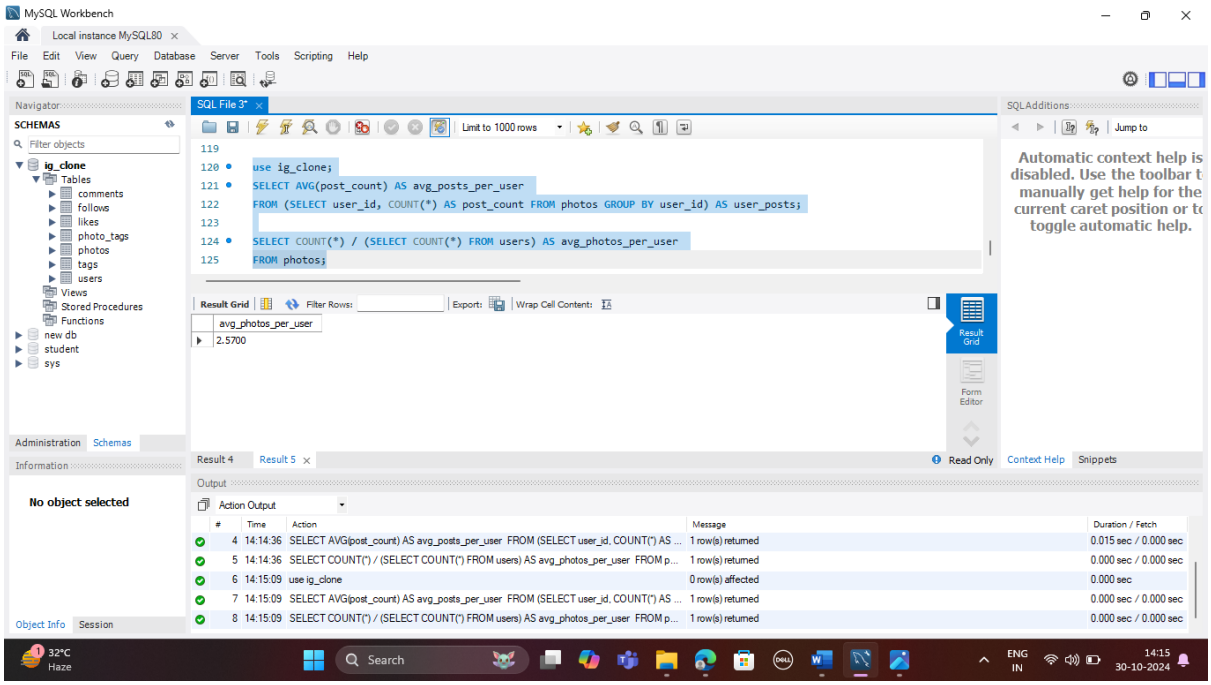
Insight: Scheduling ads on this peak day may yield the highest visibility among new users.

B) Investor Metrics

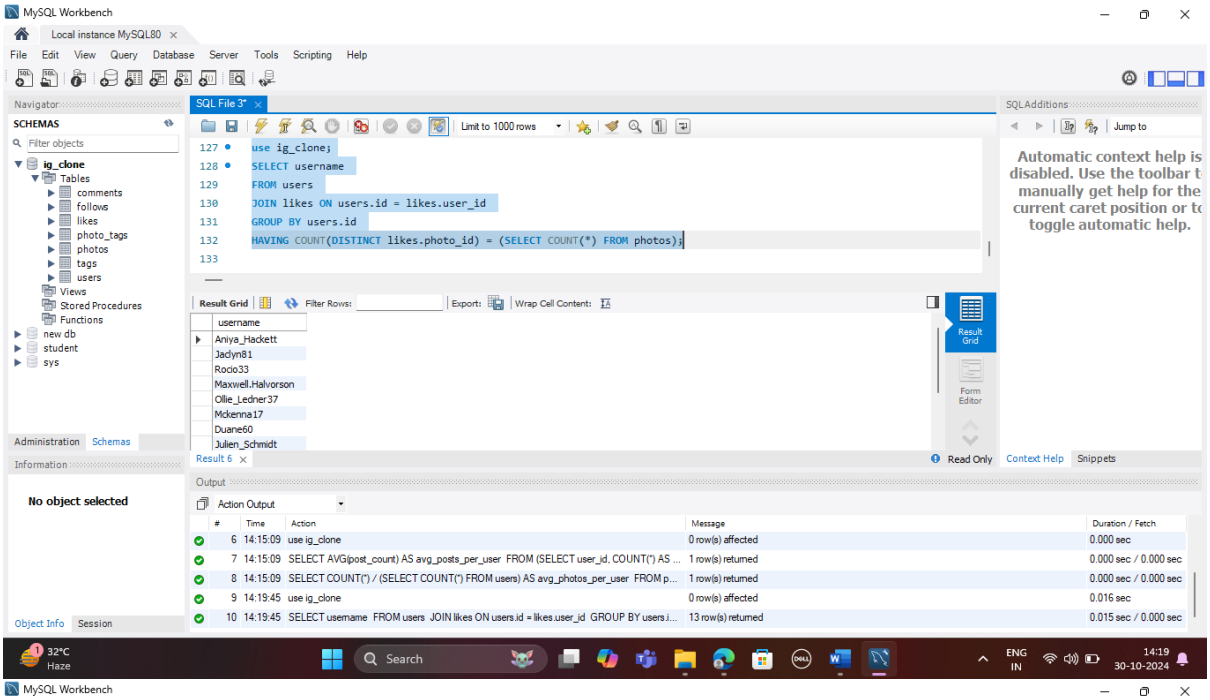
1. **User Engagement**
    - **Objective**: Calculate the average number of posts per user and the photo-to-user ratio.
    - **SQL Query:**

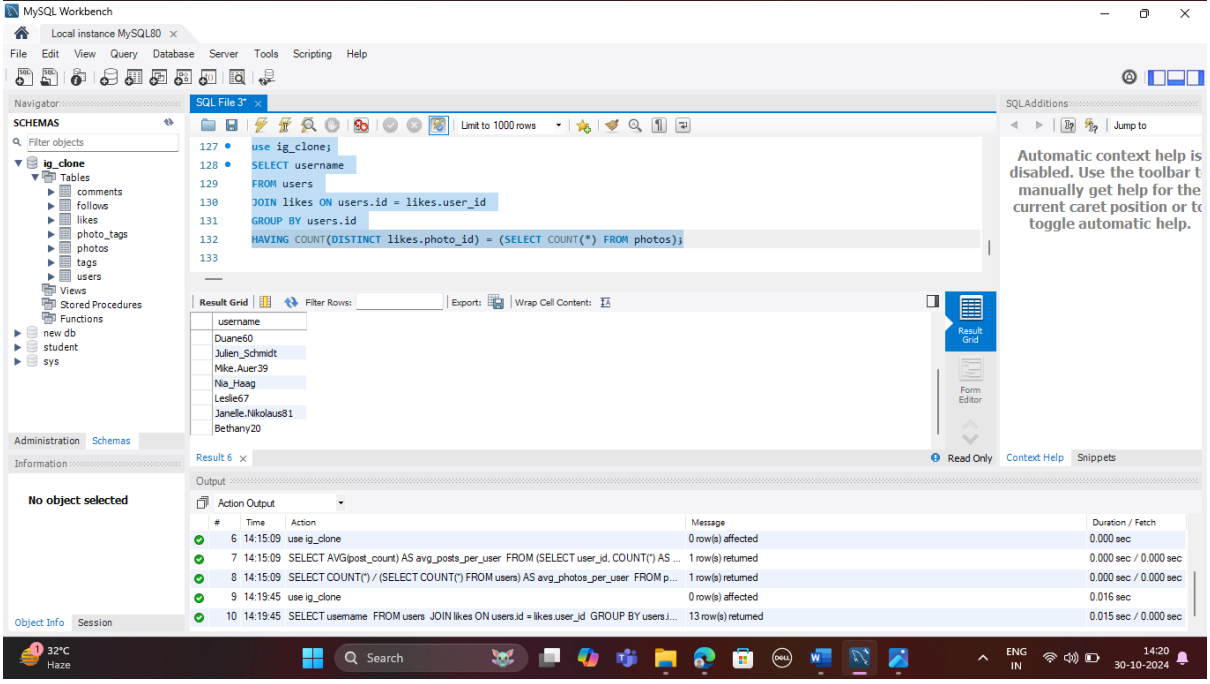


2.5700

Insight: Helps investors gauge platform engagement by comparing posting behavior across users.

2. **Bots & Fake Accounts**

- **Objective**: Identify potential bot accounts that have liked every single photo.
- **SQL Query**:
- 

- 

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Insight: High bot activity could indicate the need for better bot-detection measures to maintain user trust and engagement quality.

Insights and Recommendations

- **Loyalty Campaign**: The oldest users identified are ideal for loyalty rewards. Recognizing these users could enhance retention.
- **Re-Engagement Strategy**: The inactive users identified can be targeted with personalized messages or notifications to encourage posting.
- **Optimal Campaign Day**: The analysis shows that launching ads on the highest registration day could maximize visibility and engagement.
- **Hashtag Utilization**: Popular hashtags provide a valuable tool for brands to increase reach. This insight can aid Instagram's marketing partners in maximizing engagement.
- **Bot Detection**: The potential bot accounts identified should be further analyzed to prevent spam and maintain authentic user interactions.

Results

The analysis successfully addressed each question posed by the marketing and investor teams. By identifying the most loyal and inactive users, top-performing posts, and common hashtags, the insights have provided valuable guidance for user engagement strategies. The project also highlighted possible bot accounts, underscoring the importance of platform security. These

insights provide a foundation for future data-driven decisions to enhance user experience, engagement, and investor confidence.