ANALYSIS ON TRENDING YOUTUBE VIDEOS

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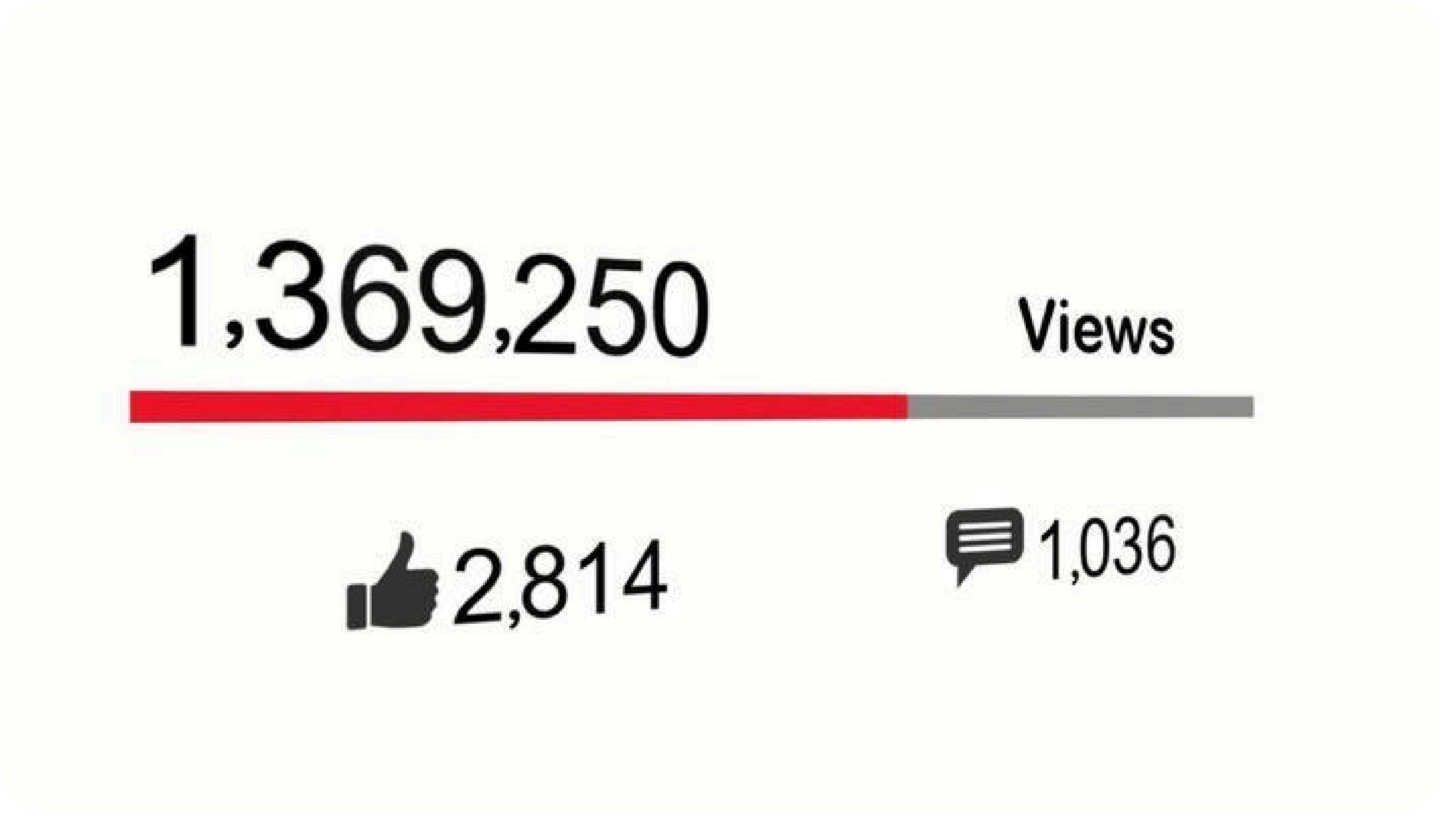
AGENDA

- Why I chose this topic
- Research Goal
- Dataset
- Implementation Pipeline
- Data Handling and EDA
- Key Insights
- Technologies Used
- Challenges

WHY I CHOSE THIS TOPIC?

- Frequent YouTube user (commutes, chill-time activity).
- Curious if there are some insights common across high performing videos.



WHAT PATTERNS AND FACTORS ARE PRESENT ON TRENDING VIDEOS?

DATASET

- Collected via YouTube API.
- Contains Daily snapshot of “Trending” list in the year 2019.
- Regions used: US, CA, GB (Major English-speaking markets) out of 10 available regions.
- Key fields: title, channel, publish time, tags, views, likes/dislikes, comments, description, category_id.
- Why it fits: aligns directly with the question “what drives trending success?”

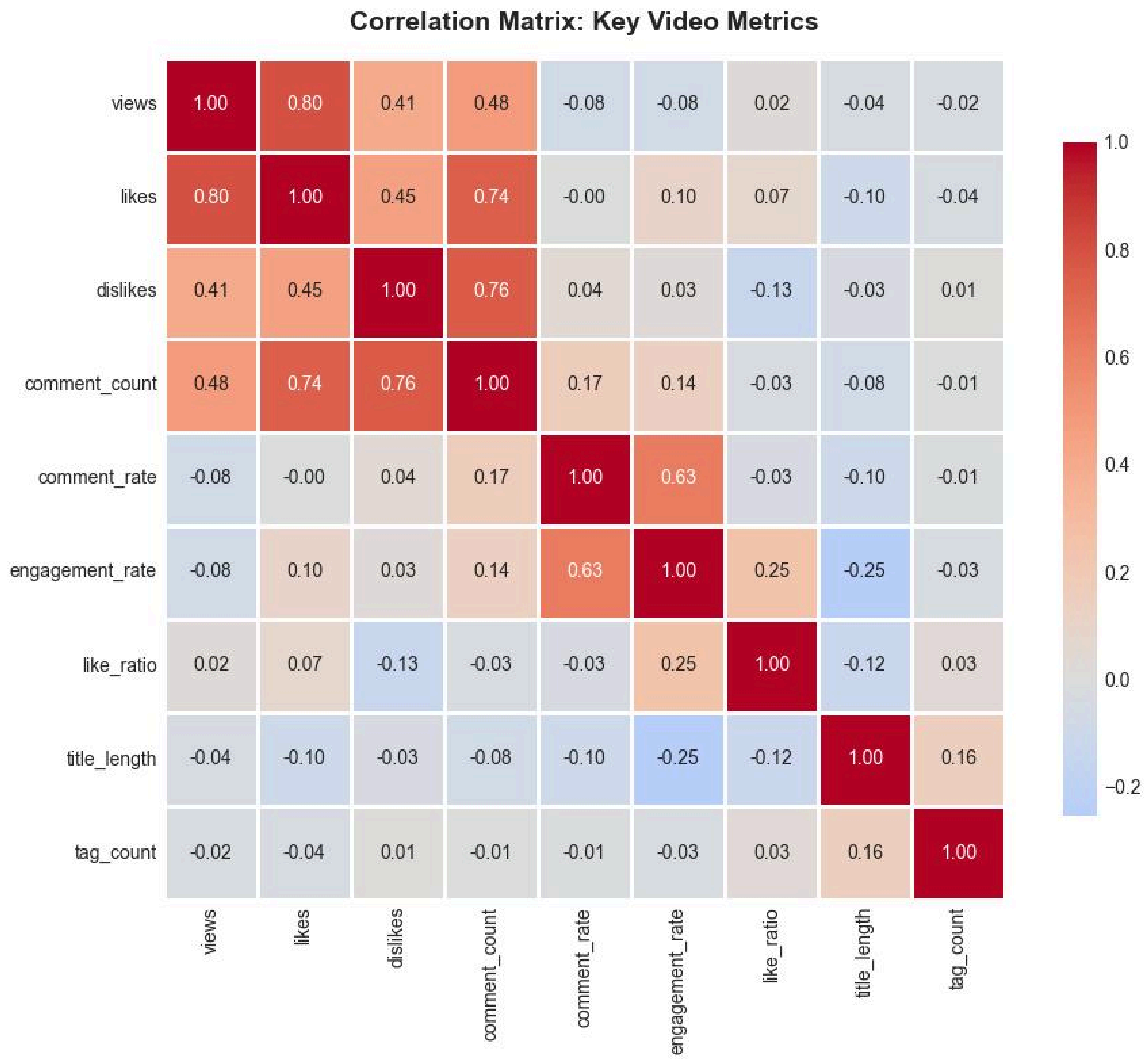
DATA HANDLING AND EDA

- **Cleaning**: handle missing values, remove duplicates, correct data types, remove rows lacking vital information.
- **Wrangling**: merge only relevant data of US/CA/GB, map category_id → category_name, standardize time fields.
- **Feature engineering**: engagement_rate, like_ratio, comment_rate, dislike_ratio, days_to_trending.
- **EDA**: Descriptive Statistics on country/category/channel/videos, correlation matrix.
- **Added Video Performance Classification**: Explosive / High-Performing / Standard Trending.

SOME EDA RESULTS

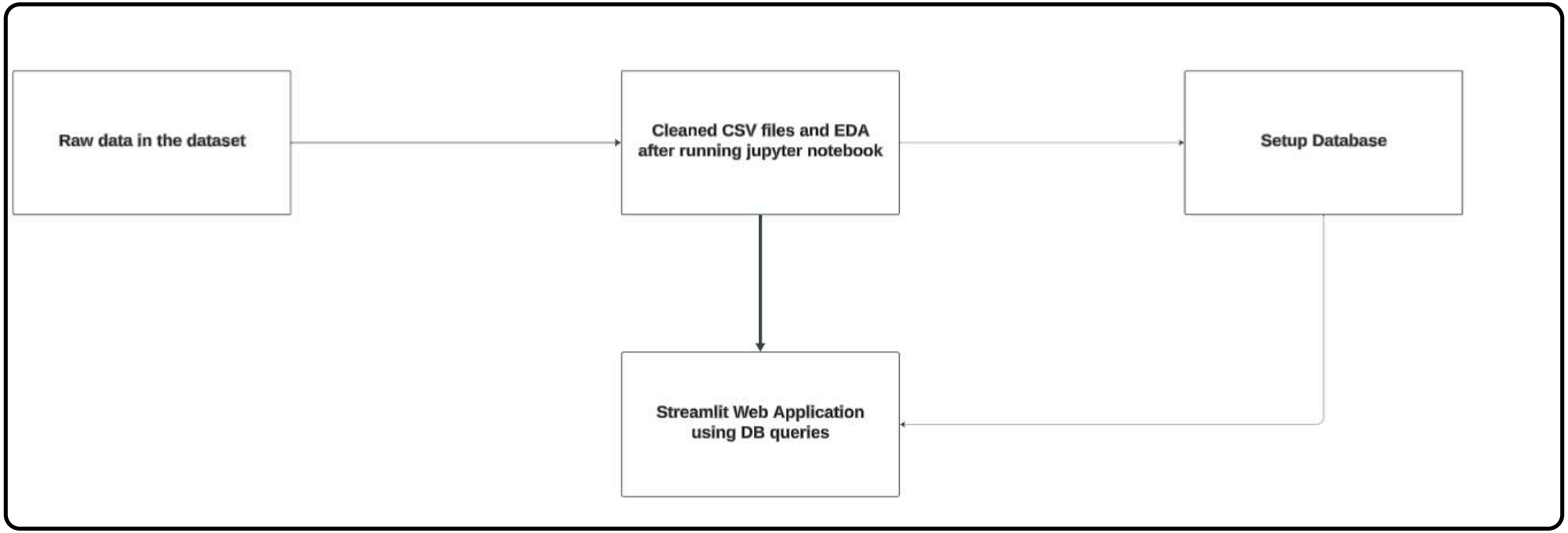
```
================================================================================
OVERALL STATISTICS
================================================================================

Total videos analyzed: 107,832
Countries: 3
Unique channels: 6,843
Categories: 18

================================================================================
VIEW STATISTICS
================================================================================
count    1.078320e+05
mean     2.852660e+06
std      1.183086e+07
min      5.490000e+02
25%      1.768340e+05
50%      5.241610e+05
75%      1.622088e+06
max      4.245389e+08
Name: views, dtype: float64
```

```
================================================================================
CATEGORY ANALYSIS
================================================================================
                       Video Count   Avg Views  Median Views  Max Views  \
category_name
Entertainment                29494  1732388.06      483142.5  169884583
Music                        20184  9343917.25     1897067.0  424538912
People & Blogs                9337   998784.42      320294.0   33627806
Comedy                        8054  1323810.48      698034.0   43460605
News & Politics               7437   550830.78      170848.0   18994966
Howto & Style                 7358   818695.67      374955.5   54155921
Sports                        6409  1438113.80      394143.0   29090799
Film & Animation              5843  2344937.87      660906.0   54863912
Gaming                        3649  1249232.39      434156.0   18158133
Science & Technology          3584  1432483.36      553772.0   42799458
Education                     2855   681374.18      358602.0   12100921
Pets & Animals                1581   835070.88      442124.0    6416920
Travel & Events                835   690061.28      307812.0   23932421
Autos & Vehicles               810   987282.25      396856.5   25244097
Shows                          199   754829.82      631793.0    1709880
Unknown                        144  1518677.87      151952.0   26703269
Nonprofits & Activism           53  3187433.30      144532.0   24286474
Movies                           6  2853415.00     2906235.5    5661965
```




```
================================================================================
COUNTRY COMPARISON
================================================================================
         Videos   Avg Views  Avg Engagement %  Avg Days to Trending
country
CA        35826   804318.71              3.98                  2.97
GB        31279  5848696.06              3.84                 43.40
US        40727  2353503.62              4.06                 16.21
```

IMPLEMENTATION PIPELINE



Key Insights

- **Creator benefit = views, and views follow reactions:**

  a. Likes, Dislikes and Comments Count have high positive correlation: Explains why creators have calls to action in the middle of videos.

Video Performance Classification Rules

```python
def classify_video_performance(df):
    """
    Classify trending videos based on views and speed-to-trending.
    Uses days_to_trending instead of engagement_rate to better capture viral growth patterns.

    Parameters:
    df (DataFrame): Video data with engagement metrics

    Returns:
    DataFrame: Data with performance classification
    """
    df_class = df.copy()

    # Calculate percentiles for classification
    view_75 = df_class['views'].quantile(0.75)
    view_90 = df_class['views'].quantile(0.90)
    days_25 = df_class['days_to_trending'].quantile(0.25)  # Fast = LOW days
    days_50 = df_class['days_to_trending'].quantile(0.50)

    # Classification logic using if-elif-else structure
    def classify_video(row):
        views = row['views']
        days = row['days_to_trending']

        # Explosive: Top 10% views AND trended in bottom 25% time (fastest)
        if views >= view_90 and days <= days_25:
            return 'Explosive'
        # High-Performing: Top 25% views OR fast trending
        elif views >= view_75 or days <= days_50:
            return 'High-Performing'
        # Standard: Typical trending performance
        else:
            return 'Standard Trending'

    df_class['performance_class'] = df_class.apply(classify_video, axis=1)

    print("Performance classification complete:")
    print(df_class['performance_class'].value_counts())
    print(f"\nClassification thresholds:")
    print(f"  Explosive views threshold (90th percentile): {view_90:,.0f}")
    print(f"  High-performing views threshold (75th percentile): {view_75:,.0f}")
    print(f"  Fast trending threshold (25th percentile): {days_25:.1f} days")
    print(f"  Moderate trending threshold (50th percentile): {days_50:.1f} days")
    return df_class

df_clean = classify_video_performance(df_clean)
```

- **Explosive Trending Videos :** Top 10% views AND in the Top 25% days to trending.
- **High-Performing Trending Videos :** Top 25% views OR top 50% days to trending.
- **Standard Trending Videos :** No extra classification criteria.

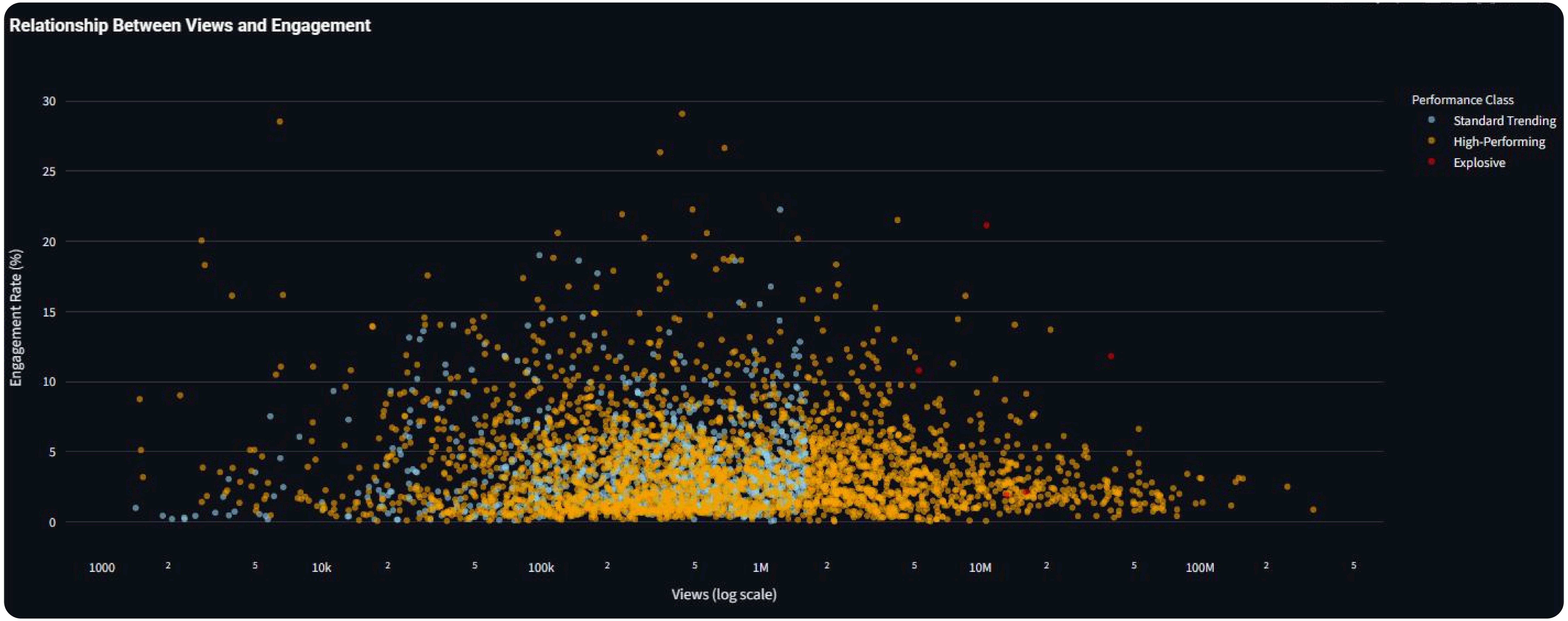
Video performance is classified using total views and days to trending, because together they capture both how large a video became and how fast it spread, which reflects real-world viral success on YouTube.

Key Insights

- **Views vs interaction on classified video performance**

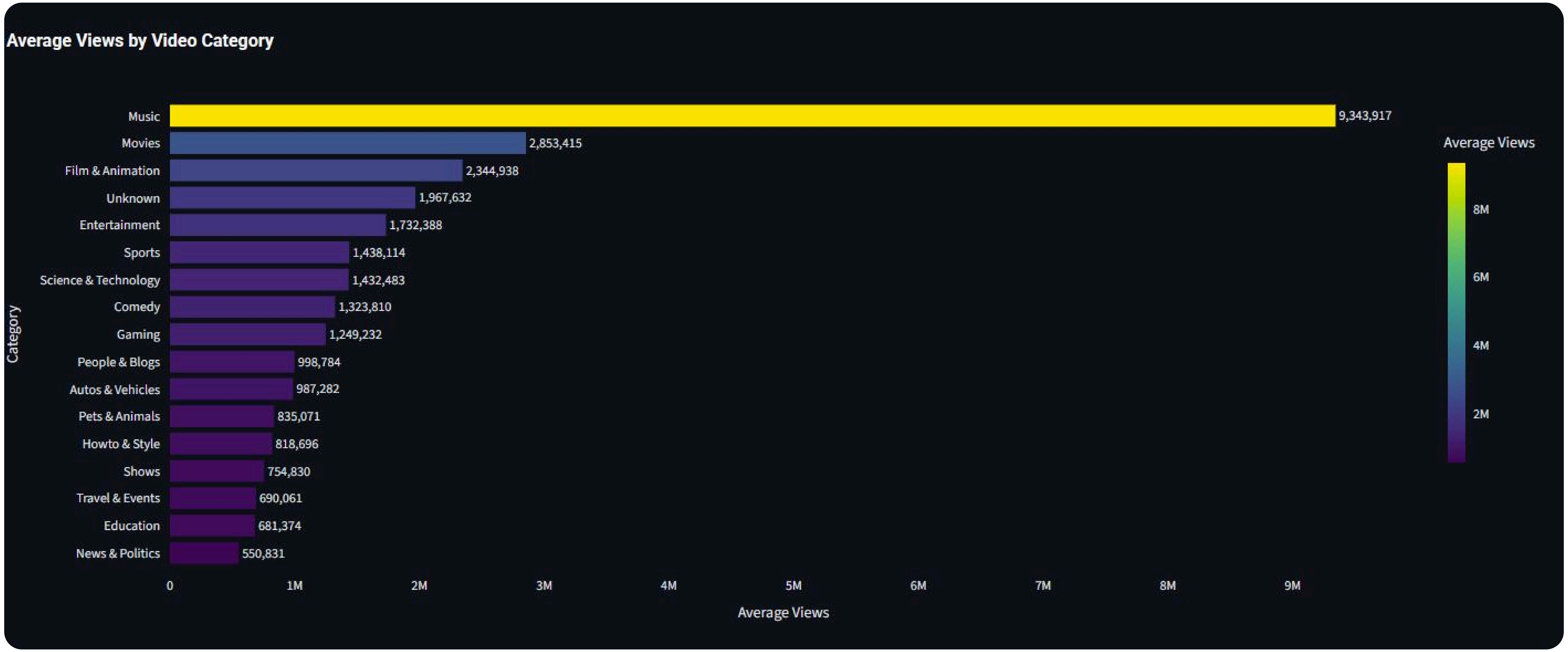
  a. Some Explosive Trending videos have high engagement rate but others don't.

  b. Consistent with correlation matrix as majority of high view count videos have lower engagement.



Key Insights

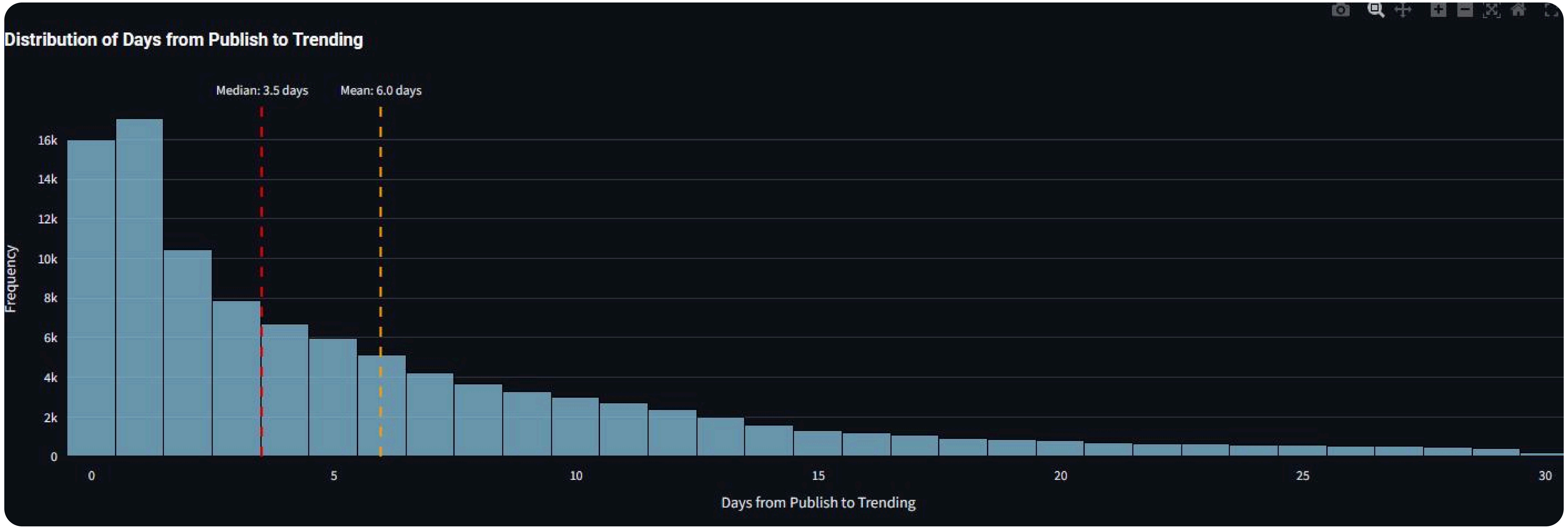
- **Category effect:** Music dominates average views as majority of trending videos are music related.



Key Insights

- **Speed matters**: Trending is time-sensitive.

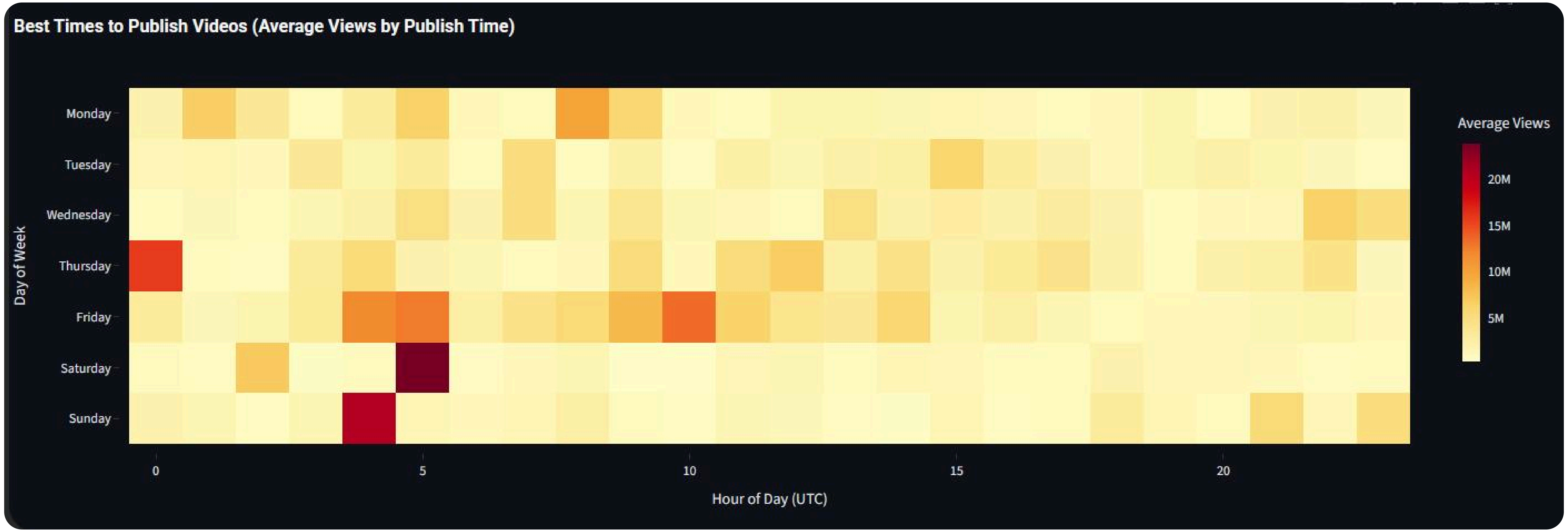
Most videos trend very close to the day of publishing so early momentum is pivotal!



Key Insights

- **Publishing strategy**: Upload timing affects performance

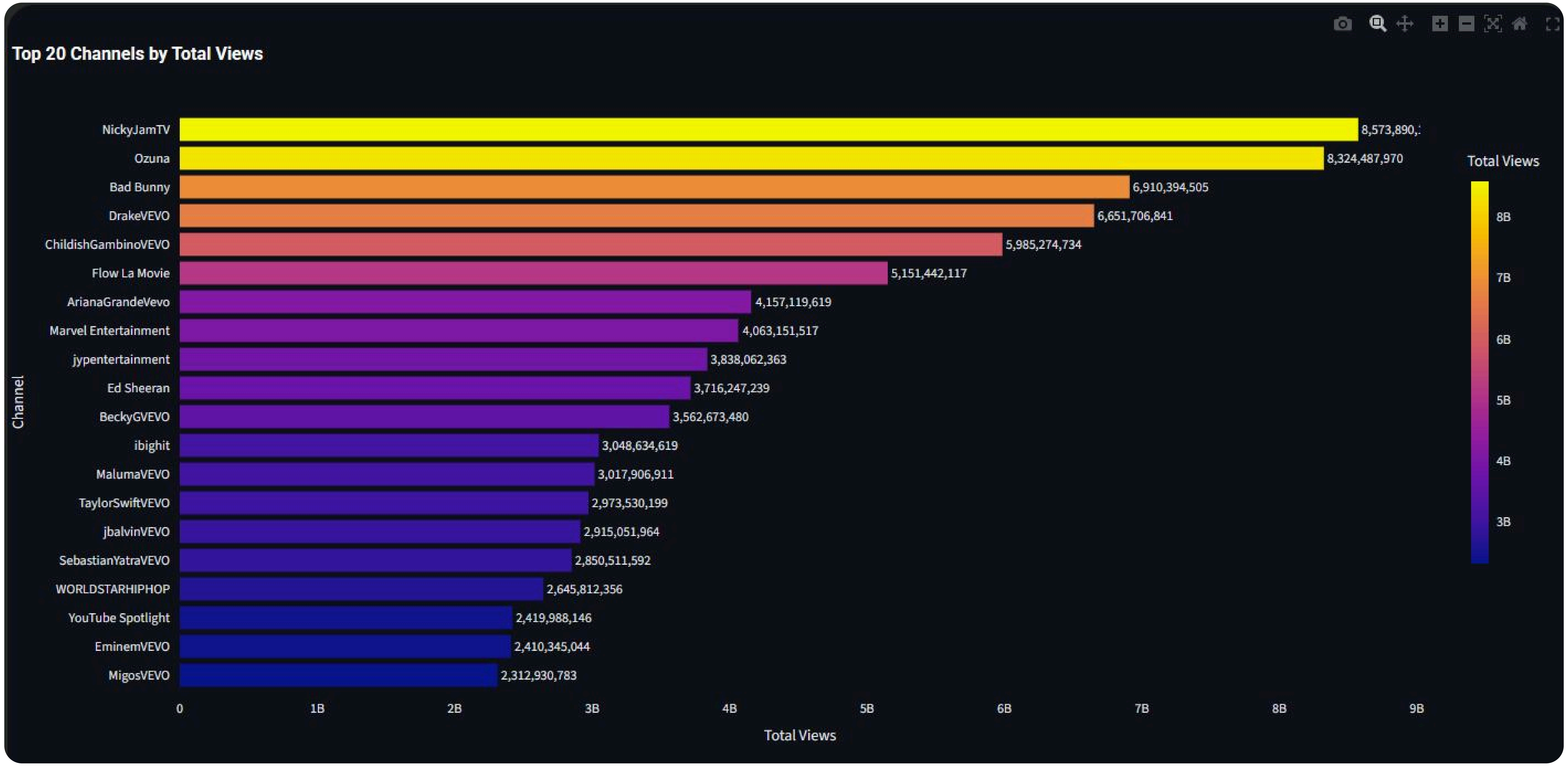
Early-morning UTC and weekend windows show highest average views.



Key Insights

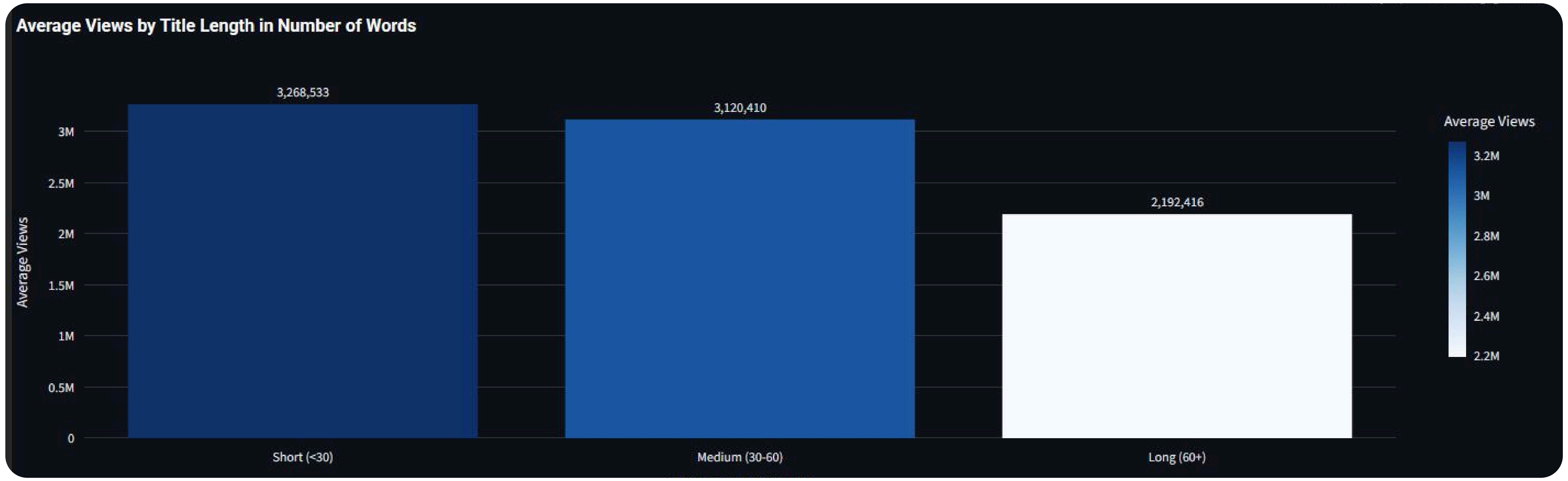
- **Trending is winner-takes-most:** The same top channels appear repeatedly

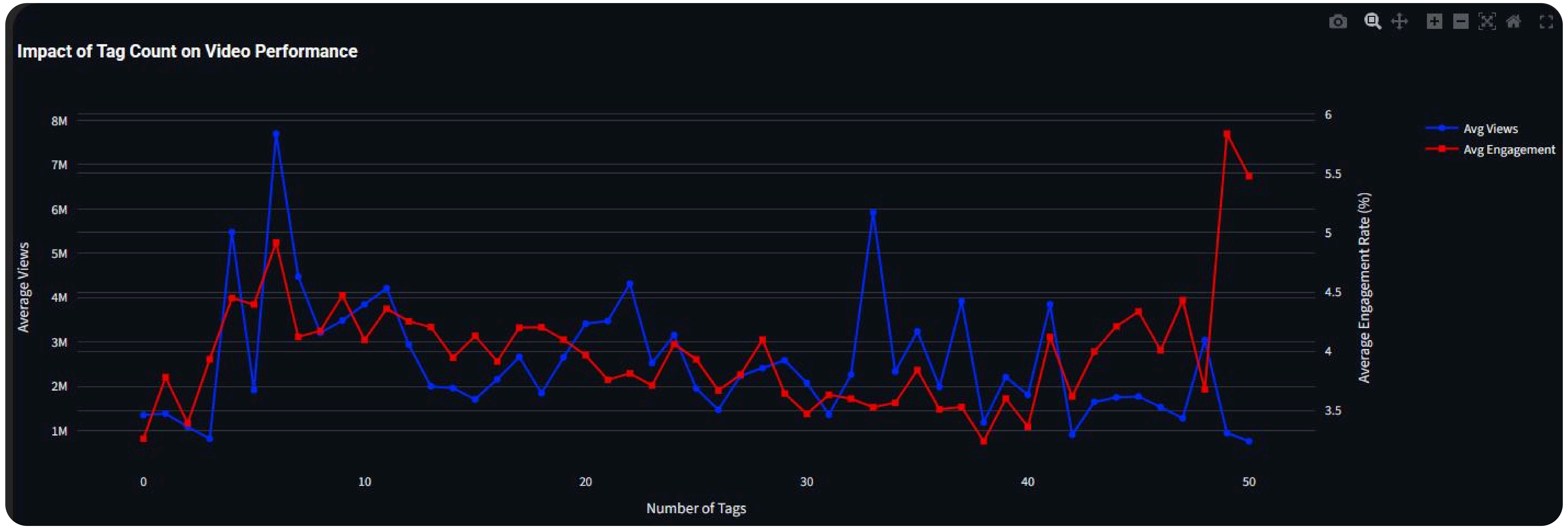
Once you go viral it’s easier to get another hit.



Key Insights

- **Metadata isn't a cheat code**: Title length and Video Tags play a minor role but have their own optimal counts.



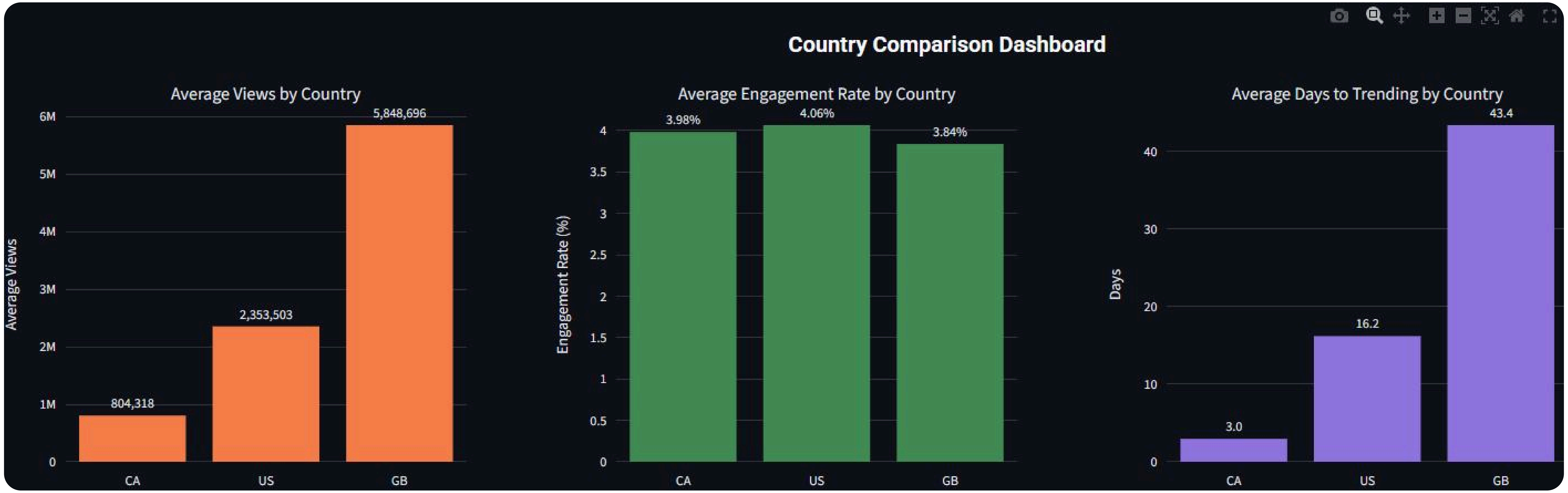


Key Insights

- **Cross Country Market dynamics:**

  a. Engagement rate similar across US/CA/GB.

  b. The Britain Paradox.



Technologies Used

- **Python:** data loading, cleaning, wrangling, database related scripts.
- **Visualization:** Matplotlib + Seaborn and Plotly (Plots, distributions, correlations).
- **SQL / Storage:** SQLite database for structured querying using sqlite3 library in python.
- **Web App Frontend:** Streamlit app for interactive exploration + insights

Challenges

- **Defining a valid classification rule for my project because all videos had already trended.**
- **Choosing which option to take for building the web app Streamlit vs Django.**
    a. Had more experience with Django but needed to assess its suitability for my project.
    b. Looked into Streamlit Community templates to see its applications.

THANK YOU!