



# Trending Lies: How TikTok Followers and Engagement Drive Misinformation

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## 1. Data Sourcing

| Dataset Name                            | Description  | Number of Columns | Number of Rows | Size     | Source                               |
|---|--|-------------------|----------------|----------|--------------------------------------|
| tiktok_dataset.csv<br>(Primary dataset) | Captures engagement metrics and characteristics of flagged claim-based videos. | 11                | 19,383         | 2,908 KB | Kaggle-<br><a href="#">Find here</a> |
| Top_Influencers.csv                     | Details about top 50 tiktokers all over the world.                             | 7                 | 50             | 4KB      | Kaggle-<br><a href="#">Find here</a> |

## 2. Data Profiling

I conducted a detailed profiling process on the TikTok dataset using Python. My goal was to understand its structure, identify missing or inconsistent data, and uncover relationships between variables to prepare it for analysis.

### 1. Structure Discovery

I started by examining the structure of the dataset.

- **Dataset Size:** The dataset contains 19,382 rows and 11 columns, confirmed through shape inspection.
- **Column Review:** I listed all column names to understand the attributes, such as `claim_status`, `video_id`, and `video_view_count`.
- **Preview:** Viewing the first few rows gave me an idea of the data types and values.
- I dropped the transcription column early on, because I won't be using it in my analysis.
- **Summary Information:** I used `Info()` to check data types, non-null counts, and memory usage.

```
tiktok_data.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 19382 entries, 0 to 19381
Data columns (total 10 columns):
#   Column                Non-Null Count  Dtype
---  -
0   claim_status          19084 non-null  object
1   video_id              19382 non-null  int64
2   video_duration_sec    19382 non-null  int64
3   verified_status       19382 non-null  object
4   author_ban_status     19382 non-null  object
5   video_view_count      19084 non-null  float64
6   video_like_count      19084 non-null  float64
7   video_share_count     19084 non-null  float64
8   video_download_count  19084 non-null  float64
9   video_comment_count   19084 non-null  float64
dtypes: float64(5), int64(2), object(3)
memory usage: 1.5+ MB
```

- **Descriptive Statistics:** I calculated metrics like mean, min, max, and percentiles for numerical columns to understand their distributions.

```
[8]: categorical=tiktok_data.select_dtypes(include=['object'])
numerical=tiktok_data.select_dtypes(include=['float', 'int'])

# Descriptive statistics
numerical.describe()
```

|       | video_id     | video_duration_sec | video_view_count | video_like_count | video_share_count | video_download_count | video_comment_count |
|-------|--------------|--------------------|------------------|------------------|-------------------|----------------------|---------------------|
| count | 1.938200e+04 | 19382.000000       | 19084.000000     | 19084.000000     | 19084.000000      | 19084.000000         | 19084.000000        |
| mean  | 5.627454e+09 | 32.421732          | 254708.558688    | 84304.636030     | 16735.248323      | 1049.429627          | 349.312146          |
| std   | 2.536440e+09 | 16.229967          | 322893.280814    | 133420.546814    | 32036.174350      | 2004.299894          | 799.638865          |
| min   | 1.234959e+09 | 5.000000           | 20.000000        | 0.000000         | 0.000000          | 0.000000             | 0.000000            |
| 25%   | 3.430417e+09 | 18.000000          | 4942.500000      | 810.750000       | 115.000000        | 7.000000             | 1.000000            |
| 50%   | 5.618664e+09 | 32.000000          | 9954.500000      | 3403.500000      | 717.000000        | 46.000000            | 9.000000            |
| 75%   | 7.843960e+09 | 47.000000          | 504327.000000    | 125020.000000    | 18222.000000      | 1156.250000          | 292.000000          |
| max   | 9.999873e+09 | 60.000000          | 999817.000000    | 657830.000000    | 256130.000000     | 14994.000000         | 9599.000000         |

- **Unique Values:** I identified video\_id as the unique identifier for the dataset, ensuring each row corresponds to a distinct video.

```
[9]: unique = [col for col in tiktok_data.columns if tiktok_data[col].nunique() == len(tiktok_data)]
unique

[9]: ['video_id']
```

## 2. Content Discovery:

I looked deeper into the content to identify issues:

- **Missing Values:** I found missing data in 298 rows, mainly in claim\_status and video\_view\_count. Most of these null values were located in the last rows of my dataset.

```
1]: nulls=tiktok_data.isna().sum()
    print("Number of Nulls in Tiktok dataset:\n",nulls)

Number of Nulls in Tiktok dataset:
  claim_status      298
  video_id          0
  video_duration_sec 0
  verified_status   0
  author_ban_status 0
  video_view_count  298
  video_like_count  298
  video_share_count 298
  video_download_count 298
  video_comment_count 298
  dtype: int64

2]: missing_values = tiktok_data[tiktok_data.isna().any(axis=1)]
    print("Shape: ", missing_values.shape)

Shape: (298, 10)
```

- **Zero Values:** Columns like video\_download\_count had zero values. However, due to the nature of my data, this is normal, as it indicates that some videos simply didn't get views. These values are still relevant to my analysis.

```
4]: zero_values = (tiktok_data == 0).sum(axis=0)
    print("Zero values in each column:")
    print(zero_values)

Zero values in each column:
  claim_status      0
  video_id          0
  video_duration_sec 0
  verified_status   0
  author_ban_status 0
  video_view_count  0
  video_like_count   4
  video_share_count  99
  video_download_count 977
  video_comment_count 3434
  dtype: int64
```

- **Duplicate Detection:** I confirmed there were no duplicate rows in the dataset.

### 3. Relationship Discovery:

- **Encoding Categorical Features:** I encoded categorical features like `claim_status`, `verified_status`, and `author_ban_status` to convert them into numerical formats. This step was essential for ensuring these features could be included in correlation analysis and other numerical computations.

```
for col in categorical:
    print(col+ " values: ",categorical[col].unique())

claim_status values: ['claim' 'opinion' nan]
verified_status values: ['not verified' 'verified']
author_ban_status values: ['under review' 'active' 'banned']
```

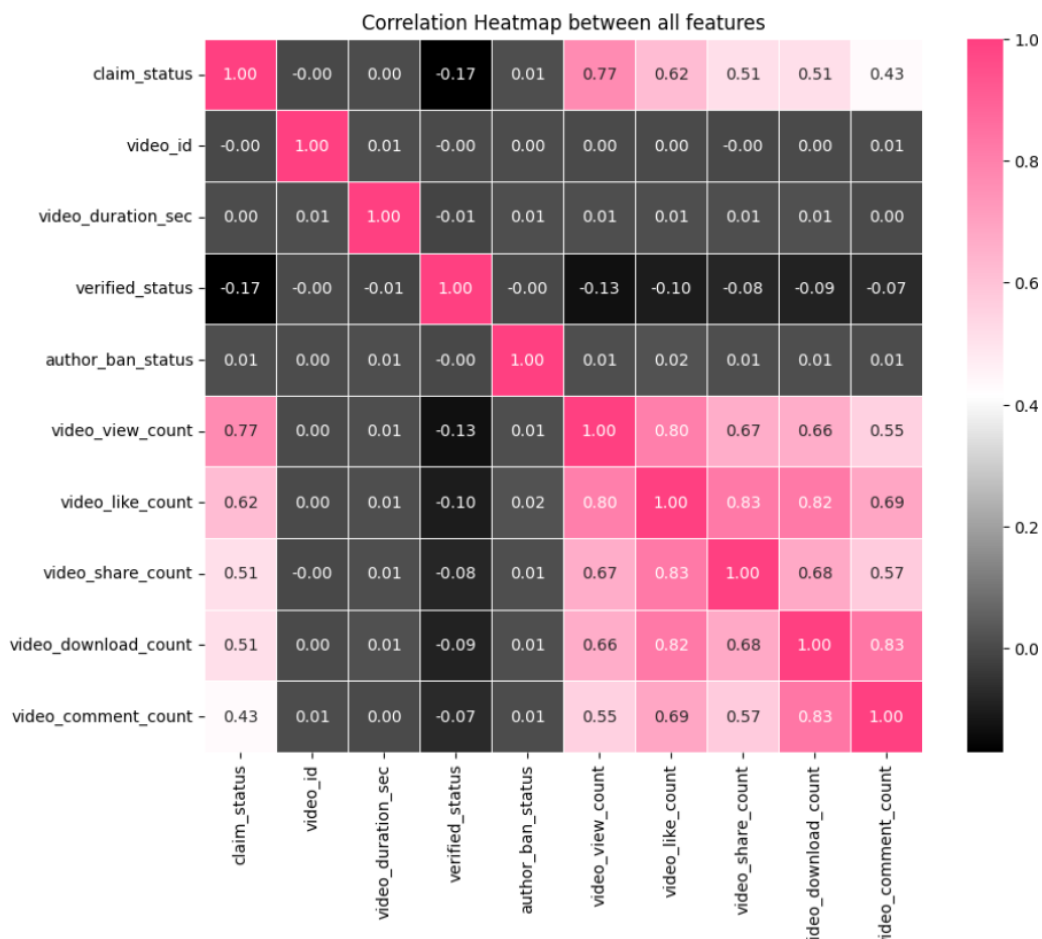
```
: encoding_dict = {
    "claim_status": {"claim": 1, "opinion": 0, np.nan: -1},
    "verified_status": {"not verified": 0, "verified": 1},
    "author_ban_status": {"under review": 0, "active": 1, "banned": 2}
}
# Replacing original columns with encoded values
for col, mapping in encoding_dict.items():
    data2[col] = data2[col].map(mapping)

|
data2.head()
```

|   | claim_status | video_id   | video_duration_sec | verified_status | author_ban_status |
|---|--------------|------------|--------------------|-----------------|-------------------|
| 0 | 1            | 7017666017 | 59                 | 0               | 0                 |
| 1 | 1            | 4014381136 | 32                 | 0               | 1                 |
| 2 | 1            | 9859838091 | 31                 | 0               | 1                 |
| 3 | 1            | 1866847991 | 25                 | 0               | 1                 |
| 4 | 1            | 7105231098 | 19                 | 0               | 1                 |

- **Correlation Matrix:** I calculated the correlation coefficients between all columns using the `.corr()` function. This helped quantify the strength and direction of the relationships between variables. For example:

- video\_view\_count and video\_like\_count showed a strong positive correlation (0.80), indicating that videos with more views tend to have more likes.
- video\_download\_count and video\_share\_count also had a strong correlation (0.68), suggesting that shared videos are more likely to be downloaded.
- **Heatmap Visualization:** I used a heatmap to visually represent these correlations. The heatmap highlighted key relationships, such as the clustering of interactions between video\_view\_count, video\_like\_count, and video\_share\_count. Additionally, the relationship between claim\_status and video\_view\_count was evident, reinforcing its relevance to my main idea. This visualization made it easier to identify patterns that might influence my future analyses.



### 3. Data Wrangling

In this phase, I focused on cleaning and transforming the TikTok dataset to prepare it for effective analysis. The wrangling process addressed missing values, outliers, and feature engineering to create a dataset ready for deriving insights.

#### 1. Handling Missing Values

As part of cleaning the dataset, I identified missing values using the `.isna().sum()` method. It turned out that 298 rows had missing values in critical columns like `claim_status` and engagement metrics (`video_view_count`, `video_like_count`, etc.).

I decided to drop these rows for a few important reasons:

- **Missing Classification Data:** The `claim_status` column, which indicates whether a video is a claim or an opinion, was missing for these rows. Since this classification is central to my analysis, keeping these rows would add ambiguity without contributing meaningful insights.
- **Irrelevant Engagement Metrics:** These rows also lacked values in key engagement metrics like `video_view_count` and `video_like_count`. Without this data, these rows didn't provide value for understanding video performance or engagement trends.

I realized that keeping these rows would only introduce noise to the dataset and reduce the reliability of the analysis. By dropping them, I ensured that the remaining dataset was clean and focused on relevant and complete data.

After dropping the rows, I verified that there were no missing values left in the dataset, allowing me to move forward confidently.

```
tiktok_data=tiktok_data.dropna()
tiktok_data.isna().sum()

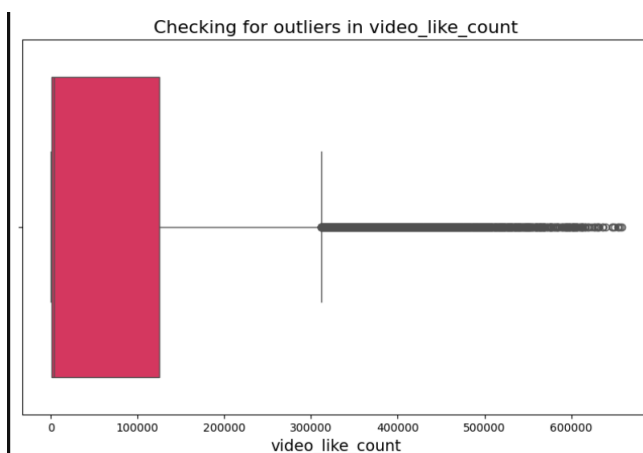
claim_status      0
video_id          0
video_duration_sec 0
verified_status    0
author_ban_status 0
video_view_count   0
video_like_count   0
video_share_count  0
video_download_count 0
video_comment_count 0
dtype: int64
```

## 2. Outlier Detection and Analysis

I used boxplots for numerical columns (video\_duration\_sec, video\_view\_count, video\_like\_count, etc.) to visually identify outliers.

### Steps:

- I created a reusable function to generate boxplots for each numerical column.
- Observed significant outliers, especially in video\_like\_count and video\_view\_count, where a few videos had exceptionally high engagement metrics.



```
numerical=tiktok_data.select_dtypes(include=['float', 'int'])

def boxplot(column):
    plt.figure(figsize=(10, 6))
    ax = sns.boxplot(data=tiktok_data, x=numerical[f"{column}"], color="#EE1D52")
    plt.title(f"Checking for outliers in {column}", fontsize=16)
    plt.xlabel(column, fontsize=14)
    plt.show()

boxplot("video_duration_sec")
print("\n"+"-"*140+"\n")
boxplot("video_view_count")
print("\n"+"-"*140+"\n")
boxplot("video_like_count")
print("\n"+"-"*140+"\n")
boxplot("video_share_count")
print("\n"+"-"*140+"\n")
boxplot("video_comment_count")
print("\n"+"-"*140+"\n")
boxplot("video_download_count")
```



## Median vs Mean Analysis to see the influence of outliers:

- I calculated the mean and median for each numerical column to evaluate the influence of outliers.
- I noticed a significant difference between the mean and median in metrics like video\_view\_count and video\_like\_count, confirming the impact of outliers.

```
print("Median VS Mean to inspect the affect of outliers\n")
summary_df = numerical.agg(['mean', 'median']).transpose()
summary_df.columns = ['Mean', 'Median']

summary_df
```

Median VS Mean to inspect the affect of outliers

|                      | Mean         | Median       |
|----------------------|--------------|--------------|
| video_id             | 5.624840e+09 | 5.609500e+09 |
| video_duration_sec   | 3.242381e+01 | 3.200000e+01 |
| video_view_count     | 2.547086e+05 | 9.954500e+03 |
| video_like_count     | 8.430464e+04 | 3.403500e+03 |
| video_share_count    | 1.673525e+04 | 7.170000e+02 |
| video_download_count | 1.049430e+03 | 4.600000e+01 |
| video_comment_count  | 3.493121e+02 | 9.000000e+00 |

Rather than dropping these outliers, I decided to retain them because they represent viral videos, which are critical for understanding engagement trends. Removing these outliers would have excluded valuable insights into what makes certain videos extraordinarily popular. To manage this effectively, I created a Video Classification feature, categorizing videos into levels of engagement (Unpopular, Typical, Popular, Viral). This allowed me to highlight and analyze outliers without compromising the overall structure of the dataset.

### 3. Handling Outliers and Creating New Features

To handle the outliers in my dataset, I created a new feature called Total Interactions, which aggregates key engagement metrics: video\_view\_count, video\_like\_count, video\_comment\_count, and video\_share\_count.

This feature also provides a view of overall engagement, offering a clearer understanding of trends while reducing the impact of extreme values.

```
tiktok_data.loc[:, 'Total Interactions'] = (  
    tiktok_data['video_view_count'] +  
    tiktok_data['video_like_count'] +  
    tiktok_data['video_comment_count'] +  
    tiktok_data['video_share_count']  
)
```

After creating the feature, I classified the videos into four distinct categories—Unpopular, Typical, Popular, and Viral—using percentile thresholds (25th, 75th, and 95th percentiles of Total Interactions). These thresholds helped me categorize videos based on their engagement levels.

```
# Calculating percentiles for thresholds  
p25 = tiktok_data['Total Interactions'].quantile(0.25) # 25th percentile  
p75 = tiktok_data['Total Interactions'].quantile(0.75) # 75th percentile  
p95 = tiktok_data['Total Interactions'].quantile(0.95) # 95th percentile  
  
def classify_video(total_interactions):  
    if total_interactions >= p95:  
        return 'Viral'  
    elif total_interactions >= p75:  
        return 'Popular'  
    elif total_interactions >= p25:  
        return 'Typical'  
    else:  
        return 'Unpopular'  
  
tiktok_data['Video Classification'] = tiktok_data['Total Interactions'].apply(classify_video)
```

This classification approach allowed me to include outliers in a meaningful way. Instead of discarding videos with exceptionally high engagement (e.g., viral videos), I treated them as valuable insights for understanding trends in user interaction and engagement behavior.

```
classification_counts=tiktok_data['Video Classification'].value_counts()
print("Counts of each classification:")
print(classification_counts)
```

```
Counts of each classification:
Video Classification
Typical      9542
Unpopular    4771
Popular      3816
Viral         955
Name: count, dtype: int64
```

By integrating outliers into my analysis through classification, I ensured that my dataset reflected real-world patterns and behaviors while minimizing the distortion caused by extreme values. This step enhanced the interpretability and relevance of my findings, making the data more robust and insightful for further analysis.

## 4. Datable Schema:

| Column Name          | Data Type | Description   |
|----------------------|-----------|---|
| claim_status         | String    | Indicates whether the video is a claim or opinion.  |
| video_id             | Integer   | Unique identifier for each video.   |
| video_duration_sec   | Integer   | Duration of the video in seconds.   |
| verified_status      | String    | Indicates whether the author of the video is verified (verified/not verified).              |
| author_ban_status    | String    | Status of the author account (e.g., active, under review, or banned).                       |
| video_view_count     | Integer   | Number of views the video received.   |
| video_like_count     | Integer   | Number of likes the video received.   |
| video_share_count    | Integer   | Number of times the video was shared.   |
| video_download_count | Integer   | Number of times the video was downloaded.   |
| video_comment_count  | Integer   | Number of comments on the video.  |
| Total Interactions   | Integer   | Sum of all interactions: views, likes, comments, and shares, reflecting overall engagement. |

## 5. Influencers Dataset:

- **Structure and Content Discovery:** I explored the structure and identified key attributes like rank, followers, likes, and country, while noting any missing values.

```

In [ ]: influencers_data.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50 entries, 0 to 49
Data columns (total 7 columns):
 #   Column              Non-Null Count  Dtype  
---  -
 0   Rank                50 non-null    int64  
 1   Username            50 non-null    object  
 2   Owner               50 non-null    object  
 3   Followers(millions) 50 non-null    float64 
 4   Likes(billions)     50 non-null    float64 
 5   Description         50 non-null    object  
 6   Country             37 non-null    object  
dtypes: float64(2), int64(1), object(4)
memory usage: 2.9+ KB

```

```

influencers_data.describe()

      Rank  Followers(millions)  Likes(billions)
count  50.000000             50.000000      50.000000
mean   25.500000             58.184000      1.762400
std    14.57738              25.190048      1.820001
min     1.00000              38.300000      0.260000
25%    13.25000              43.000000      0.750000
50%    25.50000              50.550000      1.300000
75%    37.75000              62.250000      2.100000
max     50.00000             162.200000     11.500000

```

- **Handling Missing Values:** I identified missing country values for several influencers. Using researched mappings based on usernames, I filled in the missing data to ensure consistency without assumptions.

```
nan_countries = influencers_data[influencers_data['Country'].isna()]
nan_countries['Owner']

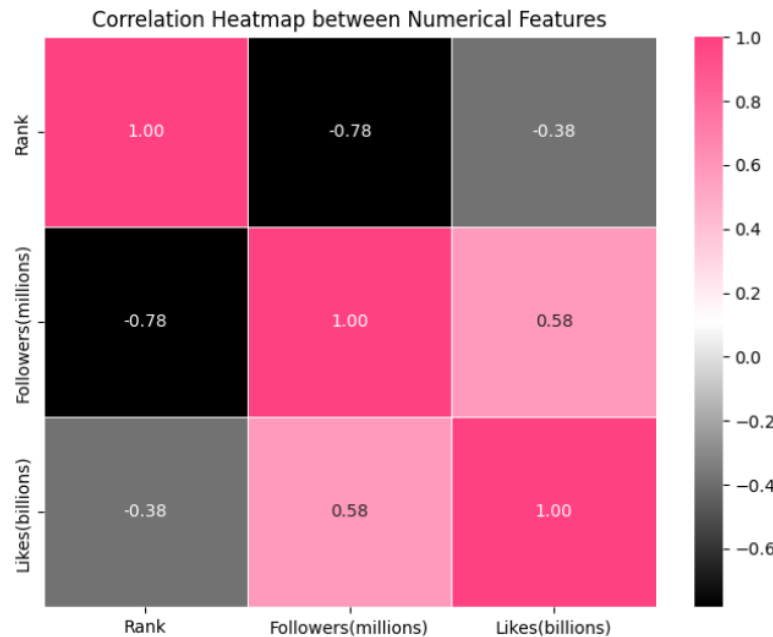
4          Addison Rae
10         The Rock
14        Jason Derulo
15       Dixie D'Amelio
18       Kylie Jenner
19       Loren Gray
21       Younes Zarou
33        Joe Albanese
34       Junya Gou
35  Pongámoslo a Prueba
36       Avani Gregg
37       Rod Contreras
38        Ria Ricis
Name: Owner, dtype: object
```

```
: #mapping users to countries based on reserach
username_to_country = {
    '@addisonre': 'United States',
    '@therock': 'United States',
    '@jasonderulo': 'United States',
    '@dixiedamelio': 'United States',
    '@kyliejenner': 'United States',
    '@lorengray': 'United States',
    '@youneszarou': 'Germany',
    '@joealbanese': 'United States',
    '@junyagou': 'Japan',
    '@pongamoslo_a_prueba': 'Mexico',
    '@avani': 'United States',
    '@elrodcontreras': 'Mexico',
    '@riaricis': 'Indonesia'
}

influencers_data['Country'] = influencers_data.apply(
    lambda row: username_to_country[row['Username']] if pd.isna(row['Country']) else row['Country'],
    axis=1
)
```

- **Outlier Detection:** I created boxplots for numerical fields like followers and likes to detect significant outliers. Instead of removing them, I retained the outliers, as they represent valuable insights about highly successful influencers.

- **Correlation Analysis:** By generating a heatmap, I examined relationships between numerical features, observing notable correlations like followers to likes, which validated trends in engagement.



- **Data Cleaning and Transformation:** I ensured no duplicates or unnecessary zero values existed, maintaining the dataset's integrity for further analysis.
- **Data Table Schema**

| Column Name         | Data Type | Description   |
|---------------------|-----------|---|
| Rank                | Integer   | Rank of the influencer based on popularity metrics.                     |
| Username            | String    | Social media username of the influencer.                                |
| Owner               | String    | Real name of the influencer.  |
| Followers(millions) | Float     | Number of followers the influencer has in millions.                     |
| Likes(billions)     | Float     | Total number of likes received by the influencer's content in billions. |
| Description         | String    | A brief description of the influencer's niche or role.                  |
| Country             | String    | Country associated with the influencer.                                 |







Get & Transform Data

Queries & Connections

Data Types

Sort & Filter

A1

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