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Clash Royale Data Intern Test

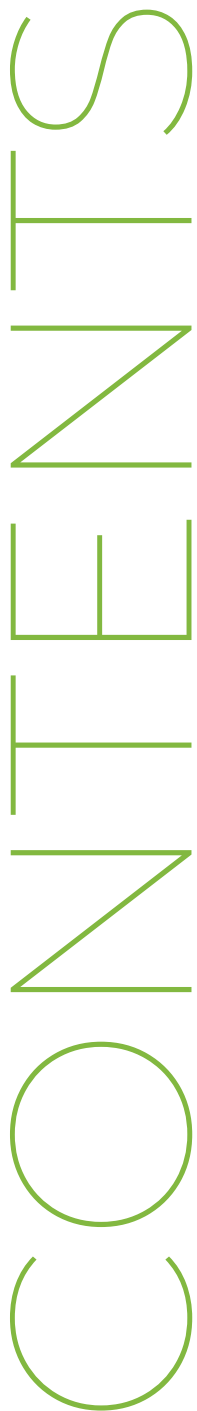
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Table of Contents



01

Project Description

01.

Short Description

02.

Analysis of DAU (Daily Active Users)

03.

Analyse Sale

04.

Geographic Split of Revenue and Users

05.

Average Revenue per User per Market

05.

Observations

06.

Stats

Project Description

The data analysis was conducted in Google Colab using Python as the primary language for data processing, exploratory analysis, and generating visualizations. SQL queries were executed within Python to extract and manipulate data directly from the SQLite database, facilitating comprehensive data analysis. The link to the Colab Notebook: [Project Link](#). Special thanks to Supercell for providing the SQLite sample game dataset which facilitated the analyzing and is the backbone of this analysis.

1. Short Description

The provided dataset consists of information from a hypothetical free-to-play mobile game. It's stored in a SQLite database and contains three main tables: account, account_date_session, and iap_purchase. The data is related to activities and interactions within the game during the year 2016 (as seen in the during data exploration). The dataset seems to offer a comprehensive view of user profiles, user activity sessions, and in-app purchase transactions, enabling analysis related to user engagement, revenue generation, geographic distribution of users, trends over time, and more within the context of the mobile game during the year 2016.

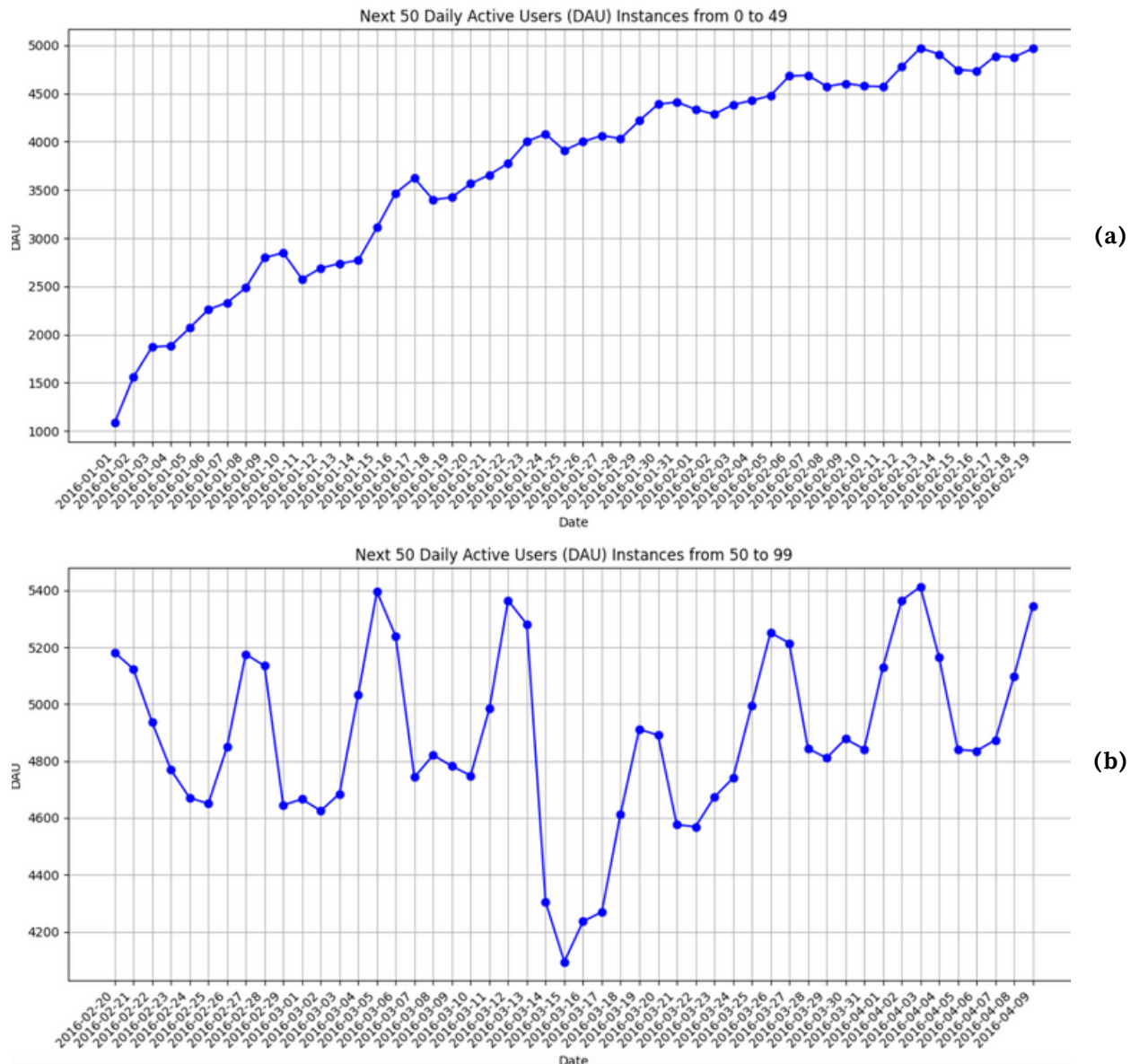


Fig 1: Daily Active User (DAU) Graph

2. Analysis of DAU (Daily Active Users)

So from the plot we can see that the number of daily active users is rising steadily starting 01.01.2016 which suggest that the game was started to roll out during this period and thus started to gain users [Refer Fig 1 (a)] I have plotted the graphs in the interval of 50 samples for better visibility and clarity [since there are a total instances of 366 rows (data points), therefore there are a total of 8 plots aka phases] It was a effective way to visualize the DAU instances in smaller segments to avoid overwhelming the plot with too many data points at once. While the first few instances show gradual increase in the number of daily active users the subsequent plots show that there are infrequent fluctuation in the Daily Active Users. However, just within the initial phase, the DAU reached the upper mark of 5400 first time on 05-03-2016, suggesting initial success.

The Mean Daily Active Users (DAU) which was calculated as 4642.005, indicated that the average number of users engaged with the application per day. The Standard Deviation (SD) of 628.269 suggested the variability or spread of the DAU values around the mean. This SD indicates that most of the DAU values are within approximately plus or minus 628 from the mean value, following a normal distribution pattern.

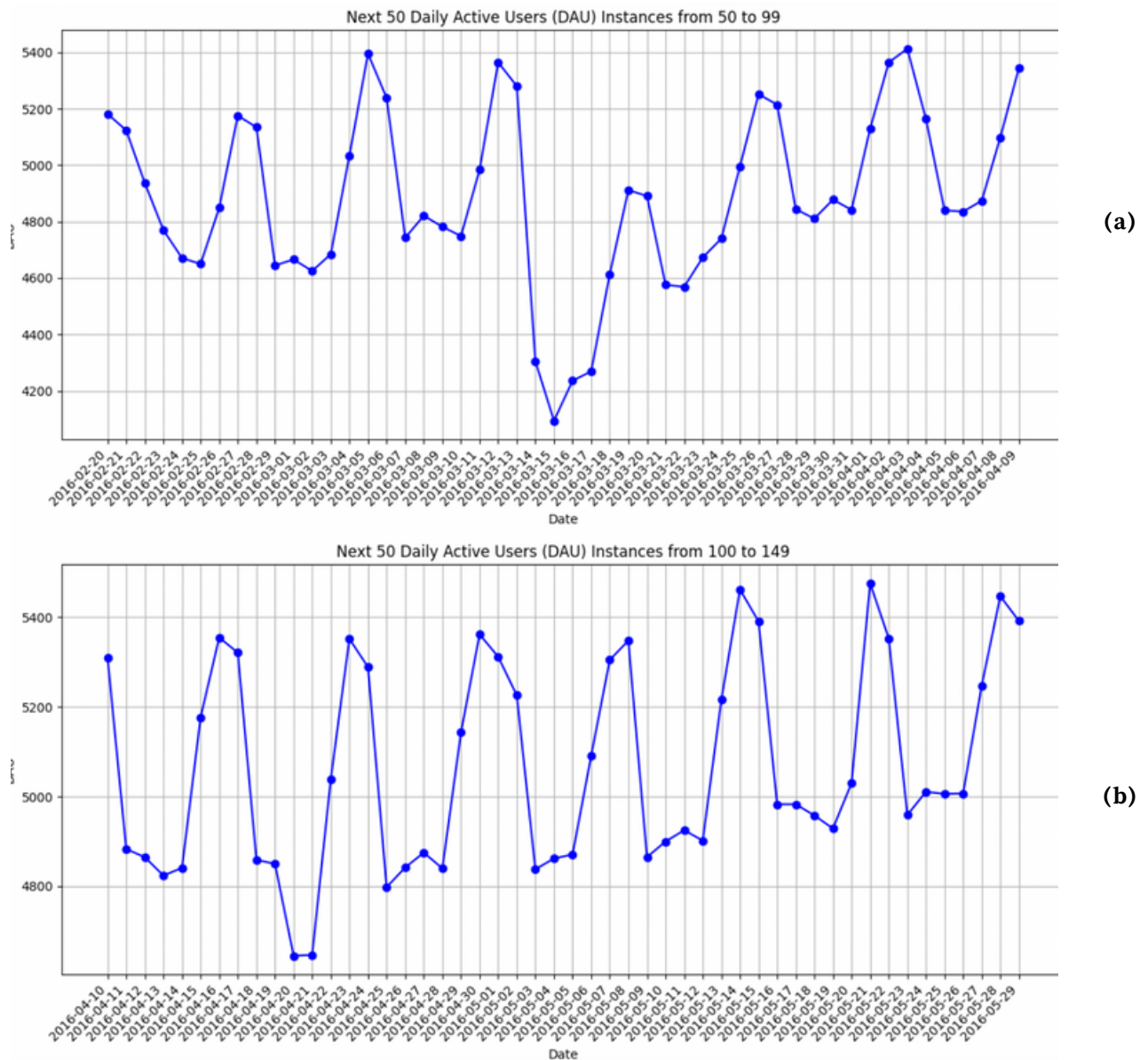


Fig 2: Daily Active User (DAU) Graph

The DAU on average reached its peak during the initial phase which indicate that the game is garnering popularity among the users. It hit record high on 21-05-2016 [shown in Fig 2 (a)], indicating that it reached popularity almost 5 months after its release (assuming the date in the format of dd-mm-yyyy). The lowest dip in the DAU after gaining users and stabilizing was noticed on 08-09-2016 and 10-11-16. Baring some extreme ups and downs, majority of DAU after crossing 4000 during the roll out remains under the range of 4000- sub 5400 conforming to the mean value of 4642 users that the analysis yielded previously.

Regarding the reason for the fluctuation in DAU, these can be influenced by several factors in the context of the gaming environment:

- Seasonal Trends: Varied user engagement during holidays or vacation periods.
- Product Updates: Impact on engagement due to new features, bugs, or updates.
- Marketing Impact: User activity changes based on successful or failed ad campaigns.
- External Events: Influence from global events, news, or market changes.
- Technical Issues: User activity fluctuations due to server or app problems.

For instance, changes in user engagement might occur due to positive events such as successful marketing campaigns or the introduction of new features, as well as negative events like technical issues or unsuccessful marketing efforts.

It is however difficult to pinpoint the exact cause without getting the overall context of the game life cycle as in what exactly happened during that specific Ups or Downs.

3. Analyse Sale

As per the provided dataset:

Revenue by Country (Fig 3):

- The 'Revenue by Country' section presents the total revenue generated (in iap_price_usd_cents) per country. Each country_code is associated with the total revenue generated through in-app purchases.

User Distribution by Country (Fig 4):

- The 'User Distribution by Country' section displays the distribution of users per country. Each country_code is associated with the number of users from that particular country

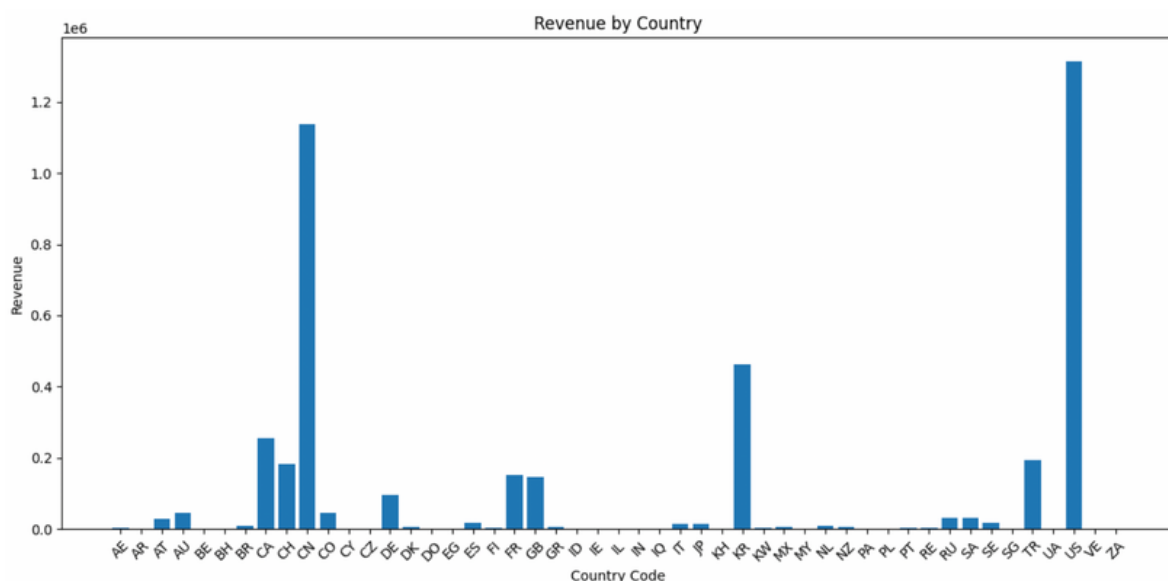
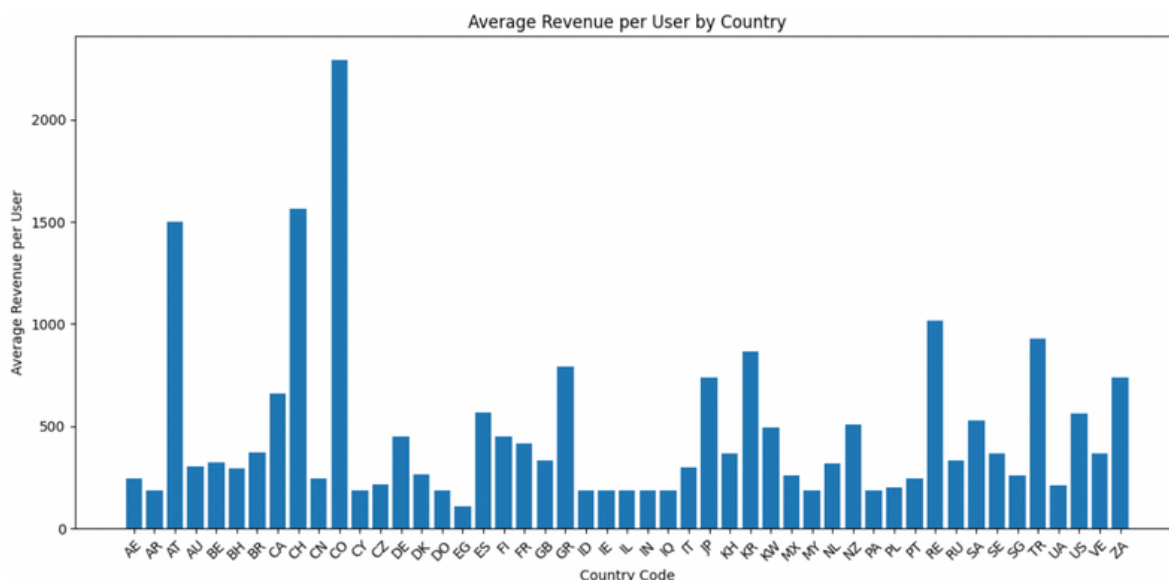
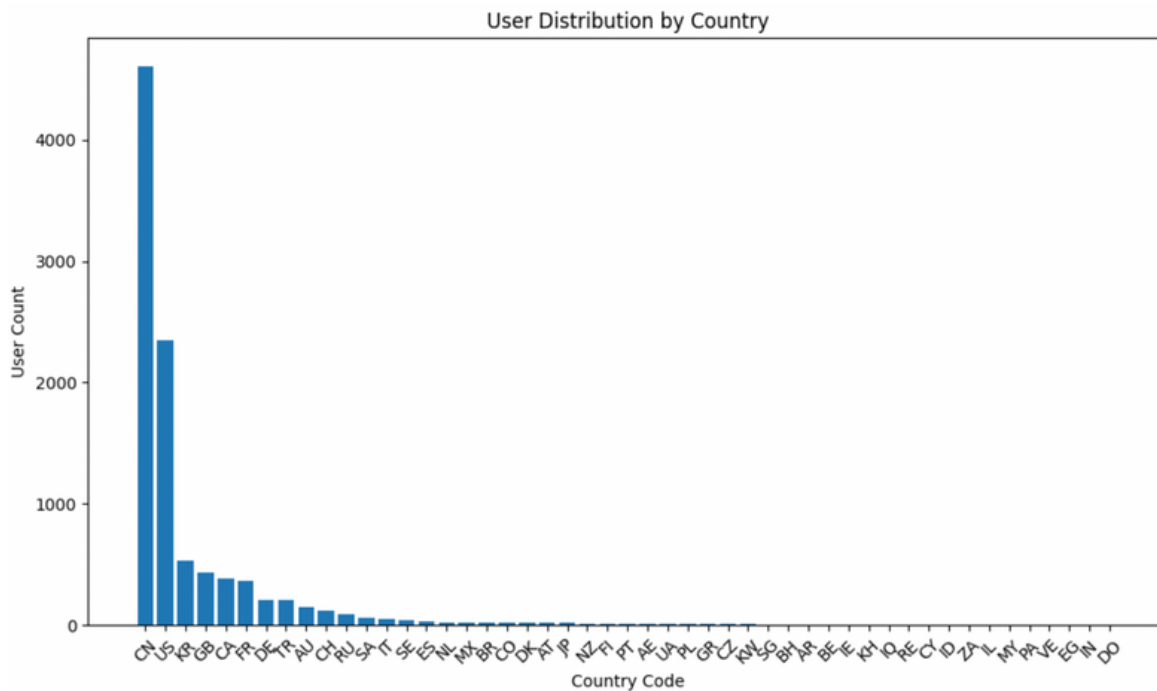


Fig: 3- Revenue by Country



Geographic Split of Revenue and Users

1.Revenue Analysis by Country:

- The analysis reveals a diverse spread of revenue across different countries or regions.
- Notably higher revenues are observed in countries such as the United States (US), China (CN), South Korea (KR), and Canada (CA)*.
- Conversely, other regions contribute less to the total revenue generated from in-app purchases (Such as Dominican Republic and Malaysia).

2. User Distribution by Country (Fig 4):

- Similar to revenue, user distribution displays significant variations across countries.
- Predominantly higher user counts are found in countries like China (CN), the United States (US), South Korea (KR)*, among others.
- Some countries with lower user counts might contribute less to the overall revenue, despite having potentially higher average revenue per user (For example, Colombia and Switzerland strikingly).

* Assuming country code CO, CH stand for Colombia, Switzerland respectively and likewise, Source: Internet.

Average Revenue per User per Market

1. Average Revenue per User Analysis (Fig 5):

- This analysis provides insights into the average revenue generated per user in specific countries or markets.
- It highlights monetization effectiveness in various regions, indicating how much, on average, each user contributes to revenue in a particular country.
- Countries like Colombia (CO), Switzerland (CH), and Austria (AT)* exhibit higher average revenue per user, suggesting potential revenue growth opportunities or more engaged user bases.

The above examples highlight that a high user count doesn't always translate to higher revenue, and understanding the nuances between user engagement and spending behavior across various markets is essential for optimizing revenue per user

Observations

1. User Count vs. Average Revenue per User:

- Some regions with a lower user count demonstrate higher average revenue per user, indicating potential opportunities for user engagement improvement or revenue enhancement strategies such as countries like .
- Conversely, high user count countries might have lower average revenue per user, which could signify a need for user monetization strategies or improving user engagement to drive more revenue (Example: especially true for gross high revenue countries like US and China).

2. Revenue and User Distribution Disparity:

- Higher revenue does not always directly align with a larger user base. Understanding user behavior and preferences in regions with varying revenue and user counts is vital for strategic decision-making (Example USA).
- Analyzing the average revenue per user allows for a deeper understanding of user behavior in different markets, offering opportunities for targeted marketing and user retention strategies.

These observations underscore the need for businesses to devise and align their strategies according to the revenue distribution, user engagement, and average revenue per user across different markets.

Some Interesting Stats

Highest Revenue Generating Countries:

1. **United States (US):** Generated \$1,314,818** in revenue.
2. **China (CN):** Generated \$1,136,507 in revenue.
3. **South Korea (KR):** Generated \$463,518 in revenue.
4. **Canada (CA):** Generated \$254,506 in revenue.
5. **Turkey (TR):** Generated \$193,339 in revenue.

Countries with Highest Average Revenue per User:

1. **Colombia (CO):** \$2293 average revenue per user.
2. **Switzerland (CH):** \$1562.17 average revenue per user.
3. **Austria (AT):** \$1498.47 average revenue per user.
4. **Réunion (RE):** \$1016.5 average revenue per user.
5. **Turkey (TR):** \$929.51 average revenue per user.

Countries with Lowest Average Revenue per User:

1. **Egypt (EG):** \$110 average revenue per user.
2. **Israel (IL):** \$184 average revenue per user.
3. **Cyprus (CY):** \$184 average revenue per user.
4. **Dominican Republic (DO):** \$184 average revenue per user.
5. **India (IN):** \$184 average revenue per user.

Unique Insights:

- **China (CN) User Distribution:** Holds the highest number of users, totaling 4610.
- **United States (US) Revenue:** Tops the revenue chart, amassing \$1,314,818, with a significant number of users, 2345.
- **South Korea (KR) Average Revenue:** Notably high average revenue per user at \$864.77.
- **Canada (CA) and Germany (DE):** Display substantial revenue figures at \$254,506 and \$94,621, respectively.

** Assuming currency value to be in US Dollars (\$).

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Total Revenue generated by all the countries

**\$1,314,818
(30.94%)**

Contributed by the United States making it the top revenue generating country (gross)

4610 USERS

From China making it the country with the highest number of users that play this game

\$2,293 / USER

Colombia stands as the Top Average Revenue per User producing country



SPECIAL THANKS TO SUPERCELL FOR PROVIDING THE SQLITE SAMPLE GAME DATASET WHICH FACILITATED THE ANALYZING AND IS THE BACKBONE OF THIS ANALYSIS 🙌😊.