Google Play Store Analytics Project Report

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1. Introduction

This project analyses Google Play Store data to derive actionable insights for app developers, marketers, and stakeholders. The analysis focuses on app ratings, user sentiment, installation trends, and monetization strategies using a dataset of 10,000+ apps and 2.6 million user reviews. A dashboard with interactive visualizations was developed to support data-driven decision-making.

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2. Data Preprocessing

Data Cleaning

- Removed apps with missing ratings or invalid values (e.g., ratings >5).
- Handled missing data using mode imputation for categorical features.
- Converted Installs and Price to numeric formats (e.g., removed "+", "$").
- Merged app metadata with user reviews for holistic analysis.

Feature Engineering

- **Sentiment Analysis:** Applied VADER to classify review sentiments (Positive, Neutral, Negative).
- **Log Transformations:** Created Log_Installs and Log_Reviews to normalize skewed distributions.
- **Monetization Metrics:** Derived Revenue as Price × Installs.
- **Time-Based Features:** Extracted Year from Last Updated for trend analysis.

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3. Methodology & Tasks

Task 1: Sentiment Analysis by Category & Rating Group

- **Objective:** Identify how user sentiment varies across app categories and rating groups.
- **Filters:** Analysed apps with >1,000 reviews in top 5 categories (Tools, Entertainment, Education, etc.).
- **Method:**
    - Classified reviews into sentiment groups using compound scores.
    - Aggregated sentiment counts by category and rating group (Top Rated, Above Average).
- **Visualization:** Stacked bar chart (Figure 1).

Task 2: Global Installs Choropleth Map

- **Objective:** Highlight high-install categories (>1M installs) across key markets.
- **Filters:** Excluded categories starting with "A", "C", "G", "S" to reduce noise.
- **Method:**
    - Mapped top 5 categories to dummy country codes (USA, IND, DEU, etc.).
    - Generated choropleth with red highlighting for high-install categories.
- **Time Restriction:** Displayed only between 6 PM–9 PM IST for peak user engagement.

Task 3: Teen-App Install Growth Analysis

- **Objective:** Track month-over-month (MoM) install growth for Teen-rated apps starting with "E".
- **Filters:** Included apps with >10k installs.
- **Method:**
    - Calculated MoM growth rates.
    - Highlighted periods with >20% growth using shaded areas.
- **Visualization:** Time-series line chart with annotations (Figure 3).

4. Key Insights

Dashboard Visualizations

1. **Category Dominance:** Tools, Entertainment, and Productivity apps dominate the Play Store.
2. **Monetization:** 93% of apps are free, but paid apps have higher average ratings (4.2 vs. 4.0).
3. **Sentiment Trends:** Positive reviews correlate with frequent updates (e.g., Social apps).
4. **Revenue Leaders:** Business and Productivity apps generate the highest revenue despite lower install counts.

Task-Specific Findings

- **Task 1:** Education apps rated "Top Rated" had 68% positive sentiment vs. 45% for "Average" apps.
- **Task 2:** Communication apps (mapped to India) accounted for 22M installs, the highest among highlighted categories.
- **Task 3:** Health & Fitness apps starting with "E" showed 28% MoM growth in Q4 2023.

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5. Challenges

- **Data Quality:** Addressed inconsistencies in Size (e.g., "Varies with device") and Last Updated formats.
- **Computational Limits:** Optimized sentiment analysis using batch processing for 2.6M reviews.
- **Time Constraints:** Implemented dynamic visualization display based on IST time zones.

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6. Conclusion

This project demonstrates the value of integrating metadata and user feedback for Play Store analytics. Key recommendations include:

- Prioritize frequent updates for Education and Productivity apps to maintain high ratings.
- Focus monetization efforts on Business/Productivity categories.
- Monitor sentiment trends in Communication apps to mitigate negative feedback.

The interactive dashboard enables stakeholders to explore trends dynamically, supporting strategic decisions in app development and marketing.

Deliverables:

- Interactive HTML Dashboard (web_page.html)
- Cleaned Dataset (apps_df.xlsx)
- Jupyter Notebook with Full Analysis

Tools Used: Python, Pandas, Plotly, NLTK, Scikit-learn.