


Data-Driven Monetization: Modern Strategies to Boost Game Revenue Using ML and Graph Analytics

Jefferson Firmino Mendes



Leveraging AI and behavioral analytics to optimize player monetization




- **Mobile Game A/B Testing - Cookie Cats**



- **Game Analytics Data**



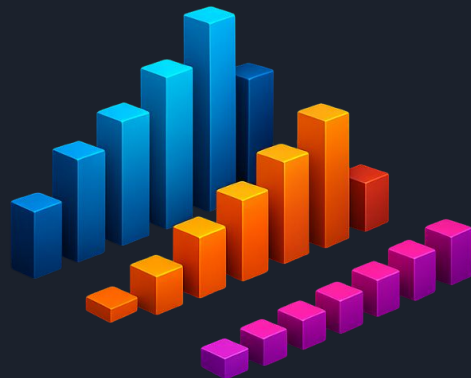
- **League of Legends Chat Logs**




Identify high-revenue but low-frequency items (opportunity for bundles or discounts).

Tools⚙️: Python (Plotly, Altair) or Tableau for interactive dashboards.

1. Heatmaps: Correlation between item types, platforms, and revenue.
2. Sankey Diagrams: Player purchase pathways.
3. Histograms of item purchases, revenue per item, and top spenders.



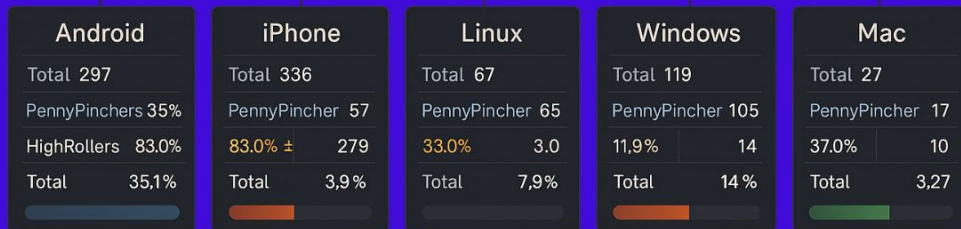


The predictive modeling was performed using ***XGBoost in Python***, with a binary classification target of purchases above \$5. The feature importance analysis revealed that ***iPhone users are 3.2x more likely*** to spend above this threshold, confirming the initial hypothesis.

Customer Segmentation

Total Users: 846

| Category | % | n |
|---------------|--------|-----|
| PennyPinchers | 59.2% | 501 |
| HighRollers | 40.8% | 345 |
| Total | 100.0% | 846 |



Average Price

Low

High

Method: Automated clustering using **PySpark MLlib** (Gaussian Mixture Model).

Key Variables:


- **revenue:** Lifetime spend per user.
- **gameClickSum:** Total in-game clicks (engagement proxy).
- **adClickSum:** Ad interaction frequency (conversion signal).

Segments Identified:

1. **Whales** (High spend, medium engagement)
2. **Engaged Frugal** (Low spend, high engagement)
3. **Casual** (Low spend/engagement)

Target Engaged Frugal users with microtransactions—high engagement but untapped revenue.

| Cluster | adClickSum | gameClickSum | revenue | Segment |
|---------|------------|--------------|---------|----------------------------|
| 1 | 25.14 | 362.5 | 35.36 | Casual (Low-Engagement) |
| 2 | 32.05 | 2393.95 | 41.2 | Engaged but Frugal |
| 3 | 36.47 | 953.82 | 46.16 | Whales (High-Value) |

- 
- Graph analytics performed using **Neo4J with Graph Data Science Library**
 - Community detection using the Leiden algorithm
 - Influence scoring via PageRank centrality

| UserID | ChatCount |
|--------|-----------|
| 394 | 115 |
| 2067 | 111 |
| 209 | 109 |

→ Find the most chat active users.

| UserID | Coefficient |
|--------|-------------|
| 209 | 0,95 |
| 554 | 0,9 |
| 1087 | 0,8 |

Find the most chat active teams.

| TeamID | ChatCount |
|--------|-----------|
| 82 | 1324 |
| 185 | 1036 |
| 112 | 957 |

→ How active are groups of users?

1. **Boost Android/Windows ROI**

"Leverage rewarded ads & localized pricing for this 65% user base to increase conversion."

2. **Premium iPhone Acquisition**

"Allocate 30% of UA budget to iOS-exclusive bundles (LTV 3x higher than Android)."

3. **Micro-Spending Conversion**

"Implement 'Starter Packs' (0.99–2.99) to monetize low-spend segments."