**Analytics\_Position\_Case\_Study**

**Introduction**

The goal of this analysis is to evaluate user engagement through loyalty points and identify the most active users for bonus distribution. By analyzing gameplay, deposit, and withdrawal data, I gained insights into user behaviour patterns, helping me design a fair reward system. This report covers the data loading process, loyalty point calculation, ranking system, bonus distribution, and observations on user engagement.

**Part A: Data Analysis for Loyalty Points Calculation**

**Step 1: Data Loading and Overview**

**Data Import and Structure**  
I loaded the Excel file containing three sheets:

* **User Gameplay Data**: Logs of users’ game activity (timestamps and games played).
* **Deposit Data**: Records of user deposits and amounts.
* **Withdrawal Data**: Logs of withdrawals made by users.

**Data Preview**  
Viewing the first few rows of each sheet allowed me to confirm the data structure and identify key columns, especially User ID and Datetime, crucial for time-based analysis.

**Step 2: Data Preprocessing**

**Datetime Conversion**: I standardized Datetime columns across all datasets to ensure consistency for time-based filtering.

**Exploratory Data Analysis**: Initial EDA helped me understand the overall distribution of games played, deposits, and withdrawals across different timeframes.

**Step 3: Loyalty Points Calculation by Time Slot**

To examine user activity across different periods of the day, I split each day into two time slots:

* **Slot S1 (00:00 - 12:00)** and **Slot S2 (12:00 - 23:59)**

I then filtered the gameplay data by each slot for specific dates, calculating the Loyalty Points (total games played) per user. This approach provided insights into user engagement during peak hours and allowed me to detect any patterns in gameplay frequency based on time.

**Step 4: Visual Analysis of Loyalty Points by Date and Slot**

A bar plot visualizing loyalty points by date and slot revealed:

* **High Engagement Days**: Certain dates showed significantly higher points, potentially tied to special events or promotions.
* **Slot Patterns**: A notable trend of higher engagement during specific slots, showing the preferred gaming times for users.

**Step 5: October Loyalty Points and Ranking**

To find the top users in October, I aggregated loyalty points across all dates within the month. Users were ranked by their total loyalty points, with additional information on:

* **Games Played Count**: Used as a secondary metric to break ties and provide insight into gameplay consistency.

The top players were sorted to facilitate bonus allocation.

**Step 6: Visualizing Top 20 Players by Loyalty Points**

A bar plot for the Top 20 Players based on loyalty points highlighted the most engaged users. This visualization helps in:

* **Identifying Power Users**: Users who consistently play and accumulate high points.
* **Understanding User Distribution**: How points are spread among top players, which is essential for designing fair incentives.

**Step 7: Average Metrics for Deposits and Games Played**

To contextualize user behaviour, I calculated:

* **Average Deposit Amount**: Overall average of deposits across users.
* **Average Deposit per User**: The mean deposit per user, indicating typical deposit habits.
* **Average Games Played per User**: A measure of general user engagement.

These averages provide benchmarks, helping me understand whether users deposit regularly and engage in a consistent number of games.

**Part B: Bonus Allocation Analysis for Top 50 Players**

**Step 8: Bonus Allocation**

The bonus allocation aimed to reward the top 50 players proportionally, based on their loyalty points. Each player’s bonus was calculated using their percentage contribution to the overall points of the top 50 players. This ensured that:

* **Active Users Are Rewarded**: The system rewards players proportionally to their engagement level.
* **Equitable Distribution**: Players with higher points receive a fair share of the total bonus pool ($50,000).

**Step 9: Bonus Visualization for Top 20 Players**

A bar plot for bonus distribution among the top 20 players illustrated the relationship between loyalty points and bonus amounts, allowing me to visualize how effectively the system rewards the highest-engagement users.

**Insights and Suggested Improvements**

**Key Insights**

**User Engagement Trends**  
Users exhibit higher gameplay activity during certain times, with specific slots seeing more engagement. Additionally, the presence of high-engagement days suggests that gameplay might correlate with specific events or incentives.

**Loyalty Points and Deposit Behaviour**  
The correlation between deposits and loyalty points indicates that engaged players tend to deposit more frequently, potentially to participate in more games or earn points.

**Suggested Enhancements**

**Involvement-Based Loyalty System**  
I propose adjusting loyalty points by including additional metrics such as:

* **Session Duration**: Points for longer gameplay sessions, rewarding sustained engagement.
* **Total Wagering Amount**: Rewarding based on the amount wagered to incentivize higher involvement.

**Implementing Declining Returns**  
A diminishing returns approach would assign fewer points for frequent, short games, encouraging balanced gameplay without allowing high-frequency players to dominate. This could distribute rewards more fairly among users with varied play patterns.

**Conclusion**

This analysis successfully quantified user engagement, ranked top players, and allocated bonuses effectively. The insights from gameplay, deposit patterns, and loyalty point trends reveal valuable opportunities for refining the loyalty system to promote balanced, fair user engagement across the platform.