Analyzing Gaming Addiction Trends and Player Engagement

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Introduction

Excessive playtime and compulsive gaming behavior impact well-being. Studies indicate 3-4% of gamers show symptoms of gaming disorder (Pontes et al., 2021).

Mental Health Impact: Gaming has been linked to increased anxiety, depression, and social isolation (Pontes et al., 2021).

Threshold for Addiction: Playing 20 or more hours per week may indicate potential gaming addiction (American Journal of Psychiatry, 2021).

The goal of this research is to analyze player engagement trends and identify factors contributing to gaming addiction.

Data

Extracted the data using the Steam Web API.

The dataset includes 99,008 user-game records with game-level data such as title, genre, release date, and review scores, and user-level data such as total playtime, recent playtime, and ownership.

Methodology

Statistical Analysis: Used descriptive statistics and correlation analysis to explore player behavior and gaming patterns.

Hypothesis Testing: Conducted a chi-square test to examine whether there is a relationship between multiplayer support and the likelihood of a player being classified as addicted.

Machine Learning: Applied a Random Forest Classifier to predict addiction risk based on game features. Evaluated using accuracy, precision, recall, and F1-score.

Assumptions:

- 20 hour/week threshold as a potential indicator of addiction.
- Data may have bias due to missing or incomplete records.
- Playtime as a proxy for addiction risk without considering other motivations.

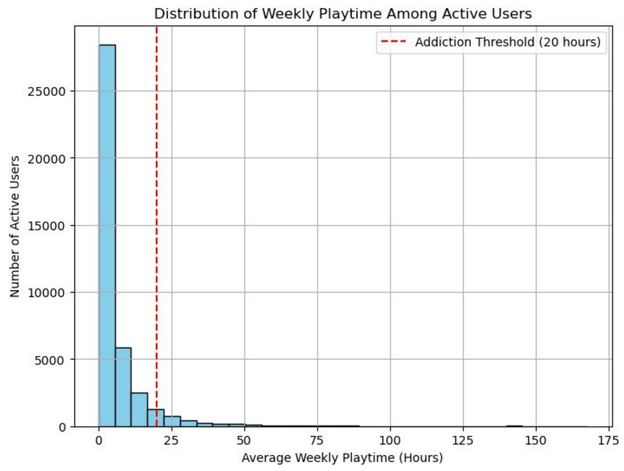

Figure 1: Distribution of Weekly Playtime Among Active Users

Figure 2: Word Cloud of Player Reviews for PUBG: BATTLEGROUNDS

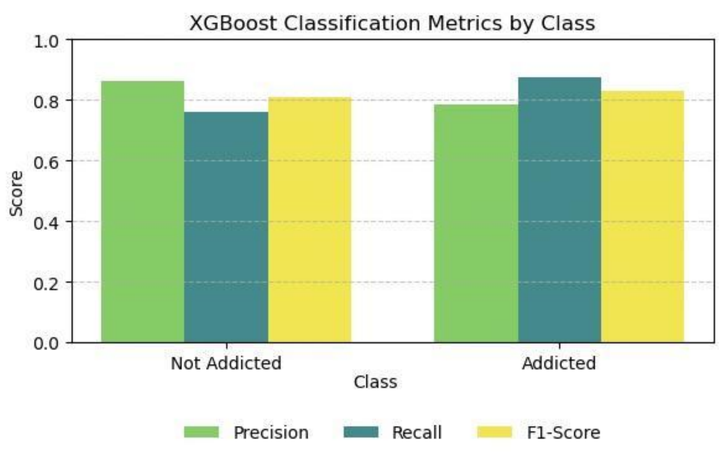

Figure 3: Classification Metrics (XGBoost)

Final Results

Gaming Behavior: Most users (75.4%) are casual gamers, while 6.6% exhibit playtime patterns suggesting potential addiction risk.

Game Features Impact: Multiplayer support and in-game purchases are linked to increased playtime, whereas review scores show a weak correlation with user engagement.

Hypothesis Test: Multiplayer games significantly contribute to higher playtime (T-stat: 90.292, p-value: 2.053×10^{-21}).

Prediction Accuracy: Machine learning models achieved an 87% accuracy in identifying addiction risk using game features.

Key Predictors of Addiction Risk: High game ownership, engagement-heavy genres (Casual, Action, Strategy), popular developers, and strong social/multiplayer elements.

Review Sentiment: Positive reviews often praised engaging gameplay, while negative reviews commonly mentioned issues with monetization and bugs.

Future Work

Apply advanced neural networks for improved gaming addiction prediction accuracy.

Use time series analysis to track and forecast long-term gaming behavior patterns.

Create dynamic dashboards to visualize and monitor addiction trends in real-time.

References

Pontes, Halley M., et al. "The Prevalence of Gaming Disorder: A Meta-Analysis of Empirical Studies." *Journal of Behavioral Addictions*, vol. 10, no. 1, 2021, pp. 20-33.

American Journal of Psychiatry. "How Much Gaming Is Too Much? An Analysis Based on Psychological Distress." *American Journal of Psychiatry*, 2021, www.ajp.org/article/gaming-addiction-threshold.