

Predicting Trolling Behaviors Using In-Game Timeline Data: A League of Legends Case Study on Divergent Mechanisms Behind AFK and Item Tier-Dropping

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EXTENDED ABSTRACT

Introduction

Trolling is one of the most frequently observed forms of disruptive behavior in online multiplayer games, yet existing research has traditionally interpreted it as behavior driven primarily by malicious intent. Prior studies describe trolling as an intentional attempt to provoke, disrupt, or violate normative expectations within play environments, emphasizing hostility as its dominant motivational basis (Cook et al., 2018; Cook et al., 2019; Hilvert-Bruce & Neill, 2020; De Mesquita Neto & Becker, 2018). However, recent qualitative work suggests that trolling is not always rooted in malice. Interview data reported by Choi & Lim (2021) indicate that some players intentionally perform trolling behaviors for strategic reasons—for example, accelerating an inevitable loss or conserving time for subsequent matches—revealing that trolling may reflect heterogeneous motivations rather than a single toxic impulse. This study constructs predictive models of trolling behaviors using large-scale timeline log data from League of Legends. Throughout this paper, we treat this research explicitly as a League of Legends case study rather than as a generalizable model of all MOBA games. League of Legends represents one of the most globally influential competitive multiplayer environments, and focusing on a single title enables clearer interpretation of system-specific mechanics and player behavior without implying universality across the genre. The results show that different trolling behaviors may emerge from distinct performance trajectories. Rather than assuming uniform contagion dynamics, the findings indicate that performance differences at the lane level and at the team level operate differently over time in shaping behavioral shifts.

Background

Trolling in online games has long been conceptualized as behavior driven primarily by malicious intent. Previous research consistently defines trolling as a purposeful attempt to provoke, disrupt, or violate normative expectations within multiplayer environments (Cook, Schaafsma, & Antheunis, 2018; Cook, Conijn, Schaafsma, &

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Antheunis, 2019; Hilvert-Bruce & Neill, 2020; De Mesquita Neto & Becker, 2018). Behavioral trolling includes actions such as inhibiting teammates, aiding opponents, or abandoning active participation, and these behaviors are consistently identified as trolling across empirical MOBA research (Kwak, Blackburn, & Han, 2015; Cook et al., 2018; Kou, 2020). A qualitative study by Choi and Lim (2021) shows that some players intentionally engage in trolling because “the game is already lost, so it is better to end it quickly and move on to the next match,” highlighting that certain trolling behaviors may reflect deliberate and efficiency-driven decision-making rather than purely hostile intent. Research on multiplayer disengagement further demonstrates that relative performance differences shape how players evaluate continued participation. Edge (2013) shows that relative disadvantage reduces perceived ability to influence match outcomes, increasing disengagement likelihood. In this study, we distinguish lane-level dominance, relative performance between a focal player and their direct lane opponent, from team-level dominance, aggregated performance differences between teams.

Data and method

This study uses approximately 2.9 million match-level timeline logs obtained via the official Riot Games Developer API. Timeline data capture event-level records including player positions, combat outcomes, gold accumulation, item transactions, and state changes throughout each match. For analytical purposes, event-level logs were aggregated into segmented time windows (0–10 minutes, 10–20 minutes, and 20+ minutes). Dominance indicators were computed separately for each segment.

Two trolling behaviors were operationalized: Away From Keyboard (AFK), defined through sustained inactivity patterns, and intentional item tier-dropping, defined as replacing higher-tier items with lower-tier ones. Relative performance measures were constructed using commonly accepted MOBA performance indicators, including Kill–Death–Assist rate (KDA) and gold differences. Binary indicators reflect whether a player or team held relative advantage within each segment.

Decision-tree classifiers were trained to derive interpretable thresholds characterizing behavioral shifts. SHapley Additive exPlanations (SHAP) values were applied to quantify feature contributions and clarify which performance disparities most strongly predict each form of trolling.

This analysis does not explicitly differentiate matches by rank/MMR bracket, queue type, or competitive stakes. While these contextual factors may shape pressure and strategic behavior, they are not directly modeled in the present study and represent an important direction for future refinement.

Results

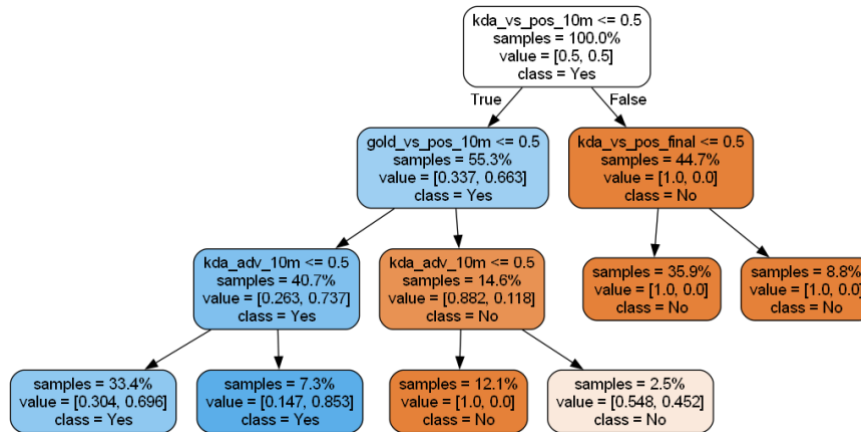


Figure 1: AFK Decision Tree. Primarily determined by early KDA disadvantage at 10 minutes, with lower gold and KDA advantages reinforcing the AFK path.

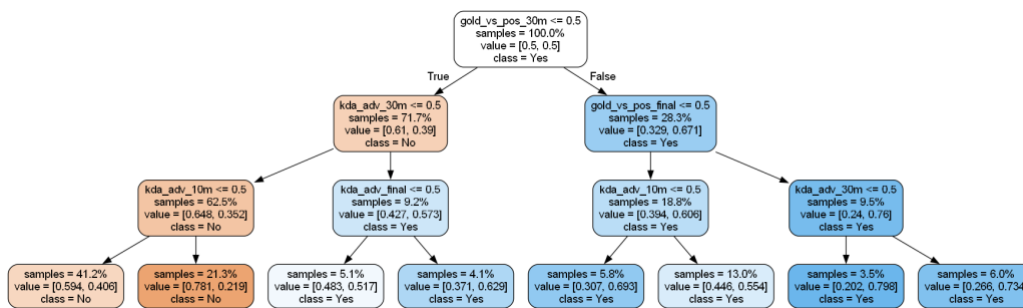


Figure 2: Item Tier-Drop Decision Tree. Driven mainly by 30-minute gold advantage, with subsequent splits shaped by early and late KDA advantage differences.

In plain terms, AFK is most strongly predicted by early, sustained disadvantage: falling behind one's lane opponent substantially increases withdrawal probability. In contrast, item tier-dropping is most strongly predicted by sustained mid-to-late game advantage. Players maintaining gold superiority around the 30-minute mark show a higher likelihood of subsequently weakening their own position by downgrading items. AFK aligns closely with patterns of prolonged relative disadvantage, indicating a withdrawal mechanism triggered when players perceive diminishing agency. Item tier-dropping, however, emerges under advantageous conditions. Because weakening one's own position while winning primarily harms one's own team rather than directly targeting the opponent, this behavior is less consistent with conventional aggression-based trolling frameworks, which emphasize hostility toward others. Instead, it may reflect alternative motivational processes such as strategic disengagement, protest against teammates, or time-efficiency considerations.

Discussion and contribution

These findings demonstrate that trolling behavior is not monolithic but reflects heterogeneous situational dynamics. AFK and item tier-dropping arise under distinct performance trajectories. AFK aligns with sustained disadvantage and diminished perceived influence. Item tier-dropping appears under sustained advantage and cannot be reduced to frustration or collapse-based explanations alone.

Although this study does not provide direct evidence of player intention, the divergence between withdrawal-based and advantage-based trolling suggests that different motivational mechanisms may operate. Integrating these findings with research on ethical game design (e.g., Sparrow, Gibbs, & Arnold, 2020) highlights the importance of considering how system-level features—such as surrender mechanics, reward structures, comeback probabilities, and item economy systems—may interact with performance trajectories to shape behavioral incentives.

Future work should combine surrender-vote logs, interviews, or chat analysis with behavioral logs to better infer the intentions underlying different trolling trajectories.

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Keywords

trolling behavior; MOBA games; game analytics; player experience; decision-tree analysis