

Automating Requirements Engineering in Game Development: An AI-Driven Approach to Player Frustration Analysis and Feedback Categorization

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EXTENDED ABSTRACT

Game development relies on a repetitive testing cycle to refine design decisions based on test feedback. However, analyzing large volumes of qualitative data is labor-intensive and is prone to human bias and error. For test results, it also lacks a standardized framework for categorizing frustrations. This paper introduces a novel framework for frustration analysis in digital games, providing a taxonomy to classify game-related frustrations based on multidisciplinary insights from game studies, human-computer interaction, and psychology. The framework distinguishes between detrimental frustrations hindering the player experience and those contributing positively to engagement.

Building upon this framework, we develop an AI-driven feedback analysis tool that uses large language models (LLMs) to automate the categorization of player feedback into structured themes, such as gameplay mechanics, user experience, and technical issues, while mapping frustrations to actionable development requirements. The tool interprets ambiguous language, prioritizes recurring concerns based on frequency, and assists designers in identifying critical areas for improvement. In addition, it addresses challenges in translating qualitative feedback into structured design insights.

To validate the effectiveness of the proposed tool, we conduct empirical case studies in multiple game projects, comparing AI-generated categorizations with traditional human analysis. The evaluation measures efficiency, accuracy, and

the tool's ability to reduce processing time without compromising the precision of issue identification. The findings of this study contribute to the automation of playtesting workflows, improving iteration speed, and enhancing data-driven decision making in game development.

KEYWORDS

human-computer interaction, NLP, requirement engineering, digital games

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