Machine Learning Analysis of Player Reviews and Video Game Development: What Information is Useful for Games Developers?

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INTRODUCTION

This paper will outline research investigating how game developers can utilise online reviews to inform their development processes and, in particular, what useful information for developers can be extracted from large data sets of player reviews using Machine learning techniques. Before exploring game developers' specific information requirements, the paper summarises previous work identifying information useful in general software development. The aim here is twofold: to advance the understanding of 'helpful information' as applicable to the video game industry, and explore the potential for incorporating the analysis of online reviews into game development processes.

Digital distribution platforms enable users and players to write reviews on application software by posting comments and recommendation suggestions (Zagal et al., 2009).

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These platforms allow developers to exchange information with customers (Panichella et al., 2015), providing potentially rich data for customer feedback (Carreño and Winbladh, 2013) and understanding user opinions (Gao et al., 2020). Prior studies have investigated the characteristics of information useful for application developers. They suggest that useful reviews contain information that helps developers in aspects of software maintenance, in identifying user preferences, and in identifying potential additional features and enhancements (Pagano and Bruegge, 2013; Guzman and Maalej, 2014; Iacob and Harrison 2013; Inukollu et al., 2014).

Although some general principles for identifying helpful information for software development are applicable to the games industry (Lin et al., 2019), they are challenged by the unique and entertainment-focused nature of video games, which distinguishes games from conventional software development. According to Kanode and Haddad (2009), games are different from other software in that they need to fascinate the user. Further, players' judgements about whether a game is 'fun' are subjective (Lewis and Whitehead, 2011), which increases the difficulty of processing reviews containing player preferences in a particular game context.

METHOD

The methodology of this study is divided into two sections. Firstly, we used an advanced text classification method (BERTopic, Grootendorst, 2022) for discovery of extracted themes in online reviews, generating an initial analysis report to discuss with developers. The dataset was collected and stored separately from the Steam community based on the target interviewees' game companies and their released games. All personally identifying information (PII) was removed to maximise the data's anonymity, confidentiality, and safety (Rivers and Lewis, 2014).

Secondly, we conducted semi-structured interviews with game developers from five video game companies exploring the specific information that they hope to obtain from online reviews. The companies are all successful developers of video games varying in size from independent game developers to global studios and the interviewees are experienced practitioners. The ethical standards of this research were verified and approved by our university. Participants were asked standard starter questions including:

- What are your views on Steam or other game communities?
- What are your views on online game reviews?
- What were the most and least useful game reviews you have received?
- What are your views on the analysis report?

Open-ended discussion was actively promoted during the interviews to foster the exploration of unexpected concepts and broaden the scope of the conversation.

PRELIMINARY RESULTS

The preliminary results from game developer interviews reveal that all participants in our study emphasised that the analysis of online reviews plays a major role in the success of games, particularly when addressing common concerns and managing the player community. Although most participants said that they have considered players' feedback to some extent, the vast number of reviews and the multiple written languages used meant that thorough examination was challenging. This suggests a requirement for novel techniques to automatically process and extract helpful information from reviews.

Within game maintenance, reviews are undoubtedly a valuable resource for eliminating bugs. Developers hope that issues mentioned in reviews will be described in detail to facilitate tracking bug locations since bugs in a game product can often arise in a specific interaction sequence. In this context, in addition to reading reviews, two participants highlighted that some gameplay videos are also helpful for observing players' behaviours when tracking the bugs that players encountered.

Reviews also often contain players' preferences with a binary list of what they like and dislike, which are also favoured by developers. This format simplifies the intricate complexities of sentiment and attitude. Likewise, one participant explained that numeric scores (e.g. 5/10) provided by players for each aspect of the game are also effective in simplifying the player's satisfaction. In contrast, dislike of core game mechanics and related negative statements were widely acknowledged as unconstructive information. Complaints of foundational dissatisfaction, such as the requirement for intensive combat gameplay in an adventure game emphasising exploration and puzzle-solving were seen as beyond the scope of development needs. It is not practical for every player's preferences to be catered for, especially for those who are outside of a game's target demographic.

Reviews demonstrate that feature requirements are widely considered important by players in future games development. Nonetheless, game developers reported needing to assess new feature requests based on several interlinked factors such as, public sentiments, strategic business choices, team capacity, and their games' developmental stages. One interviewee acknowledged that there will always be new tasks suggested by players whilst equally stressing the need to prioritise getting things done. Importantly, the time and resource required to complete a new task responding to players' requirements ought to be considered. Specifically, the interviewee cautioned that updates related to new functions suggested by players should not come at the expense of the team. Moreover, another interviewee reported negatively on how long it takes for features to be developed with the possibility of player attrition even before the new function had been released.

CONCLUSION

Accordingly, this work offers an alternative approach to the information extraction from online reviews that reflects a view of what types of information are useful for video game development grounded in general software development, alongside an understanding of the particular, special nature of video games. This effectively allows less useful content to be filtered out and refines the working directions for future studies on game review analysis and the video game industry.

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