The effect of players' ability to resist monsters on immersion and fear in survival horror games

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Abstract. Horror survival games, as a crucial segment of the video game industry, are highly regrded for their ability to evoke excitement, suspense and the challenge of overcoming obstacles and fears through wit and skill. This study delves into the impact of players' ability to confront monsters in horror survival games on their level of immersion and fear, and how these two psychological states mutually enhance the gaming experience. This research applies Python for natural language processing analyses, including sentiment analysis, keyword frequency analysis, Latent Dirichlet Allocation (LDA) topic modeling, and K-Means clustering to uncover the main trends in player feedback, which is based on 5,000 user comments scraped from the Steam platform on two famous horror games, "Resident Evil 7" and "Outlast 2." Additionally, data on players' personal experiences of fear and immersion in the games are collected through surveys. The results show that the sensation of fear and successfully confronting monsters significantly enhances players' immersion of being completely engaged in the game, highlighting the importance of balancing challenge and player's ability to make choices in game design. This study provides valuable insights into understanding the psychological dynamics of players in horror survival games, guiding game designers and developers on how to create more engaging and satisfying gaming experiences that meet players' requirements.

Keywords: Horror Survival Games, Resist, Player Immersion, Fear Experience.

1. Introduction

As the technology of digital entertainment becomes more advanced, video games are becoming more popular, especially in the horror genre, which has a huge fan base. However, the immersion and fear of the player in survival horror games have always been the standard by which such games are judged to be good or bad. This study combines a detailed examination of "Resident Evil 7" and "Outlast 2" with web scraping and survey methods, adopting a mixed-methods approach and delving into the distinct survival features of these two pioneering works in the horror genre. "Resident Evil 7" is a chapter in the long-running "Resident Evil" series, which has a large fan base and a stable community. It offers an immersive horror experience through puzzles, exploration, and combat, making it a key study topic for understanding how traditional horror elements and innovation intersect to influence player immersion and fear. Conversely, "Outlast 2," as a sequel to the "Outlast" series, has been widely praised for its unique horror techniques, focusing on stealth and evasion to limit direct confrontation

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with enemies. This approach amplifies feelings of vulnerability and terror, offering a distinctly different gaming experience. It highlights the helplessness and fear provoked by this gameplay, providing a unique angle for understanding how different design philosophies impact players' psychological responses.

By employing web scraping technologies, this study delves into extensive player comments and feedback on these games. It automatically collected 10,000 user reviews from the Steam platform, then conducted text preprocessing, keyword frequency analysis, sentiment analysis, and Latent Dirichlet Allocation (LDA) topic modeling, revealing key components of the game experience as recounted by players themselves. Qualitative insights from the survey and data from 130 participants further enriched the study's findings, offering a detailed understanding of how elements like game design, narrative, and atmosphere collectively influence immersion and fear.

2. Related work

Typically, survival horror games contain an intrinsic narrative plot in which the protagonist, antagonist, and location interact with each other [1]. A good survival horror game should give the player a memorable enough experience, and when the player is in a state of suspense rather than neutrality (i.e., not feeling the atmosphere of fear), they are more likely to be terrified by horrific events [2]. When designing monsters, the less human-like the monster is designed to be, the more it can deepen the player's fear of the monster and the sense of strangeness, no matter whether it's in voice or appearance [3]. And when facing monsters, players continue to learn the battle skills and improve their ability to fight with the willingness to face the monsters [4]. Similarly, in the scene design, when the player passes through a specific place, the design of different and sudden horror background sound effects can greatly enhance the player's sense of tension and fear [5]. Comparatively speaking, a slow and incremental increase in horror is far more likely to maximise the player's horror experience than a sudden burst of horror [6]. Immersion is stronger when players feel they have some influence in the game world [7]. If the player can choose a virtual device to play, the sense of fear and immersion are unparalleled [8]. Different people's gender and level of empathy for thrill-seeking desires can affect how it feels to experience fear [9].

3. Methodology

3.1. Preprocess

3.1.1. Data collection and preprocess. In order to analyse players' fear and immersion issues in Resident Evil 7 and Outlast 2, we collected game review data from the Steam platform in the form of a crawl. The Python-written web crawler gathers game review data by submitting requests to Steam's review API through the requests library. The crawler first sends a request to the comment interface of a specific game, using the game's unique AppID to locate the data source, and then parses the returned JSON data, which includes the content of the comments.

In order to ensure the quality and accuracy of the data, a retry mechanism is set up. In addition, through the implementation of cursor tracking, the crawler is able to navigate the comment data page by page, until it reaches the preset condition of 5000 comments. The acquired raw data is pre-processed for subsequent analyses, including removing empty comments, converting timestamp format, and generating unique commenters and comment IDs. Moreover, in order to explore specific themes and sentiment tendencies in the comments, a text pre-processing process was implemented, including word splitting, lexical annotation, deactivation filtering, and word form reduction. This process aims to purify the text data and extract meaningful information.

3.1.2. Text Pre-processing. Text pre-processing is a key step in data analysis, aiming to transform the content of comments into a format that can be calculated and analysed. This study applies the NLTK library to achieve text segmentation, lexical annotation, and word form reduction. The lexical labels of

NLTK are mapped to WordNet lemmas by defining conversion functions for effective word form reduction using WordNetLemmatizer. Non-alphabetic characters and deactivated words are filtered out of the preprocessed text, and the remaining words are converted to lowercase to form a cleaned word list.

3.2. Analytical methods and theoretical formulas

3.2.1. Keyword Frequency and Sentiment Analysis. Based on the preprocessed text, this study identifies and calculates the frequency of occurrence of a series of keywords closely related to the player experience. This step aims to reveal the most talked-about game features and experience aspects in player reviews. Statistical analyses allow us to understand players' feedback on the game's horror elements, challenges, and monster-fighting mechanics. Using the TextBlob library, each review is analysed for sentiment, and a sentiment polarity score is calculated.

3.2.2. LDA

$$p(w \mid d) = \sum_{z} p(w \mid z) \cdot p(z \mid d)$$

The formula is a calculation of the probability that a word will occur in a given document. This formula is part of a probabilistic model to express the process by which a document generates a vocabulary and is key to understanding the thematic structure of textual data.

 $p(w \mid d)$ denotes the probability of generating a word given a document, \sum_z inidcates the sum of all possible topics. $p(w \mid z)$ signifies the probability of a word given a topic, representing the topic-to-word distribution. $p(z \mid d)$ symbolizes the probability of a topic given a document, illustrating the document-to-topic distribution.

The application of LDA topic modeling in this study aims to automatically identify potential themes from "Resident Evil 7" and "Outlast 2" player reviews to reveal game elements or experiences frequently discussed in their reviews. For the player reviews collected in this study, the number of topics was set to num_topics=5, indicating the expectation to uncover five potential themes from the textual data. This value selection reflects a preliminary estimation of the dataset's complexity, intending to broadly categorize the content of game reviews into five distinct aspects of discussion. Moreover, id2word=dictionary was used to enable the model to map word IDs back to words using a gensim-created dictionary, a crucial feature for model interpretation and theme visualization. Finally, passes=15 was set to iterate through the entire corpus 15 times, a relatively high number of iterations designed to optimize the model's accuracy through more extensive iteration.

3.2.3. K-Means clustering

$$SSE = \sum_{i=1}^{k} \sum_{x \in C_i} \|x - \mu_i\|^2$$

The sum of squares of errors is an important metric used to measure the quality of clustering. It is derived by calculating the sum of the squares of the Euclidean distances from each point to its cluster centre (centre of mass).

In K-Means clustering, the Sum of Squared Errors (SSE) serves as a metric to measure the quality of the clustering, calculated by summing up the squared Euclidean distances of each point within a cluster to the cluster's centroid. The smaller the SSE, the closer each point is to its centroid, indicating a better clustering outcome. The application of K-Means clustering technique to player feedback analysis aims to explore the existence of different perspectives and patterns within the gaming experience. This study employs clustering analysis to divide player comments and feedback experiences into different groups, each reflecting a collection of comments that share similar

characteristics of the gaming experience. By setting 'num_clusters=5,' we divide our data into 5 different clusters and examine the patterns in player feedback from a broad perspective, avoiding overly detailed categorization to uncover the main trends in the data. Meanwhile, the adoption of the 'k-means++' initialization strategy enhances the accuracy and stability of the clustering.

3.3. Analysis Pipeline

Firstly, using the Python programming language and the pandas library, we imported the data from a JSON-formatted data file and ensured the completeness and accuracy of the data by removing data containing blank comments. Next, employing the natural language processing library NLTK, we performed a series of preprocessing operations on the text data, including lexical segmentation of the comments using the word tokenize function and lexical tagging of each word with the pos tag function. We implemented a deactivation filter to remove common English words with little value for analysis, such as "and" and "the." In the word form reduction process, we specifically defined a function get wordnet pos to convert the lexical labels of NLTK to WordNet labels to ensure the accuracy of the reduction process. A set of keywords, which are closely related to the game experience, were defined on the basis of text preprocessing, and the frequency of occurrence of these words in the comments was counted. Sentiment analysis of the comments was performed using the TextBlob library and the sentiment polarity score of each comment was calculated, thus assessing the overall emotional response of the player to the game. Further, the preprocessed text was converted into vector form using TF-IDF vectorisation and the K-means clustering algorithm was applied to cluster the comments with the aim of exploring the different dimensions of player feedback. The use of LDA (Latent Dirichlet Allocation) topic modelling helped us to automatically identify the implicit themes in the comments, revealing the players' discussed key game elements and experiences. Finally, a variety of data visualisations were used, including histograms of sentiment scores, distribution maps of keyword frequencies, and word cloud maps, to visually display the results of the analyses and make the findings easy to understand. The similarities and differences between Resident Evil 7 and Outlast 2 in terms of player experience, emotional response, and discussion focus are revealed.

4. Result and Discussion

In conducting quantitative analyses of player reviews for "Resident Evil 7" and "Outlast 2," we focused on the distribution of review sentiment, the frequency of specific keywords, and the association between these elements and the sentiment scores. Sentiment analysis results show that the overall emotional tendency of reviews for both games is neutral, indicating that players' overall feelings towards these games are balanced rather than extremely positive or negative. As is shown in Figure 1, histograms reveal that the sentiment scores for both games mainly fluctuate around neutral values, with "Outlast 2" showing a wider distribution of review sentiments, suggesting a higher diversity of sentiment expression. The sentiment distribution graph for combat-related reviews showed a more positive tendency, indicating that combat content may play a positive role in player evaluations. By comparing the frequency of keywords in game reviews, we found that "Outlast 2" surpassed "Resident Evil 7" in the use of words such as "fear," "monster," and "horror," reflecting differences in game themes and gameplay. In figure 5, the box plot further compares the distribution of sentiment scores between the two games, showing that reviews for "Outlast 2" are more extreme or divergent in their expression of sentiment. Additionally, we can see in figure 6 that keyword frequency analysis indicates that "horror" is one of the most frequently mentioned keywords in both games, highlighting the dominance of horror elements in the gameplay. The frequent appearance of the word "run" in "Outlast 2" reflects the tension and challenge when players can only flee from monsters. In figure 3, the word cloud for "Resident Evil 7" reviews emphasizes high-frequency words such as "good," "scary," and "story," revealing the core content of player comments. Combining code outputs and graphical analyses, we conclude that reviews for both games reflect a neutral-biased emotional tendency, with "Outlast 2" showing a wider range of emotions. In "Resident Evil 7," the word "fight" is more strongly associated with negative emotions, indicating that combat-related reviews tend to be

negative. In horror survival games, players' ability to resist monsters significantly enhances their immersion and to some extent increases their fear experience. However, the helplessness and uncontrollability in "Outlast 2," where players can only flee, may lead to a higher level of fear experience, hence only being able to run induces a more intense fear experience.





Figure 1. Overall Sentiment Distribution in Player Reviews



Figure 3. Comparative Sentiment Score Distribution in Review





Figure 4. Frequency Analysis of Selected Keywords in Game Reviews

5. User Study

In order to achieve more scientific results, a user study is applied to qualitatively evaluate the data.

5.1. Questionnaire design and distribution

To better understand player experiences in survival horror games, a comprehensive questionnaire was developed and distributed widely across social media, and game forums. This questionnaire focused on key aspects such as emotional response, immersion, play frequency, and game-specific elements like difficulty and storytelling. The collected data underwent pre-processing and initial sorting for detailed analysis, ensuring a broad and diverse participant base.

5.2. User study result

Based on survey data from 130 participants, the qualitative analysis of the player experience of survival horror games yields the following conclusions: In terms of fear reactions when encountering monsters in the game, the majority of players (more than 78%) reported feeling fear ranging from a certain degree to very intense when encountering monsters in the game in terms of fear reactions, highlighting the effectiveness of horror games in creating an atmosphere of fear.

Regarding the impact of game elements on immersion, a significant majority of players (over 84%) believe that the ability to fight monsters and the feeling after successfully defeating monsters have a positive impact on immersion. As for game design elements that enhance immersion, a highly stimulating soundtrack and visually striking graphics were identified as the most critical factors, with the opportunity to solve puzzles also seen as an important immersion driver. Among the factors that enhance players' overall evaluation of a game, achievement top the list by a wide margin, followed by puzzle-solving and role-playing opportunities in game content, suggesting that players prefer games with rewarding mechanisms.

6. Conclusion

The results of this study highlight the significant correlations between players' ability to fend off monsters in survival horror games and the psychological conditions of immersion and fear. The quantitative analysis of user evaluations for Resident Evil 7 and Outlast 2, along with the subsequent survey data, indicates that players' experiences of fear positively correlate with immersion. Players' enjoyment and involvement in the game appear to be heightened by their ability to confront and overcome in-game adversaries. However, the study primarily relied on data from these two distinctive and representative games. Additionally, future research could expand participant diversity by encompassing a wider variety of gaming experiences. To increase the research's representativeness, future studies could think about incorporating a wider variety of data sources and game samples, such as official account comments, game forums, and relevant video reviews. This research provides a more extensive comprehension of the different factors of horror games that influence psychology. Game industry developers can use these insights to craft more flawless horror game experiences.

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