Reimagining Warfare in Virtual Reality: Innovative Narrative and Gameplay in War-Themed VR Design

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Abstract:

This paper aims to develop a war-themed virtual reality (VR) game that breaks away from traditional VR immersion approaches through innovative narrative and gameplay design methods. The game, titled Dove of Peace, symbolically journeys from war to peace, allowing players to experience warfare from the perspective of a cannonball and ultimately transform into a dove, a symbol of peace. The game design encompasses three playable stages: initially, players control a flying shell, then they locate a dove through sound tracing, and finally, they fly over the battlefield as a dove, witnessing the restoration of war-torn areas. Experimental results indicate that while the game excels in emotional resonance and innovation, there is room for improvement in visual performance, immersion, and comfort. Player feedback, collected through quantitative questionnaires and qualitative interviews, reveals that the game successfully prompts profound reflections on war through its narrative and innovative design.

Keywords: VR; game design; war-themed game

1. Introduction

Current development in Virtual Reality (VR) technology is happening at unprecedented speed. Systems and applications in the domain are presented at a daily or weekly basis [1]. Fifty years have passed since Sutherland presented his vision of the Ultimate Display mimicking the real world in all available senses [2]. A vast amount of individual technologies supporting this sensory stimulation have emerged but it wasn't until 1989 when Jaron Lanier coined the term Virtual Reality trying to aggregate the different concepts [3] VR systems providing low or partial levels of immersion have been widely used to train professionals in domains as diverse as medicine, firefighting and industry, as well as for education and health. These applications are presented as games with a serious purpose (serious games) [4]. In VR games, designers emphasize presence and immersion in particular. In a storytelling context, the concept of presence is often used as a synonym for full immersion and therefore considered the most important thing for VR. But presence is very static and only gives us spatial immersion as opposed to narrative immersion and can merely be a starting point [5].

Current VR experiences predominantly use human-like avatars to enhance player immersion, but this design has its limitations. Players are confined to

a single perspective throughout their experience, as they are bound to a specific human form. This restriction on perspective limits freedom and fails to leverage the diversity of virtual environments. Moreover, while the reliance on first-person perspectives can offer a more direct experience, it may also restrict a comprehensive perception of the surrounding environment, especially in complex interactions or explorations. Although contemporary VR tries to offer greater freedom by allowing players to control their avatars more naturally, this approach often overlooks other immersive experiences that could be achieved by altering players' forms or sensory modes. Lastly, the design philosophy of merging players with their virtual characters to deepen immersion overlooks potential innovations. Allowing players to experience different bodily forms, sensory methods, or states of being in the virtual world could provide a richer and more varied immersive experience, beyond merely mimicking human experiences.There are currently many war-themed games on the market, such as the Call of Duty series and the Battlefield series. These war games create complex battlefield environments and decision-making scenarios, placing players in moral and ethical dilemmas. For example, some missions in the Call of Duty series force players to decide how to handle civilian casualties during war, which can provoke deeper reflection on the ethics of warfare and humanitarianism. Through these games, players can experience the psychological and physical trauma of war from the perspective of a soldier, potentially gaining a deeper understanding and empathy for real-world military conflicts. However, some games have been criticized for glorifying war or exhibiting overt nationalist tendencies.

The current gaming market has also introduced VR war games such as Onward and Pavlov VR. However, these games typically place the player in the role of a soldier, focusing primarily on encouraging the player to eliminate enemy combatants. In this paper, these games do not effectively inspire reflection on the nature of war.

This paper aims to develop a war-themed game on the VR platform, with the goal of allowing players to experience a war environment from a new perspective. This paper also intends to introduce new narrative and gameplay design methods, breaking away from the traditional approaches used to create immersion in VR. The aim is to explore innovative design approaches to create a serious VR game on the subject of war. We made a game where the player turns into a cannonball and flies over the battlefield, looking down at the entire battlefield. At the same time, the character controlled by the player is transformed into a dove symbolizing peace through a sound tracing game. Finally, the player controls the pigeon to fly across the battlefield, bringing the war-torn land back to life.

2. Game Design

2.1 Story Details

The story of Dove of Peace presents a symbolic journey from war to peace through virtual reality. The player takes on the role of a fired shell, experiencing the process from being launched in battle, to flying through the air, and finally landing. Upon landing, it is revealed to be a dud, and is recovered by local militia. During the dismantling process, a dove design is discovered on the surface of the shell, marking a pivotal moment in the story. As the plot progresses, the shell transforms into a dove, symbolizing peace. From the perspective of the now-flying dove, the player witnesses war-torn landscapes gradually returning to life.

The transformation of the shell into a dove conveys both the destructive nature of war and the hope for peace. Through the innocence of a young girl and her recognition of the dove, the story also expresses a yearning for peace. In one of the key animated sequences after the shell lands, despite being a dud, a young girl is captivated by the dove design on its surface. She runs toward the shell, repeatedly calling it a dove, showing her innocent belief in its peaceful symbol. The little girl's words are the good wishes of children in war zones, and it is also the opportunity for artillery shells to become a dove.

Later in the process, the player will be guided by the voice of the little girl to find and become a dove of peace.

2.2 Scene

In this game, a combat zone including a military base, war-torn buildings, and a small village caught in the midst of the battlefield has been created. The scene of this game is larger, as the whole battlefield needs to be seen from the perspective of the shell. To start, Terrain in Unity was used to draw the basic terrain. Then, buildings were constructed on the terrain. Some building models were found in the Unity Asset Store, and an attempt was made to find models that would match the style of this battleground area. A military base has been created that includes an artillery position set on a hilltop (Fig. 1) and a base established on a plain. The artillery position serves as the opening scene of the game, featuring a simple command tent, several trucks, and multiple artillery guns. This setup represents a common form of artillery positions in Middle Eastern battlefields, where modern artillery positions require high mobility. After firing, artillery units must quickly relocate to avoid being targeted by enemy counter-artillery radar systems.
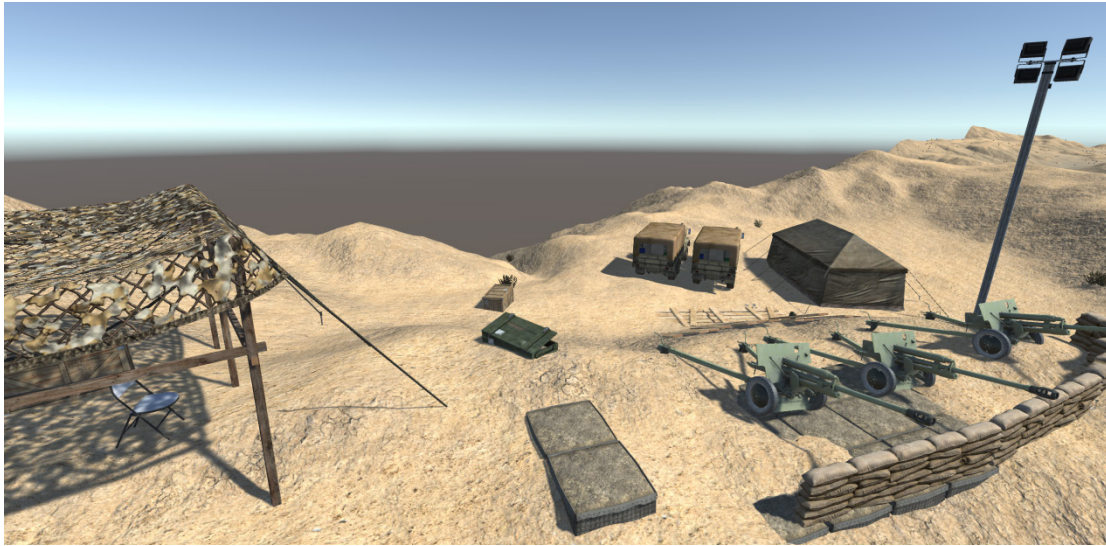
Fig.1 An artillery position set on a hilltop (Photo/Picture credit : Original)

This work has also created war-torn building complexes Fig.2, with the battlefield setting inspired by Middle Eastern war zones. Due to years of conflict and the region's rich history, buildings in war-torn Middle Eastern areas are often constructed from a mix of materials, including rocks, mud, concrete, and sheet metal.

Fig.2 War-torn building complexes (Photo/Picture credit : Original)

In addition, we designed an intact building complex that includes a church, streets, and residential houses. This scene will strongly contrast with the destroyed buildings, providing players with a clear and direct sense of the devastation caused by war.

Furthermore, we have applied LOD (Levels of Detail) technology to every object in the scene.Even with the rapid advancements in processing power and graphics capabilities of modern computers, developing a VR system that is both realistic and fast while maintaining interactivity will still necessitate balancing the trade-off between resources and realism. A widely used method for performance optimization is the concept of LOD. The core idea of LOD is to boost performance by reducing the complexity of objects when they are of lesser importance. In VR, LOD typically refers to varying levels of geometric detail, where display performance is enhanced by rendering objects with fewer details when they are not visually significant. Exploitation of the similar idea for behavior or simulation has been suggested as well [6,7]. Techniques of generating different geometric LOD are implicitly bottom-up approaches [8], that is, the most detailed mesh model is simplified to several levels.At present, there appear to be no established methods for creating LODs specific to behavior.

LOD (Level of Detail) simplifies the complexity of dis-

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tant objects in video games by reducing the number of polygons, which lessens the GPU's workload and enhances performance. This results in smoother gameplay and higher frame rates, particularly in complex environments. LOD optimizes resource allocation by adjusting the detail level based on an object's proximity and importance, ensuring high visual fidelity near the player while simplifying far-away objects. This technique is crucial in VR to maintain a steady frame rate and prevent motion sickness. LOD also makes games more scalable across different hardware, reducing memory use and shortening load times, thus improving overall memory management.

2.3 Playable Stages

2.3.1 Stage one

The game has three playable stages. In the first stage, the player controls a shell. The game mechanics involve using the left and right keys to maneuver the shell through the air, avoiding fire while heading toward the final destination. During this phase, through dialogue from NPCs, players are led to believe they are controlling a dove. The design philosophy is to make the player gradually question their identity throughout the gameplay. As the player controls the character and approaches the target area (a residential zone), they eventually discover at the end of this stage that they are, in fact, controlling a shell (a dud).

We progressively build up clues through the character's movement path, the environment the character is in, and the NPCs' terrified reactions upon seeing the character. These layers of hints escalate, culminating at the peak moment just before landing—when the NPCs' expressions of fear make the player realize they are not a dove, but a shell. It believe this moment of realization will heighten the player's emotional experience. The progression from mistakenly thinking they are a dove, enjoying the scenery from the sky, to questioning their identity, and then to the shocking and terrifying realization that they are a shell, followed by the relief of discovering it's a dud, will evoke a range of strong emotions. This emotional journey will also prompt players to reflect on war and their own role within it.

2.3.2 Stage two

The second playable stage involves the player navigating in darkness, relying on the sound's location to gradually find the target. As the player gets closer to the target, the frequency of the sound increases. Additionally, as the player moves toward the center, more elements of the dark world begin to appear. In design draft Fig.3, there are five concentric circles labeled A, B, C, D, and E.

Player starts in Area A, and as they follow the guidance of

the sounds toward the little girl and the dove, the sounds grow louder. When the player enters Area B, they can see in the dark scene a model of a little girl and a dove in the distance. In addition to the girl's dialogue, the player can also hear her laughter, which becomes more frequent as they approach the center. Upon entering Area C, some simple scenery appears around the little girl and the dove, such as grass and trees. The player can also hear the sound of the dove's wings flapping. As the player enters Area D, the surroundings around the little girl and dove become richer, with man-made objects appearing. When the player enters Area E, a special effect forms a connection between the player and the dove. The little girl's voice can be heard: You're so cute~ little dove~

As the player moves closer to the dove, the entire world transforms into the world of the little girl and the dove. The player enters the dove's model.

As we get closer to the center, more and more scenes in the dark world appear. This paper believes that this stage of gameplay will evoke a sense of pursuit for beauty and redemption in players. It will inspire players to reflect on the nature of war and realize the value of peace.
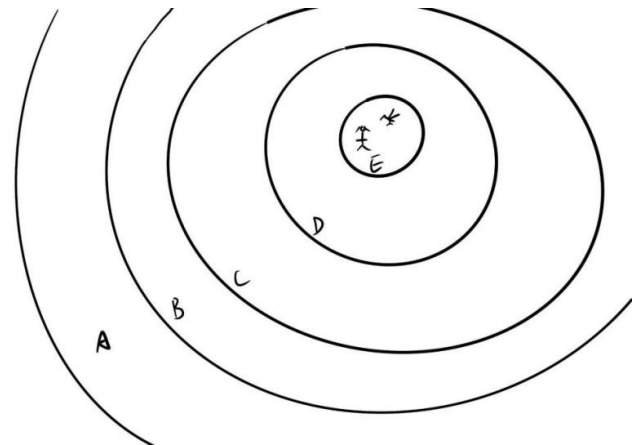

Fig.3 Design draft: five concentric circles labeled A, B, C, D, and E (Photo/Picture credit : Original)

2.3.3 Stage three

In the third playable stage, the player transforms into a dove and controls the dove as it flies over the battlefield. Wherever the dove flies, the destroyed buildings gradually transform into intact structures.

In this stage, the player sees themselves truly becoming a dove of peace, and the areas they pass over gradually restore from ruined scenes to rebuilt buildings and marketplaces. We believe this can provide players with a positive and uplifting psychological experience. After going through doubt, regret, and pursuit in the first two stages, seeing these positive and vibrant changes will give players

a sense of redemption and liberation. At the same time, it will reinforce the player's awareness of the preciousness of peace. Since the intact buildings are generated in real-time, players can directly witness the process of ruined neighborhoods being gradually restored to fully formed buildings. The stark contrast between the ruins and the restored structures further highlights the immense devastation caused by war.

3. Experiments

3.1 Experimental Objective

The objective of this experiment is to evaluate whether players experience the brutality of war conveyed by the war-themed VR game, and whether innovative narrative and gameplay design (such as transforming from a cannonball to a dove perspective and using sound tracing mechanics) trigger emotional impact and reflection on war. By assessing the game's immersion, emotional engagement, visual and audio performance, and innovation, the experiment aims to verify if the game achieves its design intent of prompting players to reflect deeply on war in a new virtual environment.

3.2 Experimental Set

The experimental subjects include a diverse group of players, comprising both VR novices and experienced VR users. The sample size is set at 20 to 30 players to ensure that the feedback is representative and covers a broad spectrum of player backgrounds.

The experimental procedure requires players to fully experience the game, transitioning from the perspective of a cannonball flying over the battlefield to ultimately transforming into a dove. This process is designed to allow players to engage deeply with the core design elements of the game, including overlooking the battlefield, sound tracing, and scene revival. Following the game session, quantitative questionnaires and qualitative interviews are conducted to collect players' feedback, focusing on aspects such as game immersion, emotional response, innovative gameplay, and audio-visual performance.

3.3 Experimental Data and Data Analysis

Each evaluation indicator is scored from 0 to 10 points, and the average score given by each player is calculated. The Player Rating Table shows the scores given by 10 people (Table 1).

Table 1. Player Rating Table

Player	Visuals & Graphics	Immersion	Playability	Interactivity	Emotional Engagement & Narrative	Innovation	Learning Curve	Comfort & Safety	Equal
1	6	6	7	7	8	8	8	7	7.12
2	6	7	6	7	8	9	8	8	7.37
3	4	6	7	7	7	9	8	7	6.87
4	8	7	8	8	8	9	8	5	7.62
5	7	6	7	8	9	8	8	8	7.62
6	7	6	8	7	8	9	7	8	7.5
7	8	6	7	7	9	9	7	7	7.5
8	5	6	6	9	8	9	8	7	7.25
9	6	6	7	7	8	9	7	6	7
10	6	7	7	7	9	9	7	6	7.25
Average	6.3	6.3	7	7.4	8.2	8.8	7.6	6.9	7.31

3.3.1 Quantitative analysis overview

The quantitative analysis reveals that the game scores lower in visual performance (6.3), immersion (6.3), and comfort and safety (6.9). These scores indicate that there is room for improvement in these areas. Specifically, visual performance and immersion are closely related, and improvements in visual quality can enhance the overall immersive experience. On the other hand, the game scores higher in playability (7), interactivity (7.4), and learning

curve (7.6), suggesting that the game design is relatively mature in these aspects, effectively engaging players and maintaining their interest. Notably, the highest scores are in emotional resonance and narrative (8.2) and innovation (8.8), which indicates that the game has been highly praised for its storytelling and innovative design.

In summary, despite excelling in emotional resonance and narrative, as well as innovation, the game needs targeted improvements in visual performance, immersion,

and comfort and safety. Enhancements in these areas will contribute to an overall better gaming experience and improve the game's overall rating.

3.3.2 Qualitative analysis

From a qualitative standpoint, the low scores in immersion and visual performance suggest that while the current visual quality meets basic standards, it falls short in creating a deeply immersive experience. This could be due to inadequate visual effects, VR performance limitations, or mismatches between visual content and game themes. Enhancing the visual elements is crucial to improving immersion.

The high scores in emotional resonance and narrative reflect the success of the game's narrative design. Through carefully crafted storylines and character interactions, the game successfully engages players emotionally and integrates them into the game world. This is particularly important for games aiming to convey deeper themes. The high score in innovation indicates significant achievements in introducing new elements. Whether through novel gameplay mechanics or advanced technological applications, these innovations have significantly enhanced the game's uniqueness and appeal. The high score in the learning curve demonstrates that the game has effectively balanced complexity with usability, enabling beginners to get started quickly while providing ongoing challenges for experienced players. High interactivity scores further confirm the effectiveness of the game design, showing that the game can attract and retain player engagement.

Regarding comfort and safety, the lower score points to common issues associated with VR technology, such as motion sickness during rapid movements. Addressing these issues through technical improvements, such as incorporating wind sound, haptic feedback, and using high-refresh-rate, low-latency VR headsets, can enhance comfort and reduce disorientation.

4. Conclusion

The Dove of Peace VR game presents a groundbreaking approach to war-themed gaming by leveraging the immersive capabilities of virtual reality to convey the harsh realities and emotional weight of warfare. Through its innovative gameplay mechanics, which include a transformative journey from a cannonball to a symbol of peace in the form of a dove, the game has successfully engaged players in a narrative that challenges traditional perspectives on war. The findings from the experimental evaluation indicate that the game has achieved notable success in eliciting strong emotional responses and fostering a

sense of innovation among its players. The game's narrative design, which integrates a powerful message of peace amidst the devastation of war, has resonated deeply with the participants, as evidenced by the high scores in emotional engagement and narrative. However, the study also highlights areas where the game can be further refined to enhance the overall player experience. The visual and immersive elements of the game, while meeting the minimum requirements for an engaging VR experience, have been identified as areas that could benefit from additional development. Enhancing the visual fidelity and optimizing the game's performance to create a more seamless and realistic environment will be critical in elevating the sense of presence and immersion for players.

In conclusion, the Dove of Peace VR game represents a significant advancement in the field of serious gaming, offering a platform for players to experience and reflect upon the complexities of war and the power of peace. By addressing the areas for improvement identified in our study, the game has the potential to become a benchmark for future VR experiences that aim to provoke thought and emotion through innovative and immersive gameplay.

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