A Case Study on FPS Game Customization Based on Asset Replacement for Child Appropriateness

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Abstract

In recent years, with the decreasing costs of Virtual Reality equipment, some first-person shooter (FPS) video games have employed this technology to provide greater immersion for players, but they rarely offer experiences appropriate for children. This work explores the customization of a first-person shooter video game in Virtual Reality by changing its visual and sound assets and the behavior of weapons shots to make it suitable for a younger age group.

Keywords

Virtual Reality (VR), First-Person Shooter (FPS), Children, Customization

1 Introduction

One of the main genres of video games is the First Person Shooter (FPS), and within this genre, the use of increasingly advanced and accessible Virtual Reality (VR) has become common to provide greater immersion for players.

However, it is still uncommon to find VR FPS games that offer experiences suitable for children. According to the Kaiser Family Foundation [8], in 2002, 89% of the top-selling video games contained some type of violence, about 50% of all video games contained serious violence, and 17% featured violence as the primary focus of the game. Thus, on Steam, one of the main online video game sales platforms, a search for FPS games with VR compatibility shows that the top options in the "most relevant" list have violent themes [7].

As children tend to mimic violent acts and may reproduce them as bullying and physical aggression towards their peers [11], it is essential that this audience is exposed to video games with appropriate content. Therefore, taking all of this into consideration, this work presents the application of a customization process for a VR FPS game, created based on a specific software framework, turning it suitable for children's consumption, particularly children aged 6 to 12 years old.

2 Materials and Methods

The customization process proposed in this article is presented in figure 1 and described below.

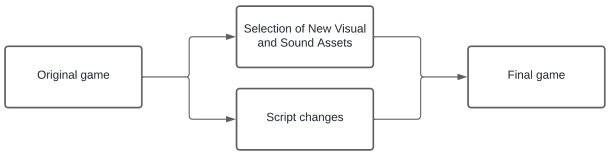


Figure 1: Proposed customization process pipeline.

To exemplify the use of the proposed process, the game 'Open Stand 360°', a prototype developed to validate a software framework specifically aimed at implementing VR FPS games proposed by Ícaro Barbosa [1], was chosen as a basis.

Both the original game and the final customized version were developed for the Head-mounted display (HMD) Meta Quest 2 [4] using the Unity game engine [9].

2.1 Original Game

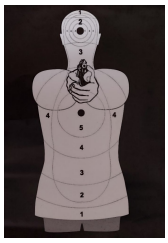
In the original game, the player is placed in an open military training environment, where targets change position when hit by player's weapon shots (Figure 2). The objective of the game is to hit as many targets as possible within a 3-minute time limit.

Figure 2: Screenshot of the original game.

2.2 Selection of New Visual and Sound Assets

To replace the military visual of the original video game and make it suitable for a younger age group, it was necessary to select assets with a friendlier appearance to compose the environment. The choice was based on a space theme and lighter colors, as these tend to induce positive feelings in children [3]. At this stage, a very

important point was the 3D model of the weapon and the targets, which in the original game were a realistic pistol and a shooting range target (Figure 3).



(a) Target used in the original game.

(b) Weapon used in the original game.

Figure 3: Some assets used in the original game.

Initially, the generative Artificial Intelligence tool Genie [2] was used to generate the new model of the weapon and the target, but due to the low quality of the generated assets, the use of this tool was abandoned, and the assets were acquired from the Unity Asset Store [10] and the Sketchfab platform [6].

The new models selected has a more fantastical look (Figure 4). Additionally, a new sound effect that simulates a laser being fired was selected for the weapon, and a background music track was added to create the atmosphere of a space adventure. These sounds were sourced from online platforms such as Pixabay [5], which offers a wide variety of free audio collections.

After selecting the visual and sound assets, they were replaced in the original game, making adjustments to make the experience more accessible to the target audience.

(a) Target used in the final game.

(b) Weapon used in the final game.

Figure 4: Some assets used in the final game.

2.3 Script Changes

The original game uses Ray Casting, which is already implemented in Unity, to simulate the trajectory of a shot as a non-visible 'imaginary ray' traced from the muzzle of the weapon to determine what the shot hits. However, without a physical projectile providing visual feedback, aiming was difficult, especially for younger players with no experience in VR games, leading to frustration.

For this reason, the Ray Casting technique was replaced with the generation of a visible projectile — a 'laser' represented by a red cylinder, launched slowly from the muzzle of the weapon. The game continuously checks if the launched projectile hits anything in the environment and whether the hit object is a target or not. This simple modification makes aiming easier, as it enables the player to actually see the trajectory of the shot.

2.4 Final Game

After completing the previous steps, the final result was achieved (Figure 5), a game with mechanics similar to the original but with visuals and difficulty adjusted for younger players.

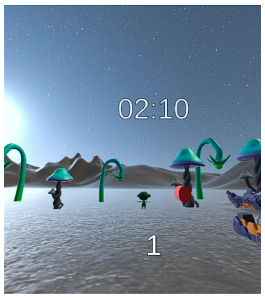


Figure 5: Screenshot of the final game.

3 Conclusion

After customizing the original game to create the new version, tests were conducted with both adults and children. Given the players' approval, the validity of the customization process followed is noticeable. This demonstrates that it is possible to engage a younger audience in VR FPS games without exposing them to excessive violence, simply by making some changes, such as altering assets and shot behavior. This now allows for further research, creating new games applying the same process described here, and conducting more formal tests to validate the proposal.

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