Alaska Steve: Using Virtual Reality to Enhance a 2D Platforming Game

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Abstract

Traditional virtual reality games foster immersion by giving the player a first-person perspective of a three-dimensional world. Alaska Steve: Bite Frost Back takes a different approach by using the Oculus Rift's orientation tracking as a core game mechanic for 2D platforming. The use of virtual reality allows the player to maintain context while navigating and manipulating the large two-dimensional game world as the main character travels through it. The game's obstacles complement the use of virtual reality by requiring the player to quickly scan the game world independently of the main character.
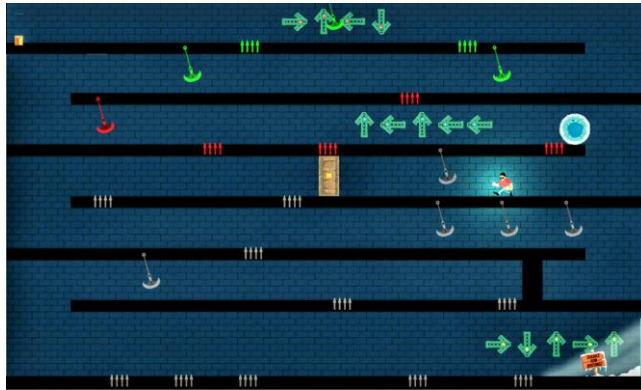
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ACM Classification Keywords

K.8.0. [Personal Computing]: General - Games

Introduction

Virtual reality represents a next step in game development, bringing a sense of immersion that was once thought to be impossible. Traditionally, virtual reality games present a first person, three-

Figure 1. A zoomed out view of the game world of Alaska Steve. The level consists of swinging axes, spikes, and ancient doors.

dimensional experience that immerses the player by making them feel like they are physically present in the game's world [1]. Often this means that the player is placed in the shoes of the main character, experiencing the action of the game through their eyes. Challenging this tradition, Brendan Iribe, CEO of Oculus Rift, recently stated that the first-person view is not the quintessential format for virtual reality gaming, and that "people are underestimating the third-person viewpoint" [2].

Alaska Steve: Bite Frost Back follows this third-person approach, using virtual reality to immerse the player in a two-dimensional platforming game. To navigate the two-dimensional world, the player simply moves their head where they would like to look. The player does not control the main character, but instead manipulates the world around him to help him survive. There are a large number of obstacles in the game, requiring the player to quickly scan the

world to find and remove them. On a standard screen, the viewport is too small to make this mechanic feasible, but the Oculus Rift and head movement make it easy to maintain context while navigating a large space. The frantic nature of the gameplay, paired with the stylistic and thematic choices of the game, offer a new approach to the 2D platformer where the player manipulates the level directly. The format of Alaska Steve also reduces the likelihood of virtual reality sickness, or "simulator sickness" [1].

Gameplay in Alaska Steve
Alaska Steve is an over-the-top action hero, reminiscent of Indiana Jones, Duke Nukem, and other action protagonists of the 1980s and '90s. Steve frequently breaks the fourth wall by directly referring to the player and to the fact that he is in a video game. Steve is spelunking a dangerous Alaskan temple, and it is the player's task to help him escape unharmed. Steve is fully autonomous in the game world, and does not require the player's input to move. However, he cannot see any of the traps in the world, and will run into them unless they are "discovered" for him by the player. There are also ancient doors which can only be opened by typing in a code. These codes are represented as hieroglyphs scattered throughout the level. The player's task is made more difficult by a giant snowball which chases Steve through the temple. The more mistakes the player allows Steve to make, the closer the snowball will get to him, until he is run over.

The game's obstacles encourage the player to quickly explore the world independently of Steve. The traps
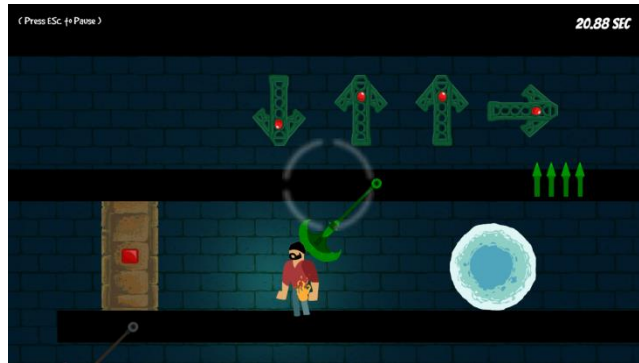
Figure 2. The player attempts to unlock the red ancient door (bottom left) using the corresponding hieroglyph (top right) before Alaska Steve is hit by the snowball (bottom right).


Figure 3. Steve gets knocked back by an undiscovered trap as the snowball approaches. Discovered traps are coloured green, and traps that have injured Steve are coloured red.

require the player to quickly navigate the game world ahead of Alaska Steve. The player must also remember where the hieroglyphs are to avoid a fatal stall at an ancient door, requiring context in the game world made possible only by the VR mechanic. The world is full of traps that the player has to discover before Alaska Steve reaches them. The player needs to constantly look around for the next obstacle, increasing the importance of the VR mechanic.

Working with the Oculus Rift
There were challenges in development that stemmed from this unorthodox use of the Oculus Rift. First, Unity's support for the Oculus rift is limited to first-person; the player's head orientation relates to the first-person camera's rotation. In contrast, our game requires the player's head orientation to modify the position of the camera in two-dimensional space. This required the translation of a Quaternion representing

head orientation into a vector representing the camera's position.

Upon testing the "tilt-to-translate" mechanic, it became clear that although the game world is two-dimensional, it does not feel that way from the player's perspective. Rather, because the rotation of the player's head results in camera translation, there is a feeling that the two-dimensional world wraps around the player, as if it were mapped to the inside of a dome. This is illustrated in Figure 4.

Another benefit of Alaska Steve's use of virtual reality is that the player is in complete control of the camera's movement, which diminishes the likelihood and severity of simulator (VR) sickness. The camera's movement also feels natural, allowing the player to easily navigate the two-dimensional space while maintaining context of the location of objects in the game, such as door codes and Steve himself.
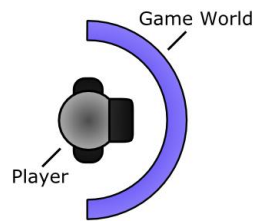
Figure 4. A visualization of the game world from the player's perspective. The world seems to "wrap around" the player.

Experience

The benefits of Alaska Steve's use of virtual reality became clear when the game was revealed and tested at Queen's University's Creative Computing show in 2015. The game was played by approximately 50 people.

All but one players experienced no virtual reality sickness, and the severity for the one who did was low. Players enjoyed the style of the world, and Steve himself; many players reported that they enjoyed Steve's humour, and understood that he was influenced by '80s action heroes. The learning curve for Alaska Steve is low—players typically understood how to play after one try—but it was still difficult for players to complete the level. This added replay value, which revealed itself as players wanted to stay at our booth to keep playing until they beat the level.

Figure 5. A participant at Queen's University's 2015 Creative Computing Show playing *Alaska Steve: Bite Frost Back*.

References

[1]   A. Craig and W. Sherman. (2002) *Understanding Virtual Reality: Interface, Application, and Design.* Morgan Kaufmann, San Francisco, CA, USA.

[2]   K. Graft, 8 key VR takeaways from a chat with Oculus' CEO. Retrieved August 6, 2015 from http://www.gamasutra.com/view/news/247607/8_key_VR_takeaways_from_a_chat_with_Oculus_CEO.php#.VZrNirK4Nis.twitter.