
An Ant's Life: Storytelling in Virtual Reality

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Abstract

An Ant's Life is a game that explores the use of virtual reality in connection with physical props to tell a captivating story and create a unique immersive experience through innovation in graphics, gameplay and design. It takes a new approach to the virtual reality space by integrating 2D art in a 3D environment, including props and theming alongside the use of the Oculus Rift and PS Move and focusing on storytelling for naïve guests with an unusual perspective from the point of view of an ant. The game hopes to bridge the virtual and physical worlds and make virtual reality games more accessible to a wide audience.

Author Keywords

virtual reality; game design; storytelling.

ACM Classification Keywords

H.5.1. Information Interfaces and Presentation: Multimedia Information Systems: Artificial, augmented and virtual realities.

Introduction and Storyboards

The development period for An Ant's Life was three weeks as part of the Building Virtual Worlds class of Carnegie Mellon University's Master of Entertainment Technology program.



Figure 1: We used hand drawn 2D art assets in the 3D virtual environment of our game, such as this bird sprite that utilises forced perspective to increase the feeling of being small.

The purpose of this game was to tell a compelling story using technology and art, so we dedicated the first week to storyboards and platform decisions. Although the ultimate goal was an aesthetic experience, we were particularly interested in creating a mixed reality storytelling environment.¹

Additionally, we wanted to keep the story simple to allow first-time players to have a rich, immersive experience with little to no external direction. We chose to let the guest experience the world from the point of view of an ant. In our game, the guest controls the ant's leaf raft, making his or her way back to the ant hill in the rain while avoiding obstacles such as raindrops, birds, stomping feet and falling trash.

Keeping a simple story arc forced us to use indirect control and strong visual storytelling to communicate effectively to the guest. We decided to tell the story with no dialogue, text or instructions, allowing anyone to play it without us having to explain it. Our early storyboards developed into cutscenes that zoom in from the view of a city to the view of the ants, taking the player from his or her natural perspective as a human into the first-person perspective of an ant.

Decisions about gameplay followed: to keep the guest on track towards a single goal, we kept the river flowing in one direction, and placed non-player ants around the guest in-game who were all heading towards the ant hill, which served not only to reinforce the role of the player as an ant but also to provide direction. The direction was emphasized by using a one-point perspective towards the ant hill, which is always visible in the distance during the game.



Figure 2: To focus on storytelling, we created detailed storyboards, that later developed into our cutscenes and gameplay.

Platform and Technology

We felt that virtual reality was particularly good at immersive experiences, so we created the game on Unity for the Oculus Rift. We wanted to explore using VR to make the guest feel tiny. To do this, we played with perspective in the virtual space, using perspective drawings and distorted sound effects. Additionally, the gameplay mechanics required the guest to look upwards to see what dangers there were in the world.



Figure 3: To prevent 2D images from appearing flat in the 3D space, we rotated the sprites dynamically to face the guest as he or she looked around.

For input, we wanted to keep controls intuitive and not have gameplay distract from the story, so we used a single PlayStation Move controller for tilting and steering the leaf, as if it was at the top of a stem as depicted in the illustrations of the other ants in the game. Using control props has been shown to help with spatial awareness and allowing natural movement in the environment.²

Art Direction

While it is natural to put 3D art assets in VR worlds, we wanted to try something that had not been done before. Our choice to use 2D drawings in a 3D virtual space gave our game a unique visual style and aesthetic. We also felt that the 2D art would increase the guest's emotional connection to the characters rather than 3D models of ants that might appear unrealistic or clumsy. 2D assets were also very effective for huge figures through using forced perspective drawings, and this allowed guests to feel a sense of size difference.

However, placing 2D objects in a 3D environment presented challenges both artistically and technically. In order to make items and characters look more realistic rather than flat, we rotated the sprites in-game animated the assets with 2D hand drawings to keep everything consistent with the art style

To convey the calm, sad mood of the game, we used only low saturated yellowish and bluish grey tones to create a "dry" city with colours like a desert in contrast with the rain. We made the human figures blue and grey to make them look cold and indifferent to each other, while emphasizing the peril of the ant's journey through the rain and the guest's feeling of being small.



Figure 4: Cutscenes at the beginning of the game helped us convey the story and establish an art style of low saturated colours, in order to communicate the dreary tone of a rainy day.

Display and Presentation

As we were designing for naïve guests who might not have used VR technology before, we paid special attention to the complete experience.

Although this was a virtual reality game, the guest experience would begin even before the guest put on



Figure 5: Set up and display included antennae, a giant leaf, a stem and cherries, as well as themed 2D decorations. We designed interactions to occur in both the physical and virtual worlds to increase guest immersion.

the Oculus Rift headset. Thus, we included physical props that reflected the player's situation in the game: a giant leaf to stand on, a stem to support the PS Move, and red stuffed cherries to carry during the game. We attached pipe cleaners as antennae to the Oculus Rift headset so the guest knew their identity in the game as soon as they donned the headset.

Incorporating physical props that reflected in-game assets deepened the guest's connection to and immersion in the virtual world. In our presentation, we also used the stuffed cherries to increase difficulty as the game progressed by giving more cherries to the guest to balance if their ant companions perished in the rain, which further connected the physical and virtual worlds and made the game more engaging. Game interactivity was thus twofold, occurring in both the real world and in the virtual one.

Theming was a vital part of the guest experience, even though guests were not able to see the props or decorations while playing the game. We found that including physical props and controls strengthened our storytelling by providing context for the guest before the game even started. Marrying the game controls to the physical action of steering a leaf also fostered a more natural gameplay and intuitively linked the guest to the story and world we had created. Tangible props have been shown to improve the usability of virtual and augmented reality applications³, and we hoped to apply the same technique to video games.

Final Prototype

Our end-of-term presentation of *An Ant's Life*, as played by naïve guests at the Building Virtual Worlds Festival, can be viewed in our gameplay video at the

following link:

<https://www.youtube.com/watch?v=DPSRmGimHh0>



Figure 6: Guest's view from an ant's perspective of the game environment through the Oculus Rift.

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References

1. Bayon, V., Wilson, J.R., Stanton, D., and Boltman, A. Mixed reality storytelling environments. *Virtual Reality*. 12/2003; 7(1):54-63.
2. Mihelj, M., and Podobnik, J. Haptics for Virtual Reality and Teleoperation. Springer Science+Business Media, Dodrecht (2012).
3. Kruszynski, K.J., and van Liere, R. Tangible props for scientific visualization: concept, requirements, application. *Virtual Reality* (Impact Factor: 0.73). 11/2009; 13(4):235-244.