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Authors

Swearingen, Scott

Swearingen, Kyoung Lee

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The Woods: A Mixed-Reality Cooperative Game

Scott Swearingen, The Ohio State University

Kyoung Lee Swearingen, The Ohio State University

Introduction

“The Woods” is a mixed-reality, two-player cooperative game that addresses the perils of social isolation by promoting connections between people and actively engaging them through play. Using augmented reality (AR) and 4-channel audio spatialization panning, players choreograph their movement in real-world space while interacting with birds, clouds, and other objects in virtual space. In pursuit of a shared goal, players experience an immersive sonic narrative of rumbling storm clouds and disconnected voices that culminate in stories of hope and reconciliation. The design intent behind “The Woods” is to illuminate human connections to others and to celebrate this through collaborative play.

Since the 1980s, the percentage of American adults who say they are lonely has doubled from 20 percent to 40 percent. Research has also indicated that increases in mobile phone use and online networking in contrast to face-to-face interactions have had a negative impact on children’s health, specifically citing screen time, “phone addiction,” and lack of physical activities as potential health-related challenges. These same challenges can be detrimental to a young person’s mental and social well-being; can lead to isolation, depression, and cyberbullying; and can contribute to increased suicide rates. While loneliness in real life is increasingly recognized as having dire physical, mental, and emotional consequences, the goal of “The Woods” is, through creative inquiry, to examine how technologies can be reimaged to strengthen connections between isolated persons through play and collaboration, and to create a dialog at the intersection of the arts, humanities, and human-centered technology.

Narrative

The narrative of “The Woods” is built around the broken relationship of two adult siblings who have been separated and out of contact with each other for a considerable amount of time. One of the siblings, in a desperate attempt to reach out and reconcile with the other, is heard leaving a voicemail. In the beginning, players hear only fragments and distorted chunks of the voicemail message and are unable to decipher meaning or intent. However, as the game progresses through player collaboration, the message becomes clearer. Ultimately, players hear the message in its entirety and learn that, although the two siblings haven’t spoken in years, both yearn to mend their severed ties and reconnect.

Mechanics

As a two-player game, “The Woods” is unique in how it enables players to physically collaborate with their whole bodies. A client-server model exists between the players’ phones and the Photon Unity Network where each client renders the game based on its shared positional data. We accomplish this by tracking the positions of each phone relative to an AR marker located on the floor as players move about the 12-foot diameter game space with their positions synched over the network. Based on the calculated positions of each client, we connect the players together by placing a virtual branch at their midpoint. As players move their phones through physical space, the branch simultaneously moves accordingly in virtual space. Thus, players must choreograph their movement and, by extension, the branch to provide a perch for virtual birds to land on. The game checks for collisions between the branch and two other virtual objects. If a collision occurs between the branch and a bird, then the bird will land on the branch and a new fragment of the aforementioned voicemail will play. Alternatively, if a collision occurs between the branch and a storm cloud, then a crash of thunder erupts, and any birds that had been caught scatter and fly

away. These game mechanics are designed to parallel the narrative of the isolated siblings who are navigating their own obstacles in order to reconnect with one another.

Audio

“The Woods” employs the human voice as a mechanism for expressing motivation and intent in the narrative. Our idea in “The Woods” is for the voice to trace a path from isolation to communication while creating an immersive narrative experience. The real-time soundscape of “The Woods” also uses both samples and synthesized sounds and a combination of such spatialization techniques as point-source spatialization, vector-based amplitude panning, and ambisonics to create immersion. We use two channels of audio (home performance) or four channels (installation performance), and the number of channels can be further extended. The sound engine is the open-source graphical programming environment Pure Data (PD), interfaced with the Unity3D game engine via OSC messages sent on a local network.

Our audio configuration is designed to expand virtual space beyond the phone screen, making the storm clouds into sonic experiences as they drift by the players, underscoring the obstacles that can make connecting with others difficult. In contrast to the global sounds of the storm, the sibling’s voicemail that is delivered by the birds after they have perched on the branch is played only through the phone speakers, providing a more intimate and private experience for the players.

Conclusion

The strength of cooperative games is that they promote social interaction, build empathy, and improve personal relationships by encouraging players to work together to achieve a common objective. “The Woods” further expands this by promoting real-world, physical space interactions over screen-based interactions, made possible through our unique design of AR and audio spatialization. Expressive, playful, collaborative, and physical, “The Woods” illuminates our connections to one another and communicates the importance of fostering positive social interaction through face-to-face engagement while prompting our players to coordinate their efforts, discover what connects them, and work together in pursuit of shared goals.



Figure 1

“The Woods” being played in The Urban Arts Space, Columbus, Ohio.

Links to Gameplay Videos

[TheWoods - YouTube](#)

<https://youtu.be/D9Xn8n2Uwvc>