"The Woods" AR Game

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Abstract. While loneliness in our real lives is increasingly recognized as having dire physical, mental and emotional consequences, cooperative games have been shown to build empathy and provide positive social impact. In this paper, we present “The Woods”, a local cooperative, mixed-reality game using augmented reality and 4-channel audio spatialization panning that provides players with face-to-face interactions in pursuit of a shared goal. This paper discusses the narrative, mechanical, and sonic components of the game, as well as the players’ experiences. The goal of our team is to develop a narrative-driven AR game that promotes collaborative problem-solving and engages players in an emergent physical and digital experience.

Keywords: Networked AR, Cooperative Game, Multiplayer, Mixed Reality, Sonic Experience, Collaboration, Social Good.

1 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 while communicating the importance of fostering positive social interaction through face-to-face engagement and the power of the human voice. [1], [2], [3], [4]

2 Narrative

The narrative of “The Woods” is built around the broken relationship of two adult brothers who have been separated and out of contact with each other for a considerable amount of time. One of the brothers in a desperate attempt to reach out and reconcile with the other brother is heard leaving a voicemail. In the beginning of the game, players hear only fragments and distorted chunks of the message and are unable to decipher meaning or intent. However, as the game progresses through player collaboration, the message becomes clearer. This narrative of reconciliation between these estranged brothers informs the mechanics of the game itself, with the players coordinating their efforts to one another in pursuit of a common goal. The game is designed such that it is not enough for one player to do all of the work. Rather, success requires the combined work of both players. As players engage one another and contribute to the goal together, the game rewards them with the unfolding narrative of the brothers reconnecting to one another (see Figure 1).

Fig. 1. Two players playing “The Woods” together

3 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 (see Figures 2 and 3). As players move their phones through physical space, the branch simultaneously moves accordingly in virtual space. Thus, play-

ers must choreograph their movement and, by extension, the branch to provide a perch for the 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. Moreover, the flight path of the birds and clouds are randomly generated to maintain interest and avoid players exploiting the game. As a metaphor, these game mechanics are designed to parallel the narrative of the isolated brothers who are navigating their own obstacles in order to reconnect with one another.

Fig. 2. In-game screenshots of "The Woods"

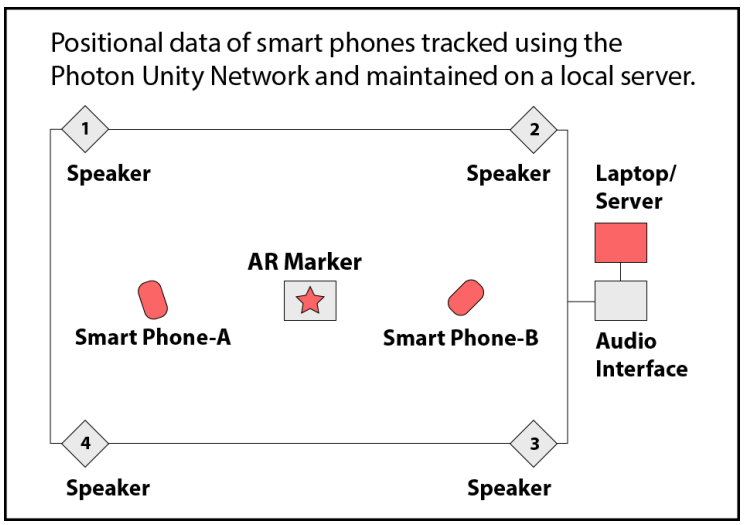

Fig. 3. Systems diagram of "The Woods"

4 Comparison to Other AR Games

"The Woods" promotes face-to-face interactions over screen-based interactions. It can only be played in person because the game is built upon the players' adjacency to one another. Furthermore, the phone as an AR device is not the focus of interaction with the other player. After the start of the game, there is no direct interaction of the player with the phone other than holding it and using it as a viewport. In "The Woods", the player's interaction with the other player extends beyond the phone and into the space in which they are playing together. There are no touch-based or gesture-based interactions. Rather, the primary purpose of the phone in "The Woods" is to provide the players with feedback and encourage verbal and physical collaboration as they negotiate the game environment together, locating birds in flight, moving the branch towards birds to provide a perch for them to land on, and evading storm clouds.

5 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. By highlighting the importance of physical interaction and collaboration, our intent is to provide a positive social impact by illuminating our human connections to one another through prompting our players to coordinate their efforts, discover what connects them, and work together in pursuit of shared goals.

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