AR Sound Garden

CS 8395

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Augmented Reality

"I pledge to pursue all academic endeavors with honor and integrity. I understand the principles of the Honor System, and I promise to uphold these standards by adhering to the Honor Code in order to preserve the integrity of Vanderbilt University and its individual members."

1   Introduction

The goal of this project was a re-implementation and exploration of the key aspects of Vazquez-Alvarez et al [1]. The core of this project is an AR sound garden. What this means is that an open space is provided for the user to explore. Within the space, there are AR elements at predefined locations, with the purpose of providing contextual information about the environment. The idea is that users can approach an AR element and hear information about the corresponding real-world object or area.

One problem that early versions of this technology encountered is that users complained that overlapping speech tracks were confusing and annoying to listen to. As such, this paper developed the idea of earcons. These are consistent ambient noises that would be emitted from each AR element when the user came within a certain activation radius. These earcons are minimal and unobtrusive, so it's not a problem if multiple are playing at the same time. The earcons' purpose is to alert the user to a nearby source of information and to use spatial audio to guide them to the interactive element. Once the user came within an inner radius closer to a single AR element, they would be able to interact with it and receive information from it. The information would only play within that inner radius, and if the user left early, it would stop. This innovation allowed users to explore the space and gather information, being aware of nearby interaction points thanks to their ambient sound, while not being overwhelmed with multiple streams of information when multiple interaction points had overlapping activation radii.

This project aims to re-implement that within a smaller environment to see how these overlapping activation radii behave in a tightly packed space, as the initial paper had the user explore a whole park, while this project uses a smaller yard. This close proximity is the novelty of the project.

2   Implementation

The project uses Adobe Aero, a mobile-friendly AR development app with a user-friendly interface and a number of started assets. It implements the key elements of the paper as faithfully as possible, with an activation zone for the ambient sounds and an interactive option for each AR element. In this case, the user can tap the AR object to play an animation and a sound effect. Adobe Aero already has built in functionality to support most of the necessary design elements, such as proximity triggers and tap interaction. The main difficulty of the project was tuning the audio levels and animations to be intuitive and unobtrusive.

Figure 1: AR view of two of the interactive totems

3   Conclusion

In exploring the environment, the ambient noises did overlap, but this was not really much of a problem since they were minimal and the spatial audio helps the user figure out which sounds is coming from which element. This seems to be an effective method of guiding an AR user's experience in an environment with multiple interactive objects.

References

[1] Y. Vazquez-Alvarez, I. Oakley, and S. A. Brewster, "Auditory display design for exploration in mobile audio-augmented reality," *Personal and Ubiquitous Computing*, vol. 16, no. 8, p. 987–999, Sep 2011.