Project Studio Midterm Project

Evan Bernard Murray, Hyunkyung Shin, Xinni Li

March 4, 2024

1 Introduction

In today's interconnected world, technology serves as a conduit for fostering new levels of connectivity among individuals and groups, particularly through the medium of sound. At the nexus of virtual and physical reality, our project aims to capitalize on this phenomenon by developing an augmented reality (AR) application. This app will enable users to explore sound identities within their surroundings, facilitated by ARKit, a toolkit developed by Apple. By leveraging ARKit's anchor-based system, users can collaboratively engage with soundscapes, sharing experiences seamlessly across devices via Multipeer Connectivity. This immersive experience not only bridges the gap between virtual and physical environments but also promotes a sense of unity among users. Unlike conventional social media platforms, our AR platform fosters connection by bringing users into a shared reality, both physically and virtually. By focusing on sound as a catalyst for connection, our project seeks to enhance understanding and community engagement in the digital age.

2 Literature Review

Our project draws inspiration from a rich collection of literature and artistic works that explore the intricate relationship between sound, identity, and technology. At the heart of our exploration lies the pioneering work of Pauline Oliveros, particularly her "Sonic Meditations"[12] and "Deep Listening"[13] Oliveros's visionary approach to sound emphasizes its transformative potential, fostering personal and collective healing through non-verbal communication and meditative practices. By incorporating physical exercise into improvisational practices, Oliveros challenged traditional notions of music-making, blurring the boundaries between musical work and somatic exploration. Her emphasis on listening as a form of healing underscores the therapeutic qualities inherent in sound, offering a pathway to understanding and inclusion.

Annea Lockwood's "Narrative Soundscape," exemplified in her seminal works "A Sound Map of the Hudson River"[8] and "A Sound Map of the Danube,"[7] documents the environmental and social ecosystems

through immersive audio recordings. Lockwood's meticulous recordings capture the essence of each location, providing a multisensory experience that deepens our connection to place. Through her innovative approach, Lockwood highlights the power of sound to construct identities and evoke collective memory, underscoring the importance of preserving sonic landscapes.

Yvette Janine Jackson's "Destination Freedom"[4] further explores the narrative potential of soundscapes, offering a visceral journey through historical and emotional landscapes. By blending orchestral sounds and electronic synthesizers, Jackson transports listeners through time, immersing them in the harrowing experience of the Middle Passage. Through her evocative compositions, Jackson demonstrates the ability of sound to convey complex narratives and evoke a profound sense of empathy.

In the realm of theoretical inquiry, Stefano Zorzanello's exploration of sound identity[18] provides valuable insights into the dynamic nature of identity within the soundscape. Zorzanello's conceptual framework challenges fixed notions of identity, emphasizing its fluid and observer-dependent nature. By reframing identity as a directional process, Zorzanello invites us to reconsider our understanding of sound and its role in shaping perceptions of place and self.

Informed by these diverse perspectives, our project seeks to illuminate the complex interplay between sound, identity, and technology, offering a platform for shared exploration and connection within the sonic landscape. Through our multidisciplinary approach, we aspire to enrich our understanding of sound identity and its profound implications for personal and collective experience.

3 Motivation

In our increasingly interconnected society, technology serves as a powerful catalyst for forging new connections among individuals and communities, particularly through the realm of sound. With the intersection of virtual reality and reality offering novel levels of connectivity, our project endeavors to capitalize on this phenomenon.

Drawing inspiration from the groundbreaking works of composers like Pauline Oliveros[9] and researchers such as Stefano Zorzanello[18], we are driven by a desire to unravel the multifaceted relationship between sound, identity, and technology. Through our project, we seek to provide users with a platform to engage with sound in ways that transcend traditional boundaries, fostering deeper connections and understanding.

At the heart of our endeavor lies the exploration of sound identities through interactivity. By harnessing the capabilities of augmented reality (AR), we aim to create an app that enables users to immerse themselves in the intricate world of soundscapes within their immediate environment. This app will serve as a conduit for users to explore, interact with, and understand the diverse array of sounds that define their surroundings.

4 System/Design

The recording took place in the eco-commons at Georgia Tech by the Kendeda building. To realize this soundscape, a background track was placed in a virtual scene on loop while six other sounds were randomly assigned to each user for placement in the scene. The app used in the demo was an extension of Apple's example project titled "Creating A Multiuser AR experience," [2]. This app was extended upon by adding 3D models [3, 17, 1, 14, 16, 15, 5, 6] which correspond to each sound source. Additionally, all the necessary code was added to randomly assign each user a sound source which they could add to the soundscape and have it appear on the shared map. Lastly, an audio engine was written using Apple's new framework called PHASE which simulated the effect of moving around the scene and listening to the sound sources A demo can be found on YouTube[11]. The code for the project, as well as all the sounds are hosted on GitHub under the MIT License[10].

5 Challenges/Successes

One of the challenges of the app was the collaboration aspect. Many of the technologies behind augmented reality are still far from perfect, and Apple's RealityKit and ARKit frameworks are no exception. While Multipeer connectivity allows each user to share ARAnchors and a sonic landscapes, this feature relies on both devices being connected to the same WiFi network and has high latency. Another challenge is the quality difference between devices and the ability to track anchor points in low lighting. Due to these challenges, recording the performance was a tedious yet informative process to how augmented reality experiences can be improved.

6 Conclusion

In conclusion, our project represents a convergence of art, technology, and theory, aimed at exploring the intricate relationship between sound, identity, and technology. Drawing inspiration from the pioneering works of artists like Pauline Oliveros, Annea Lockwood, and Yvette Janine Jackson, as well as theoretical frameworks proposed by researchers like Stefano Zorzanello, we have developed an augmented reality (AR) application that enables users to engage with soundscapes in novel ways.

References

[1] abhijithcv. Low Poly Wind Mill Free low-poly 3D model.

https://www.cgtrader.com/free-3d-models/various/various-models/low-poly-wind-mill-9ced66b4-ad30-4c38-a963-76f298624491, April 2019.

[2] Apple. Creating A Multiuser AR Experience. https://developer.apple.com/documentation/arkit/arkit_in_ios/creating_a_multiuser_ar_experience, 2021.

[3] flamazilla. Low-Poly Forest Nature Set Free Trial Free low-poly 3D model. https://www.cgtrader.com/free-3d-models/exterior/landscape/low-poly-forest-nature-set-free-trial, April 2021.

[4] Yvette Janine Jackson. *Destination Freedom: Strategies for Immersion in Narrative Soundscape Composition*. PhD thesis, UC San Diego, 2017.

[5] Kritrimvault. Bird low poly 3d model flying Free low-poly 3D model. https://www.cgtrader.com/free-3d-models/animals/bird/bird-low-poly-3d-model-dac69081-34a0-44e8-af2b-7df94801e606, June 2022.

[6] Kritrimvault. Raven low poly 3d model bird flying Free low-poly 3D model. https://www.cgtrader.com/free-3d-models/animals/bird/raven-low-poly-3d-model, June 2022.

[7] Annea Lockwood. *A sound map of the Hudson River*. Lovely Music, 1989.

[8] Annea Lockwood. *A sound map of the Danube*. Lovely Music New York, 2008.

[9] Stephen Miles. Objectivity and intersubjectivity in pauline oliveros's" sonic meditations". *Perspectives of New Music*, pages 4–38, 2008.

[10] Evan Bernard Murray. Mit license. https://github.com/emurray2/MUSI6203MidtermProject, 2024.

[11] Evan Bernard Murray. Sound identities by aura audio. https://www.youtube.com/watch?v=pGcpgUMzfiI, 2024.

[12] Pauline Oliveros. *Sonic meditations*. Smith publications Baltimore, MD, 1974.

[13] Pauline Oliveros. *Deep listening: A composer's sound practice*. IUniverse, 2005.

[14] plaggy. CC0 - Drops Free low-poly 3D model. https://www.cgtrader.com/free-3d-models/various/various-models/cc0-drops, May 2021.

[15] rusuran. Very LowPoly 3D model Banana Free Free low-poly 3D model. https://www.cgtrader.com/free-3d-models/food/fruit/very-lowpoly-3d-model-banana-free, March 2022.

[16] sudarshan-sreeram. Low Poly Clouds - Pack 1 Free low-poly 3D model. https://www.cgtrader.com/free-3d-models/exterior/landscape/low-poly-clouds-pack-1, September 2016.

[17] SydMakesArt. Strawberry Frog Free low-poly 3D model. https://www.cgtrader.com/free-3d-models/animals/other/strawberry-frog, May 2023.

[18] Stefano Zorzanello. Identity and sound identity: What are their relations within the landscape? *Soundscapes and Sound Identities*, pages 294–316, 2017.