

Enter the Paraverse: Challenging Assumptions of Live Music in the Metaverse

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Abstract: The Metaverse, a concept and buzzword echoing throughout industry and academic spaces, does not exist. In this paper we theorize about the object that does exist: the Paraverse, the global set of disconnected virtual worlds and virtual world platforms working independently to advance virtual world technology and culture. We present a novel system within the Paraverse named Soundscape.social: a multi-user virtual world where participants explore concert spaces containing pre-recorded, synchronous performances by independent musicians during the early stages of the COVID-19 pandemic. Through its design and implementation, we demonstrate how small teams of independent developers may quickly contribute to the fringes of the Paraverse, and thus play an essential role in driving innovation. We assessed the platform's ability to foster communal listening experience through virtual ethnography, in-game data collection, and interviews with attendees and performers. Soundscape.social was successful at preventing abusive behaviour despite anonymous communication, respecting participant privacy through minimal in-game data collection, modelling anarchic community through a performance format that challenged hierarchical structures of listening, and fostering a novel understanding of liveness through listener autonomy and a novel asynchronous communication feature of interest we name "virtual graffiti." We further discuss opportunities for future work developing technologies that aid developers looking to create independent Paraverse applications, contributing to the future of virtual worlds and, perhaps, the Metaverse.

Keywords: Metaverse, Virtual worlds, Liveness, Covid-19, Social media

1. Introduction

If the apostles of web 3.0 are to be believed, the social internet is on the verge of massive change; we are about to witness the rise of a "decentralized" web built on blockchains, establishing infrastructure for a Metaverse: a theoretical network of interconnected virtual spaces where users may one day work, play, and, metaphorically, live. This phenomenon has revived interest in "virtual worlds," branded as new and inseparable from virtual reality. The Metaverse does not exist (Parisi 2021). More primitive virtual worlds do, and they will define the cultural imagination of the future metaverse's structure. We name this collection of virtual worlds, which lacks the interconnectivity required of the Metaverse, the *Paraverse*.

The resurgence of interest in virtual worlds was accelerated by the COVID-19 global pandemic, as the physically isolated masses pursued virtual socializing. Online games offered opportunity for social entertainment during the height of the pandemic (Cmentowski & Kruger 2020). Many used virtual worlds as replacements for specific in-person activities. Museums created virtual experiences to allow attendees to tour their physical spaces (Katifori et al. 2020). Conferences and classrooms turned to proximity-based video-conferencing platforms to reintroduce spatiality to poster sessions, networking, and lectures (Fisher et al. 2021, Latulipe 2021, Perego & Sebastiani 2021).

In this work, we present one such domain-specific virtual world: a virtual concert space for independent musicians. Musicians faced a multitude of technological hurdles while adapting conventional, collaborative, music creation and live performance to available remote methods like conferencing and live streaming tools (Cai et al. 2021). Particular creativity erupted around the concept of "liveness" itself, with some broadening its definition to include other forms of participation (Benford et al. 2021). Traditionally, "liveness" focused exclusively on performer participation. Our work departs from this completely, taking creating a platform focused almost exclusively on audience participation.

Our application, Soundscape.social, is a virtual world to listen to musical performances in 3D spaces with spatialized audio with other listeners. In designing it as a performance space, we embodied central components of the Musicircus, a work by American anarchist composer and indeterminacy pioneer John Cage. In designing it as a system, we embodied central principles of autonomy and power elimination, characteristic of an anarchist human-computer interaction methodology (Keyes et al. 2019). Throughout a three-concert series, we engaged in participatory design with performers, interviewed attendees, and performed virtual ethnography to inform iterative design.



Figure 1: A promotional image of the lobby of Soundscape.social's first concert

This work provides the following major contributions:

- A theoretical exploration of the Paraverse as a concept to challenge the Metaverse and advocate for innovation to aid small teams of independent developers in creating Paraverse applications.
- A novel system within the Paraverse named Soundscape.social: a virtual world designed to host performances by independent musicians.
- Features of Soundscape.social that may help other virtual-world designers through qualitative evaluation of our system.

2. Related Works

2.1 The Paraverse

The Metaverse was introduced in Neal Stephenson's 1992 dystopian science fiction novel, *Snowcrash* (Stephenson 1992), which takes place in a near-future anarcho-capitalist corporatocracy, the Metaverse a global social internet hosted on a network owned by the novel's villain. This Metaverse is a single, shared virtual environment that anyone may access as virtual avatar. From a more recent, wide-reaching literature review on the subject, we can understand today's theoretical metaverse as "an interconnected web of ubiquitous virtual worlds partly overlapping with and enhancing the physical world [which] enable users who are represented by avatars to connect and interact with each other, and to experience and consume user-generated content in an immersive, scalable, synchronous, and persistent environment" (Weinberger 2022, pg. 13). Though augmented and virtual reality technologies are often conflated with the idea of The Metaverse, they are not a requirement, per this definition (Weinberger 2022). The Metaverse is meant to be platform-independent (Parisi 2021).

Several companies with virtual world platforms are competing to own/become a part of the Metaverse, including Meta's Horizon Worlds, which offers virtual rooms and tools for collaboration, virtual socializing, and game creation. No single virtual world platform is THE Metaverse, nor would we consider them a part of the Metaverse (Parisi 2021), which does not and may never exist. In this paper, we refer to this existing collection of applications as the Paraverse. We define the Paraverse (from the Greek "para-", meaning "beside" or "between") as the global set of disconnected virtual worlds and platforms working independently to advance virtual world technology and culture.

2.2 Trouble in the Paraverse

Paraverse platforms are often driven, like much of the social internet, by user-generated content, and thus share a political economy problem, creating a culture industry built on unpaid, exploited labour (Terranova 2000). Social virtual world platforms such as Horizon Worlds and Roblox create an issue from the perspective of Free software rights (Stallman & Gay 2009); they allow users to create interactive applications and environments they cannot export outside of the given platform.

Content moderation issues and online harassment are problems across many of these Paraverse platforms. Roblox, a platform primarily used by children, has been the subject of repeated controversy over alleged exploitation of underage content creators (Parkin 2022) and failure to moderate sexually explicit content (Clayton & Dyer 2022). VRChat, a platform aimed primarily at adults, has allegedly failed to keep sexual content, as well as harassment, from reaching minors (Frenkel & Browning n.d.).

The projected over-centralization of the Paraverse, as companies like Meta capitalize on the trend, produces creative stagnation and the same issues of data security and surveillance that are major concerns in current social media, as in Meta's previous venture, Facebook. If platforms like Horizon Worlds expect users to move their social and work lives onto the platform, expanding opportunities for invasive data collection, this "migration" must come with increased trust in the platform, which Meta has not accomplished (Intelligence 2020, Kelly & Guskin 2021, Robertson 2020).

In Soundscape, we took the opportunity to build a system circumventing these issues. Instead of developing a world within an existing Paraverse platform or repurposing a game, we used a free game engine to create a standalone virtual world application. Our work serves as a model for an alternative wave of Paraverse applications built quickly by small, independent teams to drive innovation and challenge injustices in the space, as well as a novel system that offers design insights in the domain of virtual music performance and appreciation.

2.3 Challenges in Virtual Music Performance

The central design challenge of adapting a musical performance to an online format is that of using remote technology to emulate a feeling of liveness: the intimacy and immediacy characteristic of in-person performance and listening (Hook et al. 2012). We focus on four attributes of liveness of a happening:

- Temporality. It is ephemeral; one is driven to experience it right now (Couldry 2004).
- Exclusivity. Access to it is limited to the social group contributing to it (Couldry 2004).
- Spatiality. It occurs in a shared space, which may be corporeal or metaphorical, establishing proximity to the happening (Hook et al. 2012).
- Interactionality. It facilitates a social experience that is alive to a participant's presence (Harris 2017).

Through Tarumi et. al. (2017), we find key elements of in-person live performances are disrupted by moving to remote technologies, including novelty of a live show (due to mundanity, "Zoom fatigue" (Nadler 2020)), spatiality of audience viewpoint, and "sense of unity" among participants due to limited communication. Video games are a natural fit for this problem; they are categorically spatial and participatory (Murray 2017). Boellstorff's ethnography of Second Life, for instance, reveals spatiality and temporality in that players are constantly building relationships and shaping the environment of this virtual world (Boellstorff 2015).

John Cage's 1967 experiment in indeterminacy, *Musicircus*, forces us to reconsider liveness priorities in musical performance. Performances generally involve independent musicians, intentionally varied in genre and ensemble size, playing simultaneously in one shared space, as listeners freely move between performances and shape their own listening (Dickinson 2014). Improvisational and indeterminate qualities of *Musicircus* amplify its temporality, as the chaotic nature of composition and spatial autonomy of listeners makes it unlikely one could reproduce the exact auditory experience within and across performances. The playfulness of *Musicircus* is inseparable from its anarchist politics. The play of *Musicircus* establishes it as not an object but a process, which naturally resists cognitive totalization and commodification, instead offering a radical non-hierarchical performance model predicated on interpersonal relationships of "respectful non-interference" and "anarchic joy" (Junkerman 1993). Similarly, virtual worlds function as cultural models with embedded social theories through simulation of social, cultural, economic, and political systems (Bainbridge 2010).

In perhaps the most popular virtual music performance, Epic Games repurposes its multiplayer battle royale, *Fortnite*, to serve as a multimedia content delivery platform for concerts with well-known pop stars and DJs (Schober & Stadtmann 2020). Combat mechanics of *Fortnite* are temporarily disabled, allowing players to navigate a performance with elaborate visuals and peacefully interact with other players. *Fortnite* has hosted both pre-recorded and live performances, with the artist represented in the space either through video or as avatars. The audio has no spatial component; each player hears the same audio regardless of their position. Although artists call out to the audience to perform certain actions during these performances, like using particular "emotes," the artist has no clear ability to observe their audience, minimizing the distinction between live or pre-recorded performance.

The politics of *Fortnite* concerts are antithetical to those of *Musicircus*. Superficially, *Fortnite* is a platform for celebrity concerts, more of a platform for wealthy advertisers than one dedicated to musical expression. Listener self-expression requires the purchase of commodities, as expression is primarily facilitated by "emote" character animations, which players must individually purchase (Marshall 2019). *Fortnite* uses virtual world capabilities to amplify hierarchical relationships between performer and audience, with one concert even representing Ariana Grande as a larger-than-life figure with godlike control over the audience. While Cage's

Musicircus uses performance to explore an alternative future, Fortnite uses performance to celebrate consumer culture that defines the status quo.

With Soundscape.social, our ideal liveness was temporal, exclusive, spatial, and, primarily, rooted in listener agency. We looked to emulate the interactive successes of existing Paraverse virtual concerts but in a characteristically “indie” way in terms of production limited to a single software developer collaborating with independent musicians of only modest followings, and in anticapitalism, as an experience that substitutes pursuit of profit with heightened respect for individual autonomy and pursuit of anarchic joy.

3. Iterative Design and Development of Soundscape.social

3.1 Preparing the Initial Launch of Soundscape.social

Soundscape.social’s format emerged through discussions with organizers at a local classical music nonprofit, Classical Revolution RVA. The following list expresses a high-level description of the application as it was originally devised:

- Soundscape.social is a free online virtual world application for Windows and MacOS where users experience pre-recorded concerts, synchronously.
- Each Soundscape.social concert contains four simultaneous performances, isolated to their own virtual spaces that resemble art installations, connected to a central lobby.
- Performers are represented by their instruments, pulsing in size proportionately to the loudness of their audio (Figure 2)
- Each space includes a plaque with information about the performers and the performed pieces.
- Users explore spaces from a first-person perspective but are represented on other users’ screens as emoji 1)
- Users communicate with each other through anonymous notes they may place anywhere in the environment, which we call “virtual graffiti.”

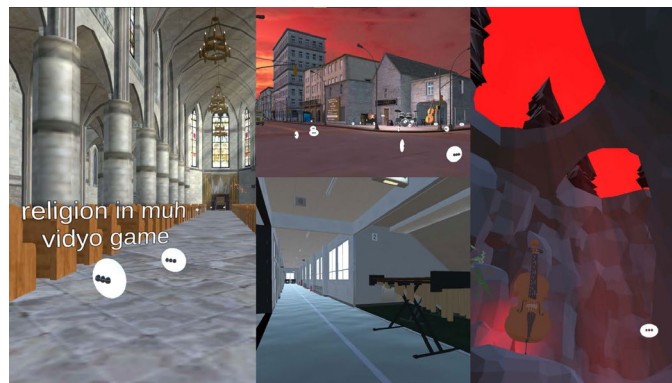


Figure 2: The performance spaces in Soundscape.social’s first concert, “Soundscape.social: Opening Night”

At first glance, Soundscape.social appears like several preexisting virtual world applications, particularly those that released in the 2000s such as Second Life, PlayStation Home, and Habbo Hotel. Like these platforms, Soundscape.social is a video game focused more on players socializing in a persistent online space than anything resembling conventional gameplay conflict. Its departure from these prior works is mainly in highlighting the possibility of independently created virtual world applications rather than virtual world platforms. One likely could have hosted a virtual concert with the same music as the concert series conducted in this work within Second Life but this staging of the music would not offer the same degree of creative freedom offered when creating an independent application. Creative collaborators who helped construct Soundscape.social had a say over how audio would sound (such as use of an advanced spatial audio system), how the players move through and interact with the space, how players may communicate with each other, and various other parameters of the experience that would have simply been given as standard in virtual world platforms.

Soundscape.social was initially implemented by a single developer in Unity. Environments were assembled using readymade 3D models purchased for the project. We used Photon Unity Networking to quickly develop multiplayer features. For communication, we hosted a web application and database of note objects, which contain only text, the location where it was placed, sender IP-address, and a Boolean indicating whether this

note has been flagged as inappropriate, determined by a simple check to determine whether the note contains language deemed offensive. Users are never notified if their note has been deemed inappropriate but inappropriate notes are hidden.

3.2 Soundscape.social: Opening Night

The initial launch of Soundscape.social included the four performance spaces found in Figure 2. A trumpet and organ duo performed in a cathedral, a jazz trio on a city street corner, a percussion ensemble in a school hallway, and a solo cellist in a cave. The cave offered our first attempt at location-specific interactivity; it contained an interactive xylophone made of stalagmites.

Information about attendance is shown in Table 1. For the purposes of iteration, we employed informal virtual ethnography, immersing ourselves within audiences during the opening night for each version of Soundscape.social and analysed content and placement of audience messages. After each launch, we conducted informal interviews with two known participants to enhance user experience. Many observations following “Opening Night” sustained themselves as patterns throughout all concerts.

We recruited personal acquaintances whom we knew had attended the launch or were referred to other attendees for informal interviews. Interviewees particularly enjoyed the option to “fly” by pressing the spacebar repeatedly as it gave them a sense of freedom not afforded by an in-person concert. Interviewees appreciated the unique interactivity of the xylophone. Some players escaped the bounds of environments and left ironic messages to mark their achievement. Not all interactivity was well-received, however; players mentioned that they struggled with platforming challenges in the cave. Additionally, interviewees requested a more conventional chat feature as opposed to the purely localized notes, finding that it lacked immediacy.

We noticed as attendees and in conversation with interviewees that attendees performed a kind of “politeness.” In addition to the positive demeanour of notes, players gathered in semi-circles around performances as if it were a corporeal event. There was visible effort to allow clear views of the performers, both in how players physically arranged themselves and how they avoided placing notes directly next to performer avatars. Players also developed imagined communities around objects and placed notes in spawn locations as impromptu tutorials for players who lacked game literacy.

Assessment of “Soundscape.social: Opening Night” led us to imagine the following additions for the follow-up iteration:

- Developed a text chat, displaying the text of notes on the heads-up-display.
- Added location-specific interactive elements in every performance space.
- Introduced a tutorial system. Text listing the game controls remains displayed until the player performs the given action.
- Designed spaces with opportunities to exit level geometry or feel as though they’d broken the game.



Figure 3: The performance spaces in Soundscape.social’s second concert

3.3 Soundscape.social: The Follow-Up

The second iteration of Soundscape.social included a classical guitarist set in a snowy forest, an avant-garde arrangement for flute and upright bass in the sky, a jazz duo in a sci-fi cityscape, and a violinist and flutist in an Asian street setting, as shown in Figure 3. All four environments featured interactive elements, such as lightable lanterns and pickable flowers that players could throw at performers. Two spaces modify movement mechanics themselves: participants enter the cityscape by riding a motorcycle through a tunnel, and players

appear to others as animated birds in the sky, corresponding with increased movement speeds and lessened gravity.

The new chat function revealed a novel communication procedure. Communication was both universal, in that text would appear in everyone's display regardless of player location, and local, in that the text would be placed as a note in the author's location. This meant that users would often have conversations with others who were nowhere near them at the time of sending, and the conversation would be spatially separated in their long-term storage.

We adjusted our design of Soundscape.social for its third concert:

- The third iteration was playable in web browser in hopes of increased attendance.
- Inspired both by positive reception to the sky navigation and need to reduce labor, the next iteration primarily focused its novel interactions around spatial navigation.



Figure 4: The introduction and performance spaces in Soundscape.social's third concert, an homage to the works of David Lynch

3.4 Soundscape.social: An Evening at Club Silencio

In Soundscape.social's third concert (subtitled "An Evening at Club Silencio," an homage to David Lynch), a jazz trio played in a waiting room inspired by *Twin Peaks* (Figure 4, upper-right) and music from a piano and tenor appeared in an apartment space from *Rabbits* (bottom-middle); both spaces featured illusions of infinite hallways, disorienting players in space. Avant-garde toy piano pieces were featured in a clinic scene inspired by the apartment building from *Eraserhead* (bottom-right), which also included a hallway that would shrink players' avatars, allowing them to explore the spaces as the equivalent of a couple inches tall. A fiddler played from a tractor as a nod to the film *The Straight Story* (bottom-left), featuring an infinitely scrolling street surrounding the player, giving the illusion of movement. This space features a hidden area containing a representation of a Musicircus: performers from all other spaces of this concert are arranged on top of each other. In addition to performance spaces, this concert features a "prologue" space, spawning players in a parking lot outside *Mulholland Drive*'s Club Silencio (upper-left).

4. Evaluating the Concert Series

We carried out a series of semi-structured interviews with 9 attendees and 2 musicians according to our IRB-approved protocol. Most interviewees attended at least one opening night, which afforded the most opportunities for contemporaneous socializing. The majority of the 9 attendees interviewed (6/9) were graduate students, all but one studying subjects not explicitly related to technology and none studying music. All the attendees claimed to be regular attendees of concerts prior to the pandemic, one claiming to exclusively attend classical music performances, four claiming to only attend concerts of other genres such as rock or pop, and four claiming to attend both. Aside from the one student studying Information Science, none of the interviewees considered themselves technology experts.

Table 1: Summary of basic quantitative participation information from Soundscape.social’s concerts.

“Launch Users” indicates the number of unique users present within the first two hours of launch, “Total Users” indicates the number of unique users who attended the concert in total, “> 0 Notes” indicates the number of users who wrote at least one note using the in-game system, and “Median Notes” indicates the median number of notes sent by any unique user for the entire concert

	Launch Users	Total Users	> 0 Notes	Median Notes
Opening Night	25	48	29	2
Follow-Up	17	17	24	2
Club Silencio	13	13	12	0

4.1 “Did you find that the relationship between musicians and audience members was different in Soundscape.social than a typical concert?”

Interviewees drew attention to the fact performers were not performing in real-time, which made the interaction feel less personal. Some were disappointed by the vagueness of performers’ visual representations, as the instrument avatars gave no opportunity for attendees to observe the performers’ skills. Others seemingly contradicted this perspective, claiming Soundscape.social allowed them a “more personal” connection to the performer, as they had greater spatial control over their own listening experience and (through notes) were allowed to contribute to the performance itself in a way they found impactful. This audience recognized themselves as participants, also performing.

4.2 “Was Your Relationship to Other Audience Members Different?”

Nearly every attendee mentioned Soundscape.social’s lack of social obligation and cause for social anxiety that would otherwise stem from other attendees’ judgments and physical interactions in in-person spaces. Though all interviewees mentioned fears that anonymity would cause toxic behaviour, their experienced reality reflected an alternative view of anonymity that allowed for a “wholesome” demeanour.

Interviewees experienced a sense of temporal spatial proximity to other attendees as they witnessed each other’s avatars move through the performance spaces with theirs. Communication through notes, however, was unsatisfying to most interviewees in that it did not feel “real-time” enough. In this way, we may expect to dismiss the notes function as failing to provide temporal liveness. However, in discussing the notes feature with interviewees who attended Soundscape.social outside of its launches, who viewed the notes exclusively as interactive “graffiti,” we see the opposite. Though notes serve as a purely historical record of past conversations, they are revealed to attendees contemporaneously to their own navigation of a community’s opinions of the experience as it is happening to them: a kind of access to audience opinions unheard of in a conventional live performance. In this instance, live temporality is not a simultaneously contemporaneous phenomenon for every participant but alternatively, a purely subjective phenomenon: a conversation happening right now, but only from this player’s perspective.

4.3 “Do you Think There Will Still be a Need for Experiences Like Soundscape.social After the Pandemic?”

Interviewees had two primary justifications for the continued existence of virtual concert experiences outside of a global pandemic: accessibility and convenience, both due to the fact virtual concerts require no navigation of public (physical) spaces. A musician we interviewed was excited for the chance to be an audience member at her own concert, not a possibility for in-person concerts. She described this as being almost like being a visual artist allowed to be in the gallery exhibition space of their own work yet acting as spectator.

5. Discussion

In creating Soundscape.social, we’ve demonstrated the feasibility of using existing technologies, including Unity, Photon, Flask, and Itch.io, to create virtual worlds inexpensively and quickly with small teams. In the context of John Cage’s method of embodied politics in music performance, we theorize that the same method applies to virtual worlds. Every virtual world models how human beings organize ourselves, and by encouraging greater innovation within the Paraverse, we not only expand the cultural imagination of the Metaverse but the cultural imagination of our corporeal human societies.

Soundscape.social manifested an ongoing, collaborative construction of liveness as opposed to a finite event, as most clearly shown in its communication format. This lends to the establishment of a “sense of unity” by

sharing information on audience reactions to a given performance, creating an element of liveness even when reading notes long after they have been written. The spatialized nature of the audio in Soundscape.social contributed significantly to the experience of liveness. The spatialized audio allowed players to transcend the musician/audience member binary, as each member composes the music, manipulating the dynamics and the type of music they are hearing, by moving around the space.

Soundscape.social, like the Musicircus that inspired it, created a unique musical model of anarchy, both in the format of listener-centric experiences themselves, and in the maintenance of gracious anonymous interpersonal communication and interaction without punishment structures. We extend these egalitarian politics into our method of iterative design. Most of the design insight for iteration came from the observed placement and content of anonymous notes. This method respected privacy not only in that it collected no personal information, but in that it based design insight on data players had chosen to broadcast to the community.

6. Conclusion

We theorize the concept of the Paraverse, the global set of disconnected virtual worlds and virtual world platforms working in parallel to develop virtual world technologies and culture. Through the design and implementation of our system, Soundscape.social, we demonstrate how small teams of independent developers may quickly contribute to the fringes of the Paraverse, and thus play an essential role in driving innovation of the form.

From evaluation of our system, we expanded on prior work on the concept of “Liveness.” We sought to expand the notion of liveness through listener agency in temporal, exclusive, spatial, and interactional ways. We came to conceive of liveness as actively co-constructed in spatiotemporally, as a participatory experience contingent on listener agency.

We emphasized individual autonomy of audience members and challenged hierarchical structures of listening. This returns us to Cage’s suggestion that “by making musical [performance] situations which are analogous to desirable social circumstances which we do not yet have, we make music suggestive and relevant to the serious questions which face Mankind” (Cage 1979). Through a listener-centric concert experience, we explore possibilities for virtual worlds that serve as models, however modest, for egalitarian politics and the possibility of further explorations throughout the Paraverse.

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