PLAYING THE ROOM: TAPEPLAYER AND THE IMPROVISED AUDIO SCORE

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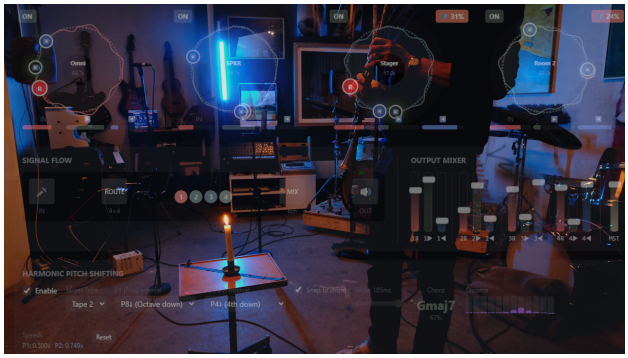
ABSTRACT



This paper presents TapePlayer, a tape echo simulator designed as a score-framework for improvising musicians. Drawing on the incommensurate loop techniques of Brian Eno's ambient works, Terry Riley's time-lag accumulators, and Alvin Lucier's room-as-instrument approach, TapePlayer provides a compositional infrastructure: four independent delay lines with configurable lengths, bidirectional playback heads, and—crucially—the acoustic room itself as primary feedback network. The score is not the sound that emerges but the framework that shapes it: system configuration, microphone placement, and spatial acoustics. The improviser activates this structure, generating material that the system transforms and returns. Rather than prescribing pitches or rhythms, TapePlayer establishes conditions for mimetic engagement—performers identify with, respond to, and transform their own sound as it returns altered by room and machine. I examine this relationship through the concept of mimesis as theorized by Paddison: not imitation-as-copying but embodied identification with sound. The paper discusses TapePlayer's technical architecture, its application as score-script for improvisation, and the psychoacoustic implications of a framework that never produces the same result twice. A video demonstration illustrates the mimetic relationship between performer, system, and space.

1. INTRODUCTION

What does it mean to "read" a sound? When a performer encounters an audio score—a sonic environment intended to guide or provoke musical response—they engage in an act fundamentally different from reading traditional notation. There is no prescribed pitch, no fixed rhythm, no determinate instruction. Instead, there is sound itself, and the performer must decide how to relate to it.

TapePlayer is a tape echo simulator that I have developed as a Python script, and it acts as a response generator that provides an improvisational framework situated in a specific room. It also encourages improvisational musicians to see its response, or feedback if you will, as audio scores evolving in real time, based on the input from the player(s). The system creates continuously evolving sonic textures that performers interpret and respond to during improvised performance. My central argument is that this interpretive act is best understood through the concept of mimesis—not in the narrow sense of imitation or copying, but in the broader sense articulated by Paddison [1] and others: mimesis as embodied identification, as a mode of "identifying with" rather than "imitation of."

The TENOR 2026 conference theme, "Sound as Score," invites consideration of how audio materials function as notation—how they guide, constrain, and enable musical action. The associated research project asks how the concept of mimesis relates to the aesthetic analysis and evaluation of audio scores. TapePlayer provides a concrete case study for examining these questions. As a system that generates scores which literally never repeat, it foregrounds the temporal and relational dimensions of mimetic response that remain implicit in fixed audio scores.

While tape-based delay systems have a rich history, the scripting approach the system builds on, its various technical features (outlined in section 3) and the room-as-feedback-network within a mimesis framework for improvisation, appear under-documented in existing literature.

The paper proceeds as follows: Section 2 situates TapePlayer within the historical lineage of tape-based generative systems and introduces the relevant conception of mimesis. Section 3 describes the technical architecture of TapePlayer. Section 4 analyzes how the system functions as an audio score and how performers engage with it mimetically. Section 5 describes the accompanying

demonstration. Section 6 concludes with implications for audio score composition and research.

2. BACKGROUND

2.1 Tape Loops and Generative Systems

TapePlayer emerges from a rich lineage of tape-based generative music systems. Terry Riley's time-lag accumulator (1963) established the foundational technique: two tape machines configured so that sound recorded on one is played back on the other after a delay, with feedback allowing material to accumulate and transform over time. Robert Fripp and Brian Eno refined this approach in their Frippertronics system (1972), using it to create dense, slowly evolving guitar ambiences [7].

Eno's subsequent work, particularly *Music for Airports* (1978), introduced a crucial innovation: incommensurate loop lengths. Rather than using loops of equal or simply-related durations, Eno employed loops whose lengths could not be expressed as simple ratios of one another. As he described it, loops of 23½, 25⅞, and 29 15/16 seconds would not return to their starting alignment for approximately 27 days [2]. The result is music that, while constructed from repeating elements, effectively never repeats at the macro level.

Steve Reich's phase music offers a related but distinct approach. In works like *Piano Phase* (1967), two performers begin in unison and gradually shift out of phase, creating emergent patterns from their temporal displacement [3]. Where Eno's incommensurate loops create non-repetition through mathematical irrationality, Reich's phasing creates cyclical patterns of convergence and divergence.

TapePlayer synthesizes these approaches. It employs multiple delay lines with configurable lengths that can be set to incommensurate values (following Eno), bidirectional playback that creates phase-like relationships between forward and reversed material, and—most significantly—an architecture designed to use the acoustic room itself as the primary feedback network.

This last aspect connects TapePlayer to another lineage: Alvin Lucier's *I Am Sitting in a Room* (1969), where the acoustic properties of a space gradually transform and eventually consume the source material [4]. Where Riley, Eno, and Fripp used tape machines as closed feedback systems, Lucier opened the loop to include architectural space. TapePlayer follows Lucier in treating the room as an active participant in the sound-generating process.

Recent artistic research has examined human-machine improvisation through archiving and playback systems. The Norwegian project Goodbye Intuition (Grydeland, Neumann, Qvenild, 2017-2020) developed Kim-Auto, a Max/MSP system that records performer input, archives it, and plays back transformed fragments—cut up, reshuffled, time-stretched, reversed [8]. They describe its output as a "turbulent mirror," producing "blurred mimesis" of the performer's material. Their aim was to create an autonomous improvisational partner with its own "personality." TapePlayer shares the tape-loop lineage but differs in framing and architecture: where Kim-Auto aspires to be a co-improviser, TapePlayer positions itself as a score-framework. The system makes no decisions about when or what to play back—the temporal relationships are fixed by loop lengths, and the room's acoustics provide the feedback network. The mimetic relationship is therefore inverted: rather than the machine producing blurred mimesis of the performer, the performer practices mimesis toward their own transformed material as it returns through space and time.

2.2 Mimesis and Audio Scores

The concept of mimesis has a long and contested history in aesthetics. From Plato's understanding of art as imitation twice removed from ideal forms, through Aristotle's more positive valuation of mimesis as creative representation, to modernist rejections of imitation in favor of abstraction, the term has carried shifting meanings and valuations.

In the context of music, mimesis has often been associated with programmatic representation—birdsong in Messiaen, thunder in Beethoven's Sixth Symphony. Allen S. Weiss's *Varieties of Audio Mimesis* [5] expands this understanding, proposing a typology of imitative strategies in sound art that encompasses not only direct sonic imitation but also evocation, stylization, and abstract correspondence.

More relevant to the present discussion is Paddison's [1] Adornian conception of mimesis as embodied impulse. Drawing on anthropological theories of mimicry (particularly Caillois [6] and Benjamin), Paddison argues that mimesis in music is better understood as "identifying with" than as "imitation of." Musical mimesis is not primarily a matter of representing external objects or phenomena; it is a mode of relation, an embodied orientation toward sonic material.

This conception proves particularly apt for understanding how performers engage with audio scores. When a musician responds to an audio score, they are not typically attempting to copy or reproduce what they hear. Rather, they are entering into relation with it—identifying patterns, sensing trajectories, finding points of connection and divergence. The response may involve imitation in a local sense (echoing a gesture, matching a timbre), but the overall orientation is one of identification and relation rather than reproduction.

The Sound as Score research project asks how mimesis relates to the aesthetic analysis and evaluation of audio scores. I propose that audio scores can be understood as environments for mimetic engagement—sonic situations

that invite and structure the performer's identificatory response. The quality of an audio score, on this view, depends not on how well it specifies a predetermined outcome but on how richly it affords mimetic engagement.

3. TAPEPLAYER: TECHNICAL ARCHITECTURE

TapePlayer is implemented as a standalone Python application. The system comprises up to four independent tape loops, each with distinct record and playback mechanisms, connected through a routing matrix and mixing infrastructure. Additionally, audio hardware with mic preamps is an obvious necessity, and to make the software easy to work with, it can work with any number of inputs from 1 to 4.

3.1 Core Architecture

The signal flow routes four inputs through a routing matrix to four tape loops, each containing a record head, forward and reverse playback heads, a variable-length buffer (2-120 seconds), and an independent feedback path. Eight playback outputs feed into a mixer producing stereo output. All of this happens internally in the Reaper DAW, so the script itself uses ReaRoute 1 - 4 for mono outputs and ReaRoute 5+6 for stereo inputs. This way, any kind of hardware can be used with it, there's no particularity or tie-in with any piece of gear.

Inside the software, each of the four inputs can be routed to any combination of the four tape loops. Each loop maintains an independent circular buffer with a configurable length ranging from 2 to 120 seconds. Loop lengths can be set individually, randomized within a specified range, or recalled as part of saved presets. In my usage, these presets can be seen as compositions. Each preset provides an improvisational framework that differs from the others, affecting the players and how they relate to the audio, precisely like a sound score.

This configurability shifts the question of temporal relationships from technical specification to compositional decision. The system does not enforce incommensurate ratios; rather, it provides the infrastructure for a composer or performer to design temporal relationships according to their aesthetic intentions. A preset might specify four loops of 7, 11, 13, and 17 seconds—prime numbers ensuring long recurrence cycles—or four loops of 4, 8, 12, and 16 seconds for more periodic, pulse-aligned relationships. The choice is compositional: what kind of temporal environment should this audio score create?

In my own practice, I typically work with 2x2 connected loop lengths, two very long (100 seconds) and two shorter, composing with them using playback direction, speed and volume. TapePlayer as a system remains agnostic, offering temporal architecture as a parameter space for compositional exploration.

3.2 Bidirectional Playback

Each tape loop features two playback heads: one reading forward through the buffer at normal speed, one reading backward. These heads operate independently, creating a continuous counterpoint between the original temporal direction of recorded material and its reversal.

The reversed playback head introduces a particular kind of mimetic complexity. Reversed sound retains timbral and dynamic characteristics while inverting temporal envelopes—attacks become decays, decays become attacks. The result is material that is simultaneously recognizable and transformed, familiar and strange. Performers responding to TapePlayer's output must navigate this dual temporality, identifying with material that is always already doubled.

3.3 Tape Modeling

To evoke the character of analog tape systems, TapePlayer incorporates several modeling elements: saturation (soft clipping at the record stage creating harmonic coloration), hiss (low-level noise simulating tape noise floor), wow and flutter (subtle pitch modulation simulating mechanical irregularities), and high-frequency rolloff (progressive attenuation with each feedback pass).

3.4 Chroma-Based Pitch Analysis

TapePlayer incorporates real-time harmonic analysis to inform pitch-shifting decisions on selected tape channels. A chroma analyzer extracts the predominant pitch class from incoming audio, representing harmonic content as a twelve-element vector corresponding to the chromatic scale. This analysis then guides automatic pitch-shifting of a designated tape channel, transposing playback by selectable intervals relative to the detected root.

This feature enables harmonically responsive behavior without requiring the system to generate new material. If the performer plays in A minor, the selected tape channel can be shifted to produce material a third or fifth above the detected root, creating harmonic reinforcement or tension depending on the interval chosen. The performer thus hears their own material returned not only temporally displaced and spatially transformed, but harmonically recontextualized.

To my knowledge, no existing delay or looper system uses chroma analysis to drive pitch-shifting in this manner. Commercial key-detection tools exist for informational purposes, but dynamic harmonic modulation of delay parameters based on real-time tonal analysis appears to be an interesting and new addition this particular script can offer.

3.5 The Room as Feedback System

While TapePlayer includes internal feedback paths for each loop, the system was fundamentally designed to *play the room, with the musician*. Rather than relying primarily on digital feedback routing, TapePlayer treats the acoustic space itself as the feedback network. The system outputs to loudspeakers; microphones placed in the room capture not only the performer but also the room's transformation of TapePlayer's output; this captured sound feeds back into the system.

This design philosophy connects TapePlayer to Alvin Lucier's *I Am Sitting in a Room* [4], where successive re-recordings through a space gradually reveal and amplify the room's resonant frequencies until speech dissolves into pure resonance. TapePlayer operates on a similar principle but in real time and with continuous performer involvement. The room's acoustic character—its reflections, absorptions, resonances—becomes part of the score-generating mechanism. Different spaces produce different TapePlayer behaviors, and the composition will dissolve only by choice of the musician; the minute the instrument(s) stops playing, the composition will start to deteriorate towards an end, being in a room, until it dissolves into nothing.

Microphone placement therefore becomes a compositional parameter as significant as loop length. Close miking emphasizes the performer's direct input; distant miking brings more room coloration into the system; strategic placement near reflective surfaces can create specific resonant feedback paths. The performer navigates not only TapePlayer's temporal streams but also their own sound returning transformed by architectural acoustics.

This approach resonates with an installation work I have presented earlier, where a system using speech-to-text and text-to-speech created a feedback loop between human speech and machine interpretation. As the piece progressed, transcription errors accumulated, the machine's "understanding" drifted further from the original utterance, and language gradually dissolved into abstraction. TapePlayer enacts an analogous process with musical material: the room and the system together transform input until its origin becomes indistinct, until the score consists of sonic material whose source—performer, playback, room reflection—can no longer be clearly determined.

This indeterminacy of source intensifies the mimetic situation. The performer identifies with and responds to material that may be their own transformed contribution, the room's resonant commentary, or TapePlayer's temporal manipulations. The boundaries between self and other, between playing and being played, become productively unclear.

4. TAPEPLAYER AS AUDIO SCORE

4.1 Non-Prescriptive Notation

Traditional notation prescribes: it specifies (with varying degrees of precision) what sounds should occur and when. Audio scores, by contrast, present: they offer sonic material without explicit instruction for response. The performer must determine their own mode of engagement.

TapePlayer extends this non-prescriptive quality through temporal indeterminacy. A fixed audio score, however complex, eventually repeats. A performer who has worked with the same fixed score multiple times will develop knowledge of its structure, anticipating what comes next and planning their responses accordingly. This is not necessarily problematic—much valuable music-making involves such preparation and anticipation—but it does represent a particular mode of engagement.

TapePlayer, when configured with incommensurate loop lengths, ensures that the system never presents the same configuration twice. The performer cannot know exactly what comes next because much of what comes next is genuinely undetermined until it occurs in a specific room, based on the specific improvisational output from the instrument. This places the performer in a continuous present, requiring ongoing attention and response rather than prepared reaction.

4.2 Mimetic Modes

I have identified several modes of mimetic engagement that performers adopt when working with TapePlayer:

Timbral identification: The performer matches or complements the timbral qualities of TapePlayer's output—adopting similar tone colors, reinforcing or contrasting harmonic spectra.

Gestural identification: The performer responds to the shapes and trajectories present in the audio score—rising and falling contours, accelerating or decelerating rhythms, expanding or contracting densities.

Temporal identification: The performer aligns with one of the system's multiple temporal streams—locking to the pulse of a particular loop, following the slower evolution of the overall texture, or navigating between temporal scales.

Structural identification: Over longer durations, the performer develops a sense of the system's behavior and responds to emergent structural patterns—the gradual accumulation of density, the periodic emergence and submergence of particular materials.

Contrastive identification: Not all mimetic response involves similarity. Performers may identify what the audio score lacks and provide it—introducing silence into density, sharp attacks into smooth textures, pitched material into noise, or even filling up the loop buffers with one kind of input, then moving on to another, adding a layer of call / response, soloist / accompaniment, and so on.

These modes are not mutually exclusive; performers typically move fluidly among them, and skilled improvisers often engage multiple modes simultaneously. In any case it pays to be deliberate: material committed to the loops will circulate many times before finally decaying, so early choices shape the entire arc of the improvisation.

4.3 The Score That Scores

There is a productive ambiguity in the word "score." As a noun, it denotes a notational document. As a verb, it describes the act of creating such a document, but also the act of marking, inscribing, leaving traces.

TapePlayer scores in both senses. It produces an ongoing audio score that guides performer response. But it also *is scored* by the performer: their input is recorded, transformed, and returned as part of the ongoing score. The distinction between score and performance, between notation and realization, becomes recursive. The performer reads the score and writes it simultaneously.

This recursivity intensifies the mimetic relationship. The performer identifies not only with the system's output but with their own transformed contributions returning to them. They hear themselves as other—displaced in time, reversed in direction, migrated across loops. The mimetic act becomes reflexive: identifying with one's own alterity.

5. DEMONSTRATION

The demonstration component of this presentation will involve showing a recording of a live performance with TapePlayer functioning as audio score. I would prefer to do it on-site, but as it requires a rather elaborate multi-input setup, a suitable room and so on, it’s safer and easier to use video.

5.1 Setup

The demonstration will show how TapePlayer is running on a computer with audio output to the room's sound system; microphones positioned to capture both performer and room reflections, feeding back into TapePlayer; one or two performers on acoustic or amplified instruments; and a visual display showing TapePlayer's interface, including real-time visualization of loop contents, playback head positions, and feedback levels.

The specific microphone placement will be determined in response to the instrumentation, the number of musicians involved, and the space's acoustic characteristics, to ensure the room itself becomes an active and optimized element of the audio score system.

5.2 Structure

The demonstration (before showing the video) will proceed in three phases: (1) System introduction (3 minutes)—briefly demonstrating TapePlayer's basic functions and explaining how loop length configuration shapes the system's temporal behavior; (2) Performance (video, 3 minutes)—improvisation with TapePlayer as audio score, seeded with initial material then left to evolve; (3) Reflection (5 minutes)— on the mimetic strategies employed.

6. CONCLUSION

TapePlayer offers a case study in score-frameworks and the mimetic relationships they afford. By generating continuously evolving sonic environments through configurable loop lengths, bidirectional playback, and—most distinctively—acoustic feedback through the room itself, the system creates conditions for sustained mimetic engagement that differs qualitatively from engagement with fixed audio scores or purely digital feedback systems.

The conception of mimesis as embodied identification rather than imitation proves particularly useful for understanding how performers relate to such systems. Performers are not asked to copy TapePlayer's output; rather, they should identify with it, entering into relation with its temporal streams, timbral qualities, and structural trajectories. When the room functions as part of the feedback network, performers must also identify with architectural acoustics—with sound that is simultaneously theirs, the system's, and the space's. This identification is active, selective, and creative—a mode of musical thinking enacted in real time.

Several questions warrant further investigation. How do different acoustic spaces shape the mimetic relationship between performer and system? How does extended familiarity with a score-framework system change the mimetic relationship? How might audio score systems be designed to afford particular mimetic modes while remaining genuinely open?

TapePlayer itself continues to develop. Current work involves integration with machine learning systems for audio analysis, enabling more structured responses to performer input. This raises questions about mimesis in human-machine musical interaction that extend beyond the present paper. More broadly, the accessibility of scripted audio systems has changed: features like automatic feedback ducking, once requiring specialized hardware or commercial software, can now be implemented by any musician comfortable with Python or a similar scripting language. This democratization of situated improvisation tools—systems designed for specific rooms, specific performers, specific compositional intentions—is itself a development worth noting in the context of audio score practice.

The audio score, I suggest, is not merely a notational format but a relational proposition. It proposes a way of

being-with-sound that the performer accepts, modifies, or refuses. TapePlayer, as a system that generates such propositions continuously and unpredictably—and that includes the acoustic room as part of its generative mechanism—foregrounds the relational, spatial, and temporal dimensions of this proposition. To improvise with TapePlayer is to practice mimesis in its fullest sense: not copying, but identifying; not reproducing, but relating; not playing in a room, but playing *with* the room.

7. REFERENCES

[1] M. Paddison, "Mimesis and the aesthetics of musical expression," *Music Analysis*, vol. 29, no. 1-3, pp. 126-148, 2010.

[2] B. Eno, *A Year with Swollen Appendices*. London: Faber & Faber, 1996.

[3] S. Reich, *Writings on Music, 1965-2000*. Oxford: Oxford University Press, 2002.

[4] A. Lucier, *I Am Sitting in a Room* [Sound recording]. New York: Lovely Music, 1995.

[5] A. S. Weiss, *Varieties of Audio Mimesis: Musical Evocations of Landscape*. Los Angeles: Errant Bodies Press, 2008.

[6] R. Caillois, "Mimicry and legendary psychasthenia," *October*, vol. 31, pp. 16-32, 1984.

[7] E. Tamm, *Brian Eno: His Music and the Vertical Color of Sound*. New York: Da Capo Press, 1995.

[8] I. Grydeland, A. Neumann, and M. Qvenild, "Goodbye Intuition," Research Catalogue, 2020. [Online]. Available: https://www.researchcatalogue.net/view/974962/974963