Title: *Musical Complexity and Symbolic Representation in AI Composition: From Transformer Architectures to Symbolic and Sonic Transduction*

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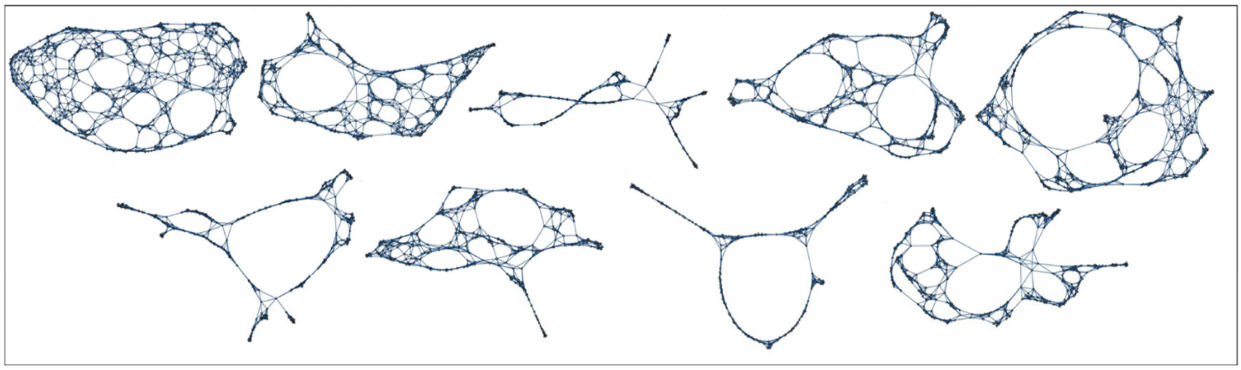
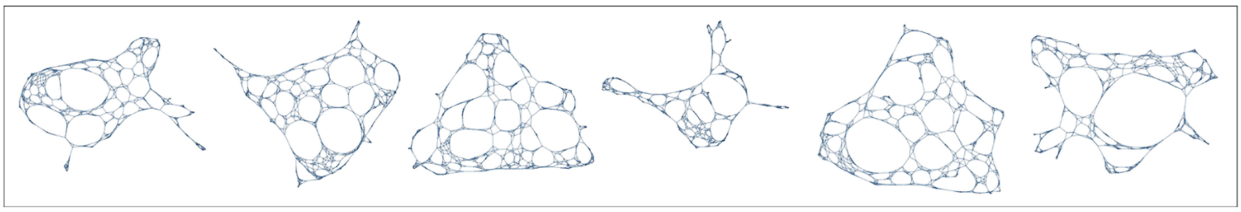


(a)



(b)

Figure: (a) Nearest neighbour graphs of the chordal distance matrices computed using each of the three movements of the piano concertos of Rachmaninov (amoeba-like shapes are generated). Each corpus generates particular shapes and topologies. (b) Nearest neighbour graphs that were generated by a GAN trained on the distance matrices in (a). We can see similarities between the shapes computed from the corpus and the shapes generated from the learned corpus. After experimenting with different corpuses, we can notice that different pieces will generate wildly different nearest neighbour graphs. Here the Rachmaninov corpus generated amoeba-like shapes while other corpuses such as the *Structures* from Boulez generated very polygonal graphs or Schoenberg's *Drei Klavierstücke* which had more convexities.

Abstract

This presentation investigates the complexity of musical representation in the context of AI-based compositional tools, focusing on how symbolic encoding, generative modeling, and transductive feedback processes mediate our understanding and construction of musical material. Developed within the research-creation framework of *The Cherry Orchard*, a contemporary opera reimagining Chekhov's eponymous play during the Vietnam War, the project engages with the technical and aesthetic implications of representing the complexity of musical information within machine systems.

We explore how Transformer architectures trained on MIDI corpora model structural relationships in music, comparing representations based on pitch-class abstraction versus full chord–timbre combinations. These representations reveal how the constraints of symbolic encoding impact expressiveness, coherence, and the resulting musical complexity (issues reminiscent of early serialist strategies for organizing pitch and timbre (Andreatta et al., 2008)).

Special attention is given to the challenges posed by non-unique notational systems and the brittleness of symbolic processing. Through iterative sound-to-notation transformations (i.e. *transductive loops*), we observe how musical information degrades with each cycle, as demonstrated in *Variations on a Theme by Handel*, a piece that was part of the 2023 Black Box concert on AI generated music. These processes ex-

pose the instability of musical representation when filtered through automated transcription and generative recomposition, echoing Lucier's work on recursive sonic decay (Lucier, 1980).

Finally, we introduce *musical deconstructivism* as both a technique and aesthetic orientation, where computational errors, misalignments, and parser failures become compositional resources rather than limitations (Nguyen & Tsabary, 2024; Tomasula, 2022). Rather than reinforcing established formal systems, the use of generative AI and algorithmic tools foregrounds the representational fragilities and emergent textures inherent in machine-mediated music making.

This work contributes to a broader discourse on how AI reshapes not only musical aesthetics but also the epistemology of composition through the lens of representational complexity.

References

Andreatta, M., Bardez, J.-M., & Rahn, J. (2008). Autour de la set theory: Rencontre musicologique franco-américaine. Éditions Delatour.

Lucier, A. (1980). *I Am Sitting in a Room* [Composition]. Lovely Music.

Nguyen, P. and Tsabary, E. (2024). The Aesthetics of Deconstruction: Neural Synthesis of Transformation Matrices Using GANs on Multichannel Polyphonic MIDI Data. *Journal of New Music Research*.

Tomasula, S. (Ed.). (2022). Conceptualisms: The anthology of prose, poetry, visual, found, e- and hybrid writing as contemporary art. University of Alabama Press.

N.B. Oral presentation is preferred as they are more interactive and direct feedback is important for me.