Mouja

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Mouja is a performance combining real-time Neural Audio Synthesis (NAS) with Thales and Stacco, two novel musical interfaces providing a fun and poetic way of navigating the latent space in NAS models through their entangled magnetic fields. In this performance, I explore the tendency of AI, emerging in my practice as well as in other artists' work, to bring forth eerie and uncanny semantics. This spectral trait may be traced back to Derrida's notion of hauntology and, after him, to the methods of the sonic hauntology movement. In *Mouja*, Thales and Stacco become a magnetic Ouija board, surprising the observer with their unpredictable magnetic interactions as the performer summons the dataset's sonic remnants from the multidimensional foldings of the latent space.

Keywords AI, Neural Audio Synthesis, Stacco, Thales, Hauntology, Hautography.
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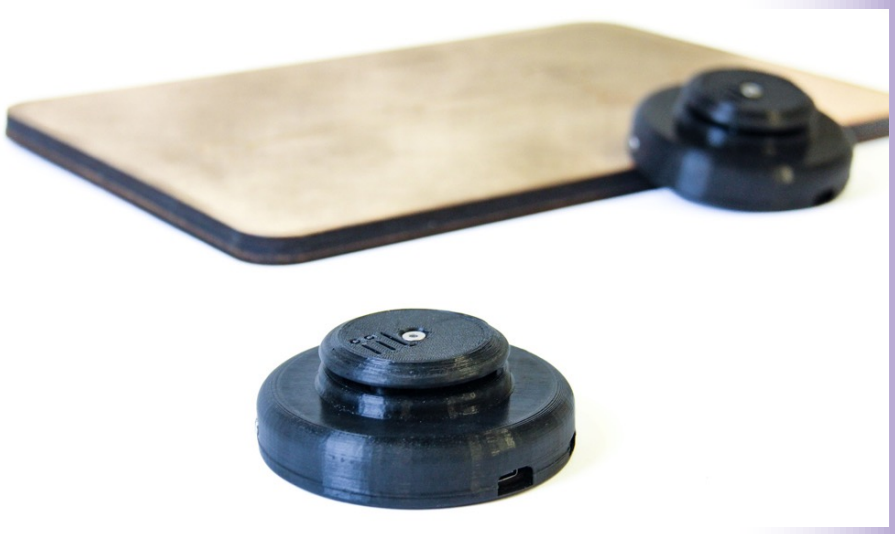
Description

Neural Audio Synthesis (NAS) is a new synthesis method based on machine learning, in which the algorithm learns through a training process to represent and reconfigure corpora of raw sounds. The performer interacts with a NAS model through style transfer techniques from acoustic primes, or by manipulating a compressed representation of the dataset, usually referred to as "latent space." In this performance, I explore this second methodology with RAVE (Caillon 2021), an autoencoder architecture for real-time NAS that I control with Thales and Stacco, two musical instruments I designed for this purpose. Thales (Figure 1) is a

composed instrument presented at NIME 2023, and 3rd prize winner at the 2024 Guthman Competition, Georgia Tech University. It is based on two controllers that interact with each other, or with any other magnetic field or ferromagnetic object, through permanent magnets of opposing polarities (Privato et al. 2023a).

Fig. 1. Thales.



When the performer attempts to join them, the controllers repel each other allowing to play with the tangible manifestation of their opposing magnetic fields in a way that reminds the interaction with an invisible bouncing ball or a loose drum skin. Each controller contains a riser, held in position by the player's palm. When an opposing magnetic field is encountered, the riser activates and pushes on the performer's hand providing tactile feedback as well as the possibility of precisely controlling selected parameters by modulating the pressure. Thanks to the controllers' ability to entangle with any ferromagnetic material, it is possible to design tailored magnetic scores (Privato et al. 2023b) by embedding magnets with different sizes and polarities in the performative space or inside two or tri-dimensional boards.

Stacco (Figure 2) is a musical instrument I designed with Giacomo Lepri, aimed at the intuitive navigation of NAS models' latent space, and based on a reconfiguration of Thales' design concepts. It attracts magnetic spheres and ferromagnetic objects to a magnetic oval board, affording a fine and detailed control of selected parameters as well as the open-ended, playful exploration of the model. Alternatively, it is possible to interact with Stacco by using Thales' controllers, or by wearing a set of magnetic rings whose opposing polarity provides haptic feedback when approached to the instrument. Under the hood, Stacco features four three-axis magnetometers combined with as many magnetic attractors, controlling eight latent dimensions and informing the performer's gestures through its magnetic fields. The composer can work with Stacco through the method of *embodied sketching*, the practice of embedding the score on the instrument itself to reconstruct or suggest the performative gestures (Privato et al. 2024). Such scores consist of cardboard oval cuts placed on the instrument's top (Figure 3): since all interactions are mediated by magnetic fields, the spheres do not need to

touch the board to control the sound and multiple notational layers can be overlapped in between the spheres and the instrument.

Fig. 2. Stacco.

Mouja (Figure 4) is a performance summoning the spectral disjunctures and sonic remnants that have emerged in my practice in designing, performing and composing with NAS interfaces. With Mouja I reflect on Derrida's notion of hauntology, a framework investigating the limits of the metaphysics of presence by displacing the focus on ontological liminalities (Derrida 1993). In music, this concept is central to Mark Fisher's formalisation of sonic hauntology as an artistic movement in which musicians produced hauntological disjunctures through the deliberate exposure of the medium and the overlapping of temporally distant sonic signifiers (Fisher 2013). Derrida's notion of hauntology is also foundational to the framework I am developing to investigate the technical, social and cultural phenomenology of AI, and that I describe as *AI Hauntography*. [1]

In line with this, in this performance I investigate and magnify the eeriness of the model and its hauntological potential in several ways. Indeed, Thales interacts with a magnetic score consisting of a series of magnets hidden under an engraved board, whose engraving features an ancient Icelandic spell that people used to place under their pillow to favour sleep; Stacco is also played by combining magnetic spheres in the guise of a pendulum oscillating in response to the forces of the instruments' attractors, then displacing them on the instrument's board based on an embodied sketch developed using the techniques of spirit photography, where multiple overexposed pictures are overlapped into a single image. As the performance unfolds, different NAS models are overlapped and cross-faded, in the guise of the processes of sonic hauntology, throughout three different sonic scenes. The models have been trained at the Intelligent Instruments Lab (Iceland)[2], and they use open-source data and/or data whose use has been consented to by the authors. These include choir, organs, water, voices and magnets' sounds.[3]

A first version of Mouja has been presented at TEI 2024 (Privato 2024). The performance I propose here maintains the models but features the aforementioned method of embodied sketching with overlapping transparent scores. Also, in this version of the performance I explore for the first time the use of magnetic rings besides the spheres.

1. This framework is thoroughly described in a paper submission parallel to this performance proposal.

2. www.iil.is

3. https://huggingface.co/Intelligent-Instruments-Lab/rave-models

These novelties aim to further increase the uncanniness and eeriness that the performance conveys, to magnify its hauntological traits and expose through this process the sonic remnants that constitute the model.

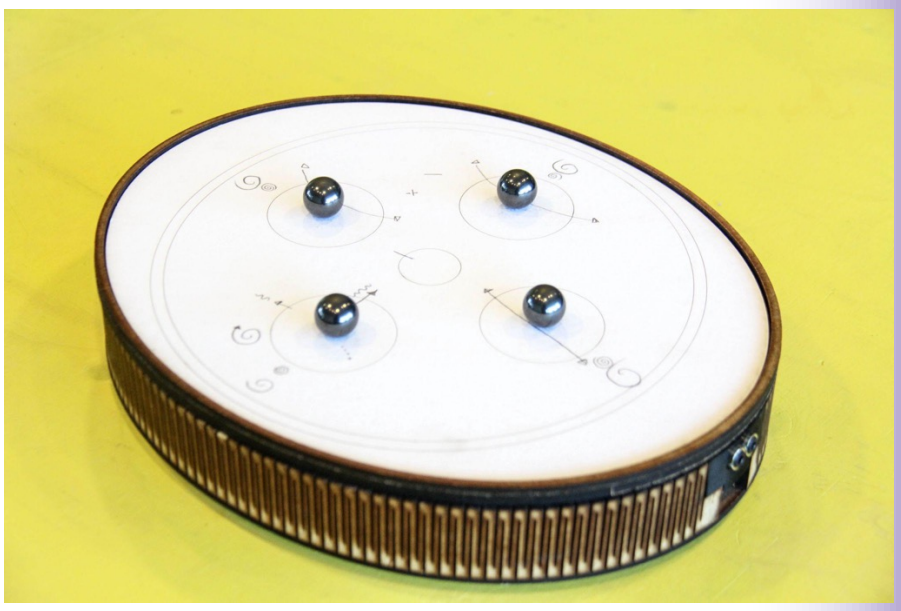


Fig. 3. Ebodied Sketch using Stacco.

Fig. 4. *Mouja* (2).

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