
Spectra

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Abstract

Spectra is a transdisciplinary performance that explores the interplay between embodied cognition and AI-driven sound spaces through multimodal interaction. By capturing the movements of a dancer, these gestures serve as a dynamic interface, enabling the navigation and manipulation of concatenated sound corpora. The performance examines the dynamics between humans and algorithmic systems, probing various relational paradigms in a context where the boundaries between artist and machine are becoming increasingly blurred.

1 Description

1.1 Audiovisual Integration

Spectra is a 20-minute performance that integrates dance with stereo audio output and projected visuals. The performance utilizes a cyclorama screen for projecting visuals, providing a continuous and uniform backdrop as well as visuals on the dancer's body.

An infrared camera on stage tracks the performer's movements in real-time. The audio and visual components are managed offstage via a laptop, with Max/MSP handling audio processing and TouchDesigner overseeing visual generation and manipulation.

The full performance can be viewed online at <https://youtu.be/TEkyeQfUFaE>

1.2 Use of AI

Real-time tracking of the dancer's movements is achieved using a Google Mediapipe model running on a Raspberry Pi 5, which processes images from an Oak-D Pro Wide Luxonis camera (1).

This setup captures and processes body dynamics for integration into the performance system. The FluCoMa toolkit (2) is used within MaxMSP to facilitate real-time audio concatenative synthesis, enabling the audio output to adapt based on the performer's movements.

Machine listening techniques are applied to analyze audio data and extract relevant descriptors that guide the synthesis process. Dimensionality reduction methods, including PCA and UMAP, are utilized to manage high-dimensional data in real-time, supporting the creation of an adaptive audiovisual environment that aligns with the interaction between human motion and sound.

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1.3 Contributions

Spectra contributes to human-computer interaction by:

1. Demonstrating how embodied cognition operates through the use of bodily movements to influence AI-driven audio and visual outputs;
2. Advancing body interaction with AI by using real-time tracking and machine listening to translate gestures into dynamic soundscapes;
3. Exploring abstract, non-symbolic interaction methods, showing that physical gestures can effectively control complex systems without relying on symbolic communication.

2 Previous Appearances

- Festival Formes•Ondes at University of Montreal, May 2024.
- NIME Conference, September 2024.

3 Biographies

Jean-Philippe Jullin is a sound and audiovisual artist whose work intersects art and technology, with a focus on the exploration of interactive and immersive systems involving co-creation with machines. His research and artistic practice have been supported by the Fonds de Recherche du Québec (FRQSC), and his compositions have been acknowledged by Musicworks magazine and the JTTP competition. He is actively involved in collaborative art projects utilizing emerging technologies.

Ariane Levasseur, based in Tiohtià:ke / Mooniyang / Montréal, is a dancer and choreographer who employs the body as her primary medium of expression. She holds a degree in dance from UQÀM and received the William-Douglas prize in 2022. Her work examines themes of resistance, advocacy, and intimacy, which she explores through movement in various performative settings.

References

- [1] Google. Mediapipe Solutions. <https://ai.google.dev/edge/mediapipe/solutions/guide>.
- [2] FluCoMa. FluCoMa Toolkit. <https://www.flucoma.org>.