Conference Report
Dance and Artificial Intelligence: Using or collaborating?

Leverhulme Centre for the Future of Intelligence

On 8 September 2022, Diego Marín presented at LCFI a talk that challenged previous approaches to the creative collaboration between humans and artificial intelligence, questioning whether we are only using AI to enhance our own creativity rather than performing a collaboration between two creative agents.

In addition, he argued for the development of more body-interactive AI systems, as he alerts us to the potential decline of bodily-kinesthetic intelligence. His point was accompanied by a proposal presented together with Benedikte Wallace, where Diego and an interactive AI created and performed dance in real-time. The following text is a summary written by the author.

Diego Marín and an AI dancing in the short film 'Dancing Embryo' by 6A9 (2022).

Human-AI dance: bodily hybrid co-creativity

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During the fieldwork for my Master's research at the Choreomundus Consortium I was looking to explore how dance was being applied to the study and development of technology in fields such as robotics, AI and immersive digital experiences.

I started this research as a visiting researcher at RITMO Centre, University of Oslo, where I began to explore sound creation by dancing wearing a MIDI device (a *Myo* bracelet that detects muscle activity, motion and rotation). When practicing, I noticed the interdependence of dance and music by perceiving how the digital sound created by my dance was at the same time driving my dance movement. This made me wonder if the bracelet and I were collaborating to create this dance or if I was just using it to enhance my creativity.

These questions remained on my mind while continuing my research. At RITMO Centre I met Benedikte Wallace, a PhD fellow who was working on teaching an AI to dance. This project triggered my curiosity enormously, as I wasn't clear about how was that AI, how does it look like and how it was able to dance. Wallace's project 'AI Learning to dance' (2020) brought to me new questions related to creativity, ownership and agency as this case and others coming from science and technology use metaphors from the field of arts to describe computational behavior.

DIAGNOSIS

By documenting the history of dance computer-making I noticed the following interesting things:

1. In general, AI design has a limited understanding about what creativity means in dance —ie *Sketching by Programming in the Choreographic Language Agent* (Downie et al, 2012)— because it is constrained by logical thinking in its design.

2. AI design, for that same reason of constraint, limits co-creativity in dance as a lineal process —ie *Generative Choreography using Deep Learning* (Friis and Friis, 2016)—.

3. There are some exceptions of insightful body-centred design thinking, as the AI installation *Becoming* (Downie and Rothwell 2013), even though this one seems to be incapable to collaborate with humans.

4. Lack of interactivity of non-bodily AI systems results in an uninteresting experience for dancers —see *Dance Becoming Knowledge: Designing a Digital "Body"* (Leach and Delahunta, 2017)—.

5. There is no discussion about the role of AI in co-creation. Therefore, it is common to see many artists misleadingly presenting the use of AI as a tool as a synonym for collaboration between humans and AI.

6. Most of these research efforts focus only on contemporary dance practice.

When dancing with the AI and when collaborating with Benedikte Wallace in Human-AI interaction design I deepened my understanding of how creativity works in contemporary dance and my own artistic practice. Therefore, I found that the application of inductive and synthetic methods during the design of AI Dance systems is an approach that brings abundant to understand and describe logically human dance phenomenon.

THEORETICAL APPROACH

My research used Embodiment paradigm (Csordas, 1990); Cyborg anthropology (Lee, Dummit and Williams, 1995; Laughlin, 2008), 4E cognition (Varela et al, 2006), Phenomenology (Merleau-Ponty, 1945; Husserls, 1991), Actor-network Theory (Law and Hassard, 2000; Latour, 2005) and Relationality (Houseman, 2006) as main theoretical framework. This gave me a structure to explore, describe and discuss the interaction between human creativity with artificial systems and inert objects.

DISCUSSION

A deep discussion around material agency and non-human agency caught my attention for some time, finding a controversial ongoing debate (see Latour, 1999; Knappett and Malafouris, 2008). Therefore, following the limitations and implications of material/non-human agency I approached trough a phenomenological analysis to divergent creative processes differentiating the situational conditions between embodying devices (ie. cyborg art and object theatre) and, on other hand, human-AI creative interaction.

On the other hand, above all the subjective meaning of the most popular elements considered to describe and define creativity, I find that forms of creativity manifest themselves in different ways depending on who or what is doing it, how is it doing and in what context the process takes place. This open-framed perspective made me take AI creativity as different than human one for different conditional reasons. Nevertheless, the fact that AI creative skills are different doesn't mean Human and AI intelligence cannot co-create, as this will depend on other multiple variables such as (but not limited to) reciprocal communication or mutual level of influence.

The discussion in the research draws that what it is required to co-create is to share a position where the power of our actions can influence each other to achieve a common goal that can be spotted as a collaboration —which does not

necessarily mean to be in the same position of power—. Creativity can be discussed it as a cognitive phenomenon, but co-creativity has more to do with the context of this creative performance. Consciousness and intentionality are also discussed through this research, finding that lack of them from AI don't cancel the potential creative collaboration either.

The central thesis of this research remarks that not any creative interaction with AI that produces something means co-creation. Therefore, I drew the distinctions between, *using*, *puppeting* and *collaborating* when performing creativity with AI, offering concepts such as *High-tech puppetry dance* and giving examples when AI participation is limited to be a creative catalyst in performing arts.

So, with those distinctions clear, I introduced an example of Human-AI co-creativity by presenting diagrammatically the human and AI creative, interactive and body conditions. The correlation of this elements circumscribes the interactive context and experiential horizon of the Human-AI co-creation of dance process, which sustains the live performance I presented co-creating dance with the AI at the end of the talk.

THE EXPERIMENT

The creative process I got collaborating with the AI was surprisingly rich, as it allowed me to identify crucial conditions and actions that make meaningful the general act of dancing and creating with other (human or machine). Moreover, when I saw the final result of the co-created dance, I felt quite satisfied, as the movement sequences achieved are aesthetically rich and interesting according to the impressions shared by the audience and my own experience. This creative collaboration was not always successful, as the AI was still evolved by Benedikte Wallace during the interactive rehearsals. For this specific experiment, the AI danced and created a choreography unknown to me, which was being significantly affected by the dance I was performing in real time (and inversely), so we both were able to influence each other and shape our movement performance to produce a new live dance.

This AI is able visually recognise my bodily presence and be affected by different features of my movement. Its body shape changes along the performance, but even in its more abstract forms it has humanoid traits (such as perceptible limbs and head). The embodied ethnography and video analysis of this dance collaborative process suggests that recognition of a body with limbs is the basis for connecting kinaesthetically with the other, even if AI's limbs are abstract or don't look like a humanoid form. The data collected shows clearly that when this body form is unrecognisable both, the AI and I are not able to perceive the presence of the other; this can be observed in the behaviour of the AI when my whole body is not perceptible to it, and in my case by feeling the absence of a body to interact to.

The audience showed curiosity to know how was the AI capable to create and perform interactive dance in real time, as well as about the feelings I had when dancing and interacting with the AI.

FINAL THOUGHTS

The current state of Wallace's 'AI dancer' is able to participate in this particular co-creative process, however a future development might be needed if other kind of creative dance methods want to be applied. Due the novelty of this approach, would be beneficial to have more testimonies of artist experiencing live collaborative dance making processes with AI to strength this theory; which is the aim of the ongoing project 'Dancing embryo' (Marín, Wallace and 6A9, 2022) a bodily-interactive installation where performing artists and general audience can live a dance creative experience with AI.

Finally, I ended the talk by sharing a reflection on how the absence of integration of bodily dynamic in AI interactive systems represents a possible decrement of physical skills and bodily-kinesthetic intelligence, and suggesting that body dynamic interaction should be considered in the development of future interactive AI.

A better structural-logical understanding of bodily creativity is required to be able to endow AI with greater intelligence in any bodily-kinaesthetic performative field. Therefore, phenomenological understanding of creativity in dance could also be beneficial for the design of other artificial systems that are required to perform complex high-performance bodily tasks.

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