AIB REVIEW
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Dancing With Generative Artificial Intelligence: The Importance of Getting the Steps Right

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The use of generative artificial intelligence (GenAI) has expanded business opportunities, allowed for timely engagement with consumers, boosted operational efficiency, generated marketing copy and even strengthened and streamlined employee performance. Yet, within the world of art and music, much is being debated on its use in the development of creative efforts. This is particularly the case in movement art.

The Future has Arrived

Researchers at Stanford University suggest that their recently released GenAI model, Editable Dance Generation (EDGE), is a breakthrough in bridging technology and movement. The development is outlined in a recent paper and was introduced at the Computer Vision and Pattern Recognition conference in Vancouver, BC. EDGE is the more recent of several GenAI-powered dance generation models such as Bailando, FACT and AIST++. Increasing in sophistication, EDGE includes a diversity of dance genres, movement, style and physical tolerability, blended with musical coherence. It produces choreography that is "strongly preferred" by its raters. With a dataset of 1,408 motions compiled from 39 dancers using a variety of dance genres including ballet, jazz, hip hop and seven others, dances are set to music from Jukebox, a tool that composes new music using OpenAI based on existent compositions.

Unearthing Bias

This explosive growth of GenAI, its use in creative dance work and the reaction of the public (including representing authorities in dance) was recently studied. AI generated choreography and works believed to be generated through AI were evaluated to address questions around bias against non-GenAI created works and whether this bias was amplified in those that were dance "experts." The results were telling: a bias against GenAI choreography was demonstrated and was more evident in experts who were able to identify choreography that was computer generated.

While the above empirical study quantified results within their test group, the reaction from others in the dance industry provides more nuance to the conversation. Much of the discussion centres around the central theme of the intent behind dance. Dance, as a depiction of emotion, feeling and individual statement is perceived by many in the industry as exclusively human, stemming from personal expression. Blending movement and music is an intensive exercise to convey a message by the artist aimed at inspiring an audience, being the catalyst for change, evoking a feeling of nostalgia, fear or joy,

or relating a cultural heritage of story-telling passed through generations. Can these goals be replicated, generated, conceived or accomplished through GenAI?

GenAI: More Than a Choreographer

There is more to add to the "dark" side of the debate within the dance community on the use of GenAI to either replace the dancer or to degrade the years of training and effort of dancers by using GenAI as a means of allowing any individual to present as a professionally trained dancer. GenAI tools are being used to represent dance movement and dancers, and are available to all freely on demand. Further development within the AI world is found in generative adversarial networks (GANs) that further deepen the conversation. GANs represent something more unpalatable to dancers as the use of deep learning video generation allows for the work of a professional dancer to be placed over the video of an individual with little or no dance training. The potential for devaluing the work of dancers and the use/misuse of their physical abilities without credit or permission is a matter of ethical debate.

GenAI's Journey

However, these concerns, while valid and requiring serious discussion, must be balanced by the role and prior use of computers and technology within dance. Technology is not always considered anathema. As early as the 1980's and 1990's, technology enriched the work of well known choreographers . Merce Cunningham, a significant influence in modern dance, used LifeForms, a software developed by Credo Interactive to develop choreography. Further, an illustration of work that has placed AI as the primary driver of choreography can be found in Troika Ranch's production in which the movement of audience members was captured, triggering Isadora (software named after Isadora Duncan a famous dancer) to select movement from a dataset that was sent to dancers to perform.

Why have some choreographers embraced GenAI? Pushing the boundaries of using dance to communicate a message in the world of ubiquitous computing requires engagement with the culture in which the choreographer and dancer live. As the Alpha generation emerges and digital natives dominate society, the use of technology is *sine qua non* (i.e. an essential condition) for interacting in our digital age. This can be seen in the proliferation of technology with the integration of robotics in dance, the use of virtual dancers alongside physical dancers, sound, lighting and video enhancements as well as wearable tech to enrich performances. Brian Magerko, project leader of the LuminAI project states: "As computers become more ubiquitous, we must understand how they can co-exist with humans. Part of that is creating things together."

At the forefront of the use of GenAI in dance are recent efforts by Google Arts & Culture. The collaboration between Google and Bill T. Jones resulted in a suite using the PoseNet machine learning model. This model can be explored through a web-browser and camera opening the world of creative movement to the general public. Google and the Martha Graham Dance Company developed choreography through the use of a Perception Neuron tracking suit as well as a Tilt Brush. These efforts allowed the choreographers to see their movement in new ways, pushing the creative envelope in a manner that without GenAI would not have been possible. Perhaps one of the most intriguing projects developed with Google was their collaboration with Wayne McGregor in which 25 years of his creative work was captured so that the GenAI can consistently learn, feed back and present sequences that could not have been imagined which, in turn, can spark ideas and generate a piece that is a unique

synthesis of both GenAI and human effort. These efforts, and others like them, are opening the world of dance to many who would not have opportunity or access to movement art.

Our Response

Like all change, adaptation of the new and unknown can be challenging. GenAI's use represents a significant shift in how dance choreography is created. To some, this infringement on what has been an exclusively human effort is perceived negatively. However, for many artists who are willing to think outside the box and striving to think differently, the goal in the use of GenAI has been to explore new and creative perspectives, seeing possibilities in movement that lie outside the human condition and generating innovative and revolutionary bodies of work that craft the dance message. While society is not prepared to definitively answer the questions of whether GenAI can be creative and express emotion or define the ethical parameters of its use, collaboration between GenAI and the choreographer/dancer pushes experimentation and expression, leading to transformative work. Human - GenAI partnerships represent new horizons in dance inherent with complexity and ambiguity, which if pursued, open new avenues for using dance to tell stories to foster emotion, shape thought and be the catalyst for positive social change. Are we ready to accept the challenge?

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Sarah is a passionate proponent of children's programs with over 35 years of experience in organisational and team management, fund development, and strategic planning and an advocate for collaboration and cooperation. She leads a team of dedicated individuals in developing a multi-program approach to performing arts education and has built a community of compatible independent organisations that work in collaboration for synergies in operations, creating community ownership of the pursuit of excellence in the Arts, Athletics and Academia.

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Svetlana is a Marketing Senior Lecturer and a Project Coordinator at AIB. She has over ten years' experience in industry and academia. Svetlana earned her PhD degree at the University of Adelaide, for which she received the Dean Commendation Award for Doctoral Thesis Excellence. Svetlana holds an MBA (summa cum laude) from the Uzbek-American Academy in collaboration with Tashkent State University of Economics and earned Master of Public Health (cum laude) from the University of Maastricht.

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Samaneh is a self-motivated researcher with a multi-disciplinary background in marketing and tourism management fields. Samaneh holds a PhD in Business and Management from University of South Australia (UniSA). Samaneh was awarded a University of South Australia President's Scholarship, School of Management/Marketing Scholarship and top-up Ehrenberg-Bass Institute for Marketing Science Scholarship to investigate the niche market of Astro tourism.

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