Chapter 3
Algorithmic Choreography:
The Kinetic Fusion of Dance and Generative AI

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ABSTRACT

This chapter seeks to explore the symbiotic relationship between dance as a medium of human expression and generative AI as a tool for creative exploration. More specifically, the focus here is on the capacity of dance to inform the development of generative AI systems and, conversely, generative AI's potential to redefine the embodied boundaries of dance. By focusing on dance's interrelationship to generative AI, this chapter aims to elucidate the transformative potential inherent in this kinetic fusion and propose a critical methodology for assessing the impacts of this fusion for the cultural and communicative practices of contemporary society.

INTRODUCTION

In March 2018, a tragic crash involving a self-driving car made headlines when it failed to detect and stop for a pedestrian. Despite being equipped with sophisticated sensors and algorithms, the vehicle's advanced AI system failed to correctly identify a pedestrian crossing the road, leading to a fatal accident (Penmetsa et al. 2021). This tragedy not only exposed potential limitations in autonomous vehicle technology but also underscored the critical need for improving AI's ability to accurately interpret and respond to human and nonhuman movement. As AI continues to be integrated into everyday life, ensuring that these systems can accurately interpret and

DOI: 10.4018/979-8-3693-7235-7.ch003

respond to everyday movements in different environments is crucial for enhancing their reliability, safety, and ability to effectively adapt to complex real-world environments where movement serves as a critical medium of communication, cultural expression, and daily interaction.

Addressing this challenge, this chapter explores how advancements in movement analysis can enhance understanding of technology's relationality to movement and also lead to the creation of more dynamic and responsive AI models. In particular, this chapter explores the potential of "kinetopoiesis," a methodology first proposed by digital theorist Nicolas Sutil (2015), that conceptualizes movement as both a physical and abstract force that actively shapes and is shaped by technological systems. This methodology is particularly advantageous as it exposes how advanced AI models can effectively mimic the natural movements of biological systems, recursively oscillating in iterative patterns reminiscent of the circadian rhythms found in complex biological systems and marine environments. Applying Sutil's methodology to the study of choreographer Irina Demina and programmer Dávid Samu's recent work, this chapter examines the degree to which human movement can be augmented and transformed by these technologies to generate novel forms of creative expression that challenge traditional notions of choreography and artistic authorship, raising new questions about the nature of human creativity, agency, and cultural expression.

Movement as a Medium of Cultural Formation and Transmission

When it comes to understanding the dynamic relationship between human and nonhuman cultures, the study of movement has emerged as a critical avenue for exploring the communicative capacities of inorganic and organic systems. In particular, modern choreographer Rudolf von Laban (1988) was among the first to pioneer a distinctive approach to complex systems that prioritized movement as a fundamental aspect of cultural formation. While movement might be critical to human thought and expression, Laban's work exposed the degree to which it had been marginalized and often completely neglected in studies of human and nonhuman cultural formation:

> *"The use of movement for a definite purpose, either as a means for external work or for the mirroring of certain states and attitudes of the mind, derives from a power of a hitherto unexplained nature. One cannot say that this power is unknown, because we are able to observe it in various degrees...wherever life exists" (1988, 20).*