Algorithmic Reflections on Choreography*

Extended Abstract†

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ABSTRACT

In 1996, Pablo Ventura turned his attention to the choreography software Life Forms to find out whether the then-revolutionary new tool could lead to new possibilities of expression in contemporary dance. During the next 2 decades, he devised choreographic techniques and custom software to create dance works that stage the operational logic of computers, accompanied by computer-generated dance and media elements. Ventura's engagement with computational approaches has led to the emergence of three thematic strands that run through the main body of his work. This article provides a firsthand account of how Ventura's engagement with algorithmic concepts guided and transformed his choreographic practice.

CCS CONCEPTS

•**Applied computing** → **Performing arts;**

KEYWORDS

Dance Technology; Computer-based Choreography; Algorithmic Choreography; Dance and Robotics; Breaking Habits; Human Machine Relationships; Extended Choreography

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1 INTRODUCTION

My wish to get involved with computers was triggered by an increasing frustration concerning the limitations of my own body and its preconditioning via internalized habits and compositional methods. This frustration led me to experiment with computers as a means of delegating aspects of creative decision making to neutral and abstract principles that are oblivious to any bodily, stylistic, and historical authority. From then onward, the software Life Forms played an essential role in the development of my choreographic ideas and techniques. Furthermore, my creative engagement with computational principles deepened considerably and led me to develop, in collaboration with partners, additional software tools that further extended my choreographic repertoire. Finally, my engagement with the creative possibilities of computers was not limited to formal and stylistic experimentation but increasingly shaped the conceptual background of my artistic work. This mutual exchange between artistic experimentation and theoretical reflection informed my interests along three main thematic strands: 1) The use of algorithmic and formal processes to break and redefine bodily and aesthetic habits, 2) The identification and differentiation of inherently human and machine-like capabilities and their increasing interdependency, 3) The application of choreographic design processes beyond the human body to include all aspects of dance and scenography

Each of these strands is briefly introduced in the next sections and its significance and development is traced across several successive works. For each of the works, a web page and/or a representative video are available online: Deus ex Machina[1], MADGOD[2], MADGOD 2.001[3], Zone[4], De humani[5], Corporis / Cluster II[6], Fabrica / Cluster III[7], 2047[8], Dancescapes[9], Heliopolis[10].

2 BREAKING HABITS

This strand employs choreography methods and movement principles that allow the choreographer and dancers to break free from habitual styles and techniques, which then enables the creation of novel choreographic languages and movement materials.

I used the Life Forms software for the first time in the realization of the work Deus ex Machina. In this case, the application of Life Forms was limited to creating short dance sequences. This approach made it evident that dancers would fall back into their habitual movements whenever they stopped following the computer-generated dance sequences. For this reason, I decided to extend the usage of Life Forms to create all movement material for my next work, MADGOD. In the succeeding work, MADGOD 2.001, the invention of transformation rules marked another significant step away from traditional choreography. These rules dispense with the necessity to manually arrange poses and sequences and thereby help to establish a new dance language that is unaffected by

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[1] https://ventura-dance.com/works/deus-ex-machina
[2] https://vimeo.com/channels/pabloventura/87560736
[3] https://ventura-dance.com/works/madgod-2-001
[4] https://ventura-dance.com/works/zone
[5] https://ventura-dance.com/works/de-humani
[6] https://ventura-dance.com/works/corporis
[7] https://ventura-dance.com/works/fabrica
[8] https://ventura-dance.com/works/2047
[9] https://ventura-dance.com/works/dancescapes
[10] https://ventura-dance.com/works/heliopolis

choreographic habituation. The work Zone brought the introduction of numerical sequences whose application allows for creating rhythmic movement sequences. For the middle piece in the trilogy De Humani Corporis Fabrica, I derived pose sequences from existing DNA nucleotide sequences. Later, the development of the software *Choreography Machine* constituted an important innovation in that it permits the fully automated creation of novel poses and movements. This software was used for the first time in the creation of the work 2047. The work Dancescapes combined computer-generated and natural movements and therefore marked a deviation from the previous emphasis on increasing alienation from choreographic and movement habituation.

3 HUMAN-MACHINE RELATIONSHIPS

This strand explores the characteristics and relationships between humans and machines. A conceptual background based on philosophical notions of the posthuman body, systemic thinking, artificial intelligence and genetic engineering motivated choreographic and scenographic experiments involving the juxtaposition, reversal, and confounding of human, cultural, and technical attributes.

In the work, Deus ex Machina, the computer-generated avatar of Life Forms was depicted on stage as an artificial character that attempted to execute human-like movements. Human dancers followed those movements. This juxtaposition between artificial and human characteristics was further accentuated in the work MADGOD. Here, the primordial appearance of a naked dancer was put in contrast to the synthetic movements and media. In the next work, MADGOD 2.001, the human body itself was treated as a machine whose modular parts could be moved individually and independently. In the work Zone, the relationship between humans and machines reached a pinnacle in that it confronted dancers with an actual robot on stage whose movement qualities were more humanlike than those of the dancers. The trilogy of works De Humani Corporis Fabrica exhibited in condensed form the progressing relationships between humans and machines. In the first work of the trilogy, De Humani, the dancers interpreted the computer-generated movements with natural movements. In the second work, Corporis / Cluster II, the humans maintained their biological characteristics but their distorted movement and appearance evoked associations with cloning and mutation principles. In the work, Fabrica / Cluster III, the dancers were further dehumanized and their movements broke down as the individuals were isolated. For the next work, 2047, I applied computational rules directly onto the dancers' bodies. Additionally, this work established conceptual and narrative connotations with the film 2046 by Wong Kar Wai, which emphasized the social and emotional aspects of human-machine relationships. The last work Heliopolis followed a similar approach as in 2047. Here, humans and machines formed symbiotic entities that operated as perfected dancers in analogy to replicants from the film Blade Runner by Ridley Scott.

4 EXTENDED CHOREOGRAPHY

This strand focuses on an extension of choreography principles to the organization of body movement, space, and media. It experiments with the establishment of correlations among all these elements and the transfer of stylistic and organizational principles across different media.

The work Deus ex Machina employed a video projection of an avatar that exhibited concurrent movements with dancers on stage. In MADGOD, the role of video projection was increased as it replaced the dancer's costume and stage lights. Furthermore, music, image, and movements were all correlated by focusing on rhythmic relationships. In the work MADGOD 2.001, video projection on three walls and the stage floor established a stage scenography and led to a superposition between the dancers' bodies and digital media. The rhythmicity of the projected images was coordinated with the choreography and synchronized with music. In the work Zone, video projection fragmented space into multiple regions. For this work, I also appropriated the counterpoint technique and applied it to movement and media. For the trilogy of works De Humani Corporis Fabrica, returning leitmotifs appeared across various media and different works. In De Humani and Fabrica / Cluster III, an actuated scenography formed a dramatic choreographic element that interrupted the dancers' activities on stage. The entire choreography was synchronized to a common timing that was perceived by the dancers through metronomes attached to their chests. The work 2047 marked the introduction of interactive media elements. Here, dancers, through their movements, controlled sounds and visuals during a short period within the performance. In the work Dancescapes, the application of the software *Choreophony* permitted the dancers to control and modulate the entire sound track of the performance. In addition, this work juxtaposed prerecorded and live media, thereby highlighting the transformation of cultural and natural phenomena through the process of their mediation. The final work, Heliopolis, combined different physically present and mediated elements on stage.

5 DISCUSSION

My systematic engagement with the software Life Forms allowed me to gradually develop for my works a new choreographic language that integrated algorithmic experimentation and thinking within all aspects of choreographic creation. In addition, the limitations of the choreography software triggered my interest in the characteristics of humans and machines and their increasingly profound interdependencies. Particularly inspired by debates within the field of complex systems and posthuman theories, I started to employ choreography as a means of artistic investigation. Dance as investigation provides the opportunity to complement scientific research in that it allows one to embody philosophical ideas. Embodiment exposes these theoretical notions in a tangible form. In this context, the dancers' perspectives are particularly valuable due to the fact that their training has led them to develop an embodied virtuosity and awareness for the quality and precision of body mechanics. This awareness is combined with the capability to follow an exact timing and movement instructions. Accordingly, dancers can adopt and combine in their behavior formal control principles and thereby become test subjects for exploring scientific hypotheses and mathematical algorithms.