Choreography and Composition of Internal Time

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Abstract
This paper provides a brief introduction to an ongoing practice-based research and creation project by composer John MacCallum and choreographer Teoma Naccarato, which examines temporal relationships between biological, behavioral, and computational processes during performance.

Author Keywords
Music, contemporary dance, embodiment, polytemporality, biosensors, electrocardiogram, heart rate, biofeedback, interoception, entrainment, music notation, enaction, situated cognition

ACM Classification Keywords
H.5.1: Artificial, augmented, and virtual realities. J.3: Biology and genetics, health, information systems. J.5: Music, Performing arts (dance, music). J.7: Real time.

Introduction
The intersection of bodies and biosensors in our compositional and choreographic practice affords a complex reconfiguration of biological, behavioral, and computational processes, as inseparable and indistinguishable from one another. Through an investigation of temporal rationality between rhythms of the human body, such as heart rate, with animate and inanimate couplings in the environment, our research complicates identifications of interior and

exterior, natural and artificial, and cause and effect. We are investigating ways in which to cultivate a continuous oscillation of awareness and distribution of agency between body, sensors, and network. Our focus is not on the sonification of biosignals, nor in the use of bio-data to control attributes of other media such as music and lighting. Rather, the intervention of biosensors in our choreographic and compositional process is intended to reveal, rearticulate and reform the underlying assumptions, questions, and practices of intelligence at play in human-machine collaborations.

Project Description

Choreography and Composition of Internal Time is a practice-based research and creation project, which examines temporal relationships between physiological processes with human movement and mediated environments. The project involves the development of a wearable, wireless electrocardiogram (ECG) unit for dance, software tools for the real-time visualization and analysis of bio-data, and embodied experiments regarding interoception, entrainment, temporal perception, and more.

Ongoing research will provide a foundation for the creation of numerous performance and installation events in which heart rate data from contemporary dancers is processed to generate real-time click tracks for musicians. In this scenario, the choreography must be designed to initiate intentional arcs in the heart activity of each dancer over time, based on a temporal pathway defined in the musical score. Each musician, click track in ear, must negotiate between the prescribed, polytemporal score, versus the actual heart rate of a dancer during the course of an event. The reliance on physiological processes to animate aspects of performance time ensures that no two performances will be alike, and further, that the relationships between the performers will be in constant flux. As such, composing moments of simultaneity is impossible in this project; rather, creation will focus on designing overlapping windows of time, during which layered textures of sound and motion result.

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