Mimetic Relationships between Bodily Movement and Musical Structure: Measurement and Application

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Abstract

"How does the human body move to music?" and "How the modelling of human bodily movement to music could be applied to the design of novel electronic musical instruments?" This doctoral dissertation will attempt to answer these questions by considering the Embodied Music Cognition train of thinking, which states that music perception and cognition are related to actions of the human body. The dissertation comprises three studies. The first is a theoretical discussion on "musical gesture", a set of corresponding qualities that can be observed in the sound produced by someone making music and also in the movement of someone making music (e.g., playing an instrument, singing, conducting) or moving to music (i.e., dancing). The second study explores how to measure and model gestures of people moving while listening to music. This modelling will be implemented into a novel digital musical instrument controlled by sensors attached to the human body. The third study will focus on evaluating user's experiences with said instrument. A key factor in this investigation is that the modelling rely in machine learning techniques, which will allow the musical instrument to adapt to its user, leading to a new paradigm in human-machine musical interaction. The results of this research will contribute directly to artistic performance, music education and music therapy. More generally it will also contribute to advance research in systematic musicology, psychology of cognition and human-machine interaction.

Keywords

embodied, music, cognition, gesture