

Physical modelling for interactive installations and the performing arts

Sarah Fdili Alaoui^{a*}, Cyrille Henry^b and Christian Jacquemin^c

^aSchool of Interactive Arts and Technologies, Simon Fraser University, Canada; ^bchdh, France;

^cThe Computer Science Laboratory for Mechanics and Engineering (LIMSI-CNRS) and University Paris-Sud, France

This article explores new artistic possibilities through four different examples of digital environments where live performance and virtual physical models come together. Physical models (specifically mass-spring systems) are used to enhance mappings between human movement and digital rendering. In the case of multi-modal rendering, physical models improve the cross-modal coherence. Given a physical model's capacity to simulate physical behaviours, they can also be used to visualise or to simulate human movement qualities, and even to simulate a dancer's virtual partner. More applications certainly remain to be tested, but the present study opens new avenues for the exploration of the complex and

time, instead of tuning one medium to another (such as adapting animations to a

performance through the plethora of possible correspondences that can be

By displaying visual feedback that represents the user's movement qualities, our MSS aims to help the dancers to improve their execution of Emilio Greco's PC qualities. This is a new approach for dance pedagogy where new media is meant to enhance the learning process of dancers. For this reason, the installation has been welcomed by dance pedagogy professionals and used every year as a pedagogical

The system is composed of a motion capture layer based on wireless accelerometers combined with the infrared sensor Microsoft-Kinect as well as an image processing program to reconstruct a skeleton from the silhouette of the dancer. The skeleton is used to acquire the 3D positions of the dancer's head, hands, centre of mass and feet.

The system extracts the ~~data~~ **data**

controlling a MSS that drives both the sound and image media indirectly. chdh considers the combination of the MSS, the sound and images and the performer interaction with the MSS, as a sophisticated 'audiovisual instrument'. We will explore two of these instruments, 'Latent' and 'Emergence'

and visuals. In this application, using a MSS allows the reduction or enhancement of the harmonic structure of the initial shape and its possible variations. Here the MSS creates a dynamic mapping that is used to creation a rich and usable instrument.

'Emergence'

Figure 8. 'Latent' instrument visual representation.

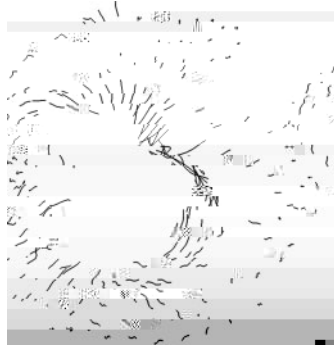


Figure 9. Emergence of spatial arrangements in a visual instrument.

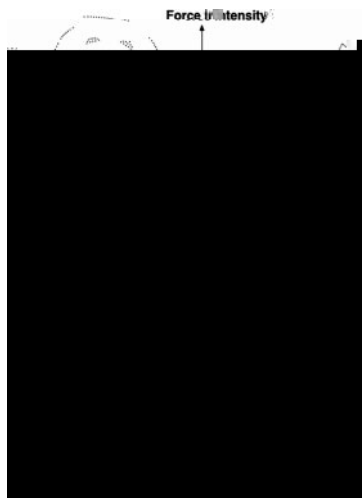


Figure 10. Different static spatial arrangements and the corresponding function curves used to

programming of the physicality, but a deeper reflection on the expected behaviour of

is focused on interactive 3D graphics and its applications for information visualisation, virtual and mixed realities, and visual arts. He is involved in several collaborations on the artistic application of interactive graphics (theatre, art installations, sound and graphic design, etc.). His current research