Co-evolving Affective Wearable Computer

Rachel Zuanon
Anhembi Morumbi University
rzuanon@anhembi.br
rzuanon@uol.com.br

The practical use of the Co-evolving Affective Wearable Computer (CAWC) is to facilitate processes of man-machine-man motor-sensitive communication, specifically the intention and performance of voluntary and involuntary movements and the exchange of digital affections. The main motivation lies in offering another channel of communication that goes beyond verbal and visual scope. As a result, it also lies in searching possible communication processes that take place when biological data information (mioelectric signs) used for training technological environments, both associative and evolutionary, return to the biological environment as motor-sensitive stimuli to the bodies of individuals and of body artists.

This process comprises the following operations: the acquisition of the emotional state and of the computer user's movements (or the thought of a movement); the coding of such emotional states and movements in motor-sensitive stimuli as well as the transmission of such stimuli to the body of the same or of another interacting individual. For this to be achieved, the 'CAWC' is made up of an intelligent conducting surface that comprehends: wrist detectors for blood volume and skin galvanic response, to capture the user's emotional state; electrodes to capture the user's electric and brain signs; electrodes for the electric neuromuscular stimulation of the interactor and two communication technological systems — an associative one and an evolutionary one. Such a surface changes its color and shape, co-evolving with those who wear it during the process of interaction between them, trying to materialize the memory of the interactive process between men and machines in the physical framework of the device. Designed for the use of one or two individuals, the computer operates this communication process between physically near or distant people. In both cases, the emotional states, movements (or thoughts) are sent from one body to the other through the net. Because the limited space to expose all concept of the CAWC here, we will present just the phases that are involving in the proposal of the device for designing body movements for dancing, acting, performance and theater.

Device for designing body movements for dancing, acting, performance and theater

The CAWC works as a device for the communication of movement through a creative and collaborative process between the man's and the machine's intelligence. For this to be attained, the operating technological system is evolutionary. That is, the information (movement or thought) performed by the computer user is coded, apprehended and evolved in this system. Thus, the stimuli to be given and performed as movements differ from the initial information introduced in the computer, as it starts to show patterns that characterize the co-authorial process between man and machine.

Action through movement

At this stage, the CAWC operates from the acquisitions of the user's movement to code in an evolving way this movement in motor-sensitive stimuli.

Individual application

At this instance, the CAWC works as a tool for the individual artistic creation that allows the individual to perform a movement and, right after that, get motor-sensitive stimuli that make him perform a different movement from the previous one, once new patterns can emerge form the co-authorial relation between the technological and biological systems.

Collaborative application

Here, the movement performed by individual A is apprehended and evolved by artificial intelligence, which inserts new patterns into this movement. This new emergent patterns can be observed in the movement performed by individual B — which is distinct from the input 'sent' by individual A. What can be noticed from now on is a creative looping, in which the new movement performed by individual B — a result of this collaborative creation process between the biological and technological systems — comes back to the evolutionary technological system, being recognized and evolved

again to be 'sent' back to individual A as motor-sensitive stimuli which will make him perform a movement that is neither the one he performed as a first 'input' of the system, nor the one sent as a response by individual B. That is, what one observes is a continuous system of biological/technological creation of movements.

Action through cerebral command

At this stage, the CAWC operates from the acquisition of the user's cerebral command to code in an evolutionary way this command through motor-sensitive stimuli.

Individual application

At this stage, one observes the co-authorial creative process between the evolved systems in which the movement imagined by the interactor gains new emergent patterns in the artificial intelligent environment. As a result, the motor-sensitive stimuli produced in the interactor's body lead him to perform a different movement from the one initially thought of.

Collaborative application

At this instance, individual A thinks of a movement to be introduced in the system as cerebral commands. These coded commands start to evolve in the technological environment. As a result, new emergent patterns are visualized in the movement performed by individual B. The same process is repeated from individual B towards A.

Designed to promote the exchange of affections and motor-sensitive dialogs in real-time, mediated by technology, the CAWC takes shape as open, dynamic system where unpredictability is also an integral and fundamental part of the process.

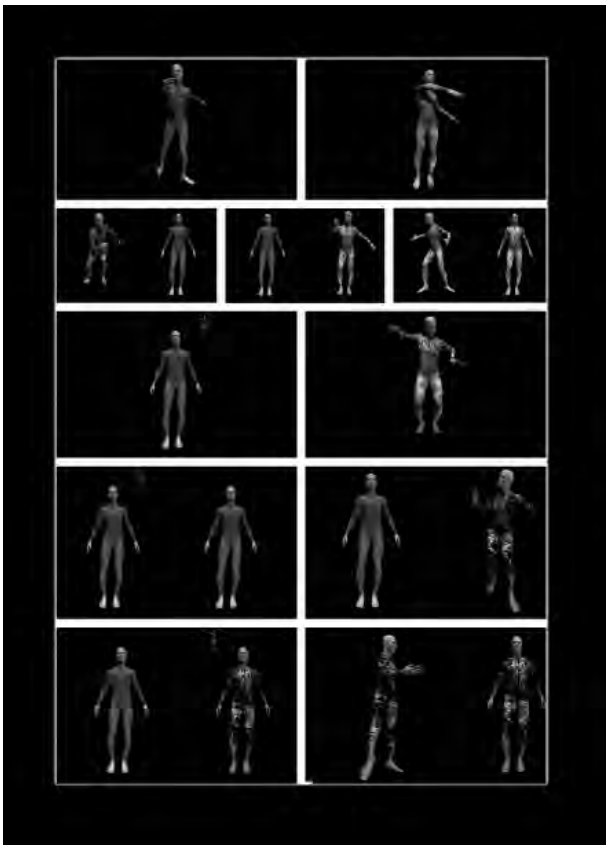

Figure 1: Individual and Collaborative applications of Action through movement and action by cerebral command of the device for designing body movements for dancing, acting, performance and theater

---

Zuanon, Rachel. Computador Vestível Afetivo Co-evolutivo: Processos de Comunicação entre Corpos Biológico e Tecnológico. Doctorate thesis, Semiotics and Communications Program, PUC-SP, São Paulo, SP, 2007.