

ANEXO 1:

COMUNICAÇÃO 1¹ – março/2016
Musical Gesture as Creative Interface
Universidade Católica Portuguesa – Escola das Artes – Porto, Portugal

DIGITAL SOCK

Study and development of digital musical instruments with an emphasis on Gestural Interface, Motion Analysis and Interactivity

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Our research project is focused on DMI Design (digital music instruments) and this paper describes the preliminary research processes – gesture interpretation and translations methods - for the implementation of our prototype: Digital Sock

Digital Sock is a digital music instrument where sound is controlled through feet movements

The gesture interpretation and translations methods process was divided on two major research parts:

- The gesture capture
- The gesture analysis

The gesture capture aims to study the body movements with no sound synchronization and consequently without a sound/body movements significance.

Through this procedure we pretend to observe how casual body movements driving the body itself to a transitory space of relationships. We based our method on Martin-Barbero (1997), Silverstone (2002) and Orozco Gomes (1993) researches.

The gesture captures and observation process was strongly based on an exploratory research approach where the body is taken as unpredictable

¹ http://artes.porto.ucp.pt/sites/default/files/files/artes/eventos/2016_PORTO_MG_FINAL_10mar.pdf

paradigm – transitory relationships between the different parts of the body / different gestures meaning as a consequence different interaction between different parts of the body. Among this experience our proposition attempted to approach Merleau-Ponty's (1945) study about movement perception, Varela's proposal in the framework of *embodied mind* (Varela 1991), the relationship body-culture from Dreyfus (Dreyfus, 1996) and Maturana's interpretive understanding of information (Maturana and Varela, 1995).

The first part of this project was realized with help of a Motion Capture System (vicom T40S-NR18 - 4 Mega pixel cameras) on the Motion Capture Lab at the School of Arts (Portuguese Catholic University) and CITAR among 2015. For the gesture capture part, we've taken thirteen volunteers (men and women of several ages). During each session each participant was being driven to produce everyday movements and also free movements with no special meaning.

The analysis global method took as starting point Laban (1978), Godard (1995), Zagonel (1992), Delalande (1988) and Marc Leman (2008, 2012) research. Concerning some specific aspects of gestures analysis, we divided this point in some categories:

- analysis of gestures and gestures levels (Zagonel, 1992; Delalande, 1988 and Marc Leman, 2008);
- gesture analysis of attitudes established through scenic movements (Laban, 1978 and Godard, 1995);
- gravitational organization and physical interpretation of gesture (Godard, 1995 and Leman, 2008).

Concerning the Similarly, we taken as principal reference Katz and Greiner studies - *Corpomídia* theory (Katz and Greiner, 2006), where "everybody is your own media" and the perception of gestures are correlated to a critical, political and social positioning of individual person against the world (Britto, 2006).

On a secondary instance we carried the extracted data from MoCap system to Autodesk Maya 3D animation software and Kinovea 8:20. The combination of these tools allowed a visual analysis of movement trajectories, movement rotation, angle positioning of the legs and body (during gesticulation) and biomechanical analysis of feet movements. The analysis parameters for the

frontal, sagittal and transverse planes was based on the system coordinates (x, y and z). With these parameters we could also analyze the direction / path (spatial position), the degree of flexion / extension, adduction / abduction; internal / external rotation.

The kinematics data analysis carried us to observe and reflect about gesture significance and his interaction with the space.

The analysis of biomechanical aspects also helped us to establish a comparative observation of participants actions and the relationship between body and space, as well the analysis of interactional cycle that guides gesture in their different growth levels.

The results of this part of our research, contributed, to understand the geometry of the movement during the realization of expressive gesture in everyday gesture in order to explore the fine motoric skills of the feet, the body-space relationship among interactive processes, as well as aspects intentional underlying of gesture development without sound/musical meaning.

Our research project and our future work will be focused on the instrument design, particularly on the interaction rules and sound control processes. For this we intend to start very soon the following tasks:

- study of the relationships between musical gesture and body gesture - transformations of space for the relational processes.
- user interface implementation, mapping strategies for a sound generation and sound control models ;
- analysis of interactional cycle - expressive gesture and the musical gesture - during artistic performances , pedagogical practices or rehabilitation therapy.