JOAKINATOR

An Interface for Transforming Body Movement and Perception through Machine Learning and Sonification of Muscle-Tone and Force

Joaquín R. Díaz-Durán1, Laia Turmo-Vidal1, Ana Tajadura-Jiménez1,2

1 i_mBODY Lab, DEI Interactive Systems Group, Department of Computer Science and Engineering, Universidad Carlos III de Madrid, Spain.
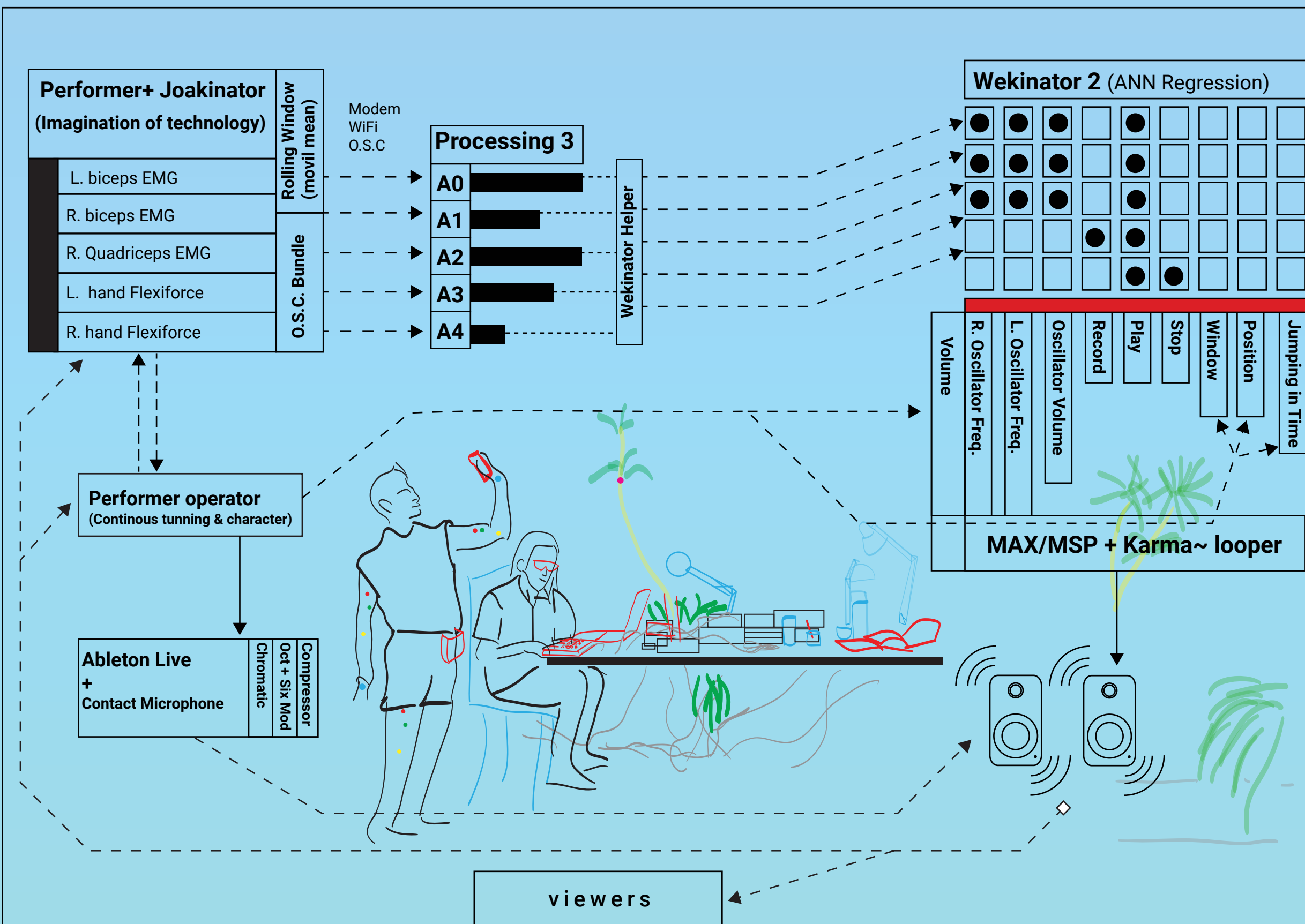2 UCL Interaction Center, University College London, UK.

jodiazd@pa.uc3m.es
lab.imbody@gmail.com
imbodylab.com
arterobotico.com
@joaku_sotavento

BODYinTRANSIT

Figure 1. Architecture of the system for the performance Lo Permanente 2020.

Figure 2. Joakinator used in the performance Lattice, 2022.

JOAKINATOR

The Joakinator is a wearable interactive interface that connects technology, body, and performing arts. It enables performers to control sound, interactive music systems, and video by muscle tone and force.

Results:

- new expressive qualities in performance
- increased audience imagination
- more creative bodily thinking

BODYinTRANSIT PROJECT

BODYinTRANSIT project merges neuroscience and human-computer interaction research to explore the transformation of body perceptions using sound and haptic interactive technology.

Scope:

- People's bodies do not often change quickly, but how people perceive them is actually highly malleable [1]
- The sonification of body movements with metaphorical sounds (e.g. water, wind, mechanical gears, musical notes) can transform body perceptions [2] [3].
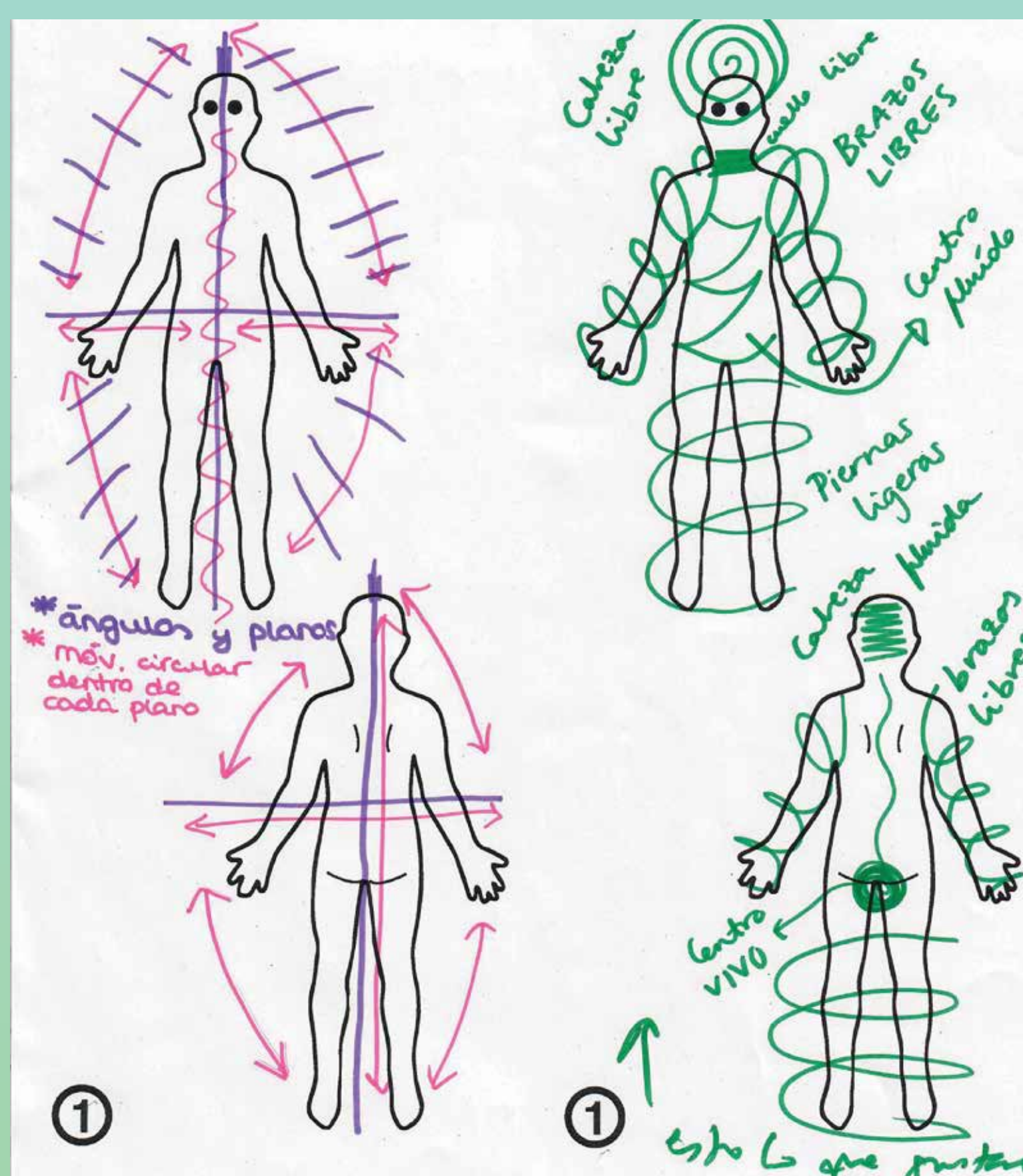

Figure 3. The Joakinator interface.

Figure 4. Body maps for registering body perception in professional dancers.

JOAKINATOR IN BODYinTRANSIT

We have investigated the potential of Joakinator to transform body perception in a workshop with professional dancers using body maps[4]. Qualitative insights from this study shows:

- Joakinator positively mediated the participants' body perception
- dancers felt more aware of their muscle tension
- and their capability to activate particular muscle groups

DEVICE

Hardware

- Arduino-MKR1010
- Myoware-v1 electromyography (EMG) sensors
- Flexiforce (FSR) sensor
- PCB circuit for noise reduction and sensor calibration

Software

- MAX/MSP for communication and visualization
- Wekinator for MachineLearning

REFERENCE

[1] M. Longo and P. Haggard, "What Is It Like to Have a Body?," Curr Dir Psychol Sci, no. 21:140–5, 2012.
[2] J. G. Ley-Flores and et al., "SoniBand: Understanding the Effects of Metaphorical Movement Sonifications on Body Perception and Physical Activity," 8-13 May 2021.
[3] J. e. a. Ley-Flores, "Effects of Pitch and Musical Sounds on Body-Representations When Moving with Sound," Scientific Reports 12(1): 2676.
[4] L. Turmo Vidal, Y. Li, M. Stojanov, K. B. Johansson, B. Tylstedt and L. Eklund, "Towards Advancing Body Maps as Research Tool in Interaction Design," February 2023.

uc3m | Universidad Carlos III de Madrid   DEI+ Interactive Systems Group   UCL   UCLIC   BODYinTRANSIT   i_mBODY lab   European Research Council   erc European Research Council Established by the European Commission