

Embodied contemplative practices and interactive music.

Doctoral Symposium Paper

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ABSTRACT

Human movement has become more and more central in nowadays music performance, in particular because of an increasing use of interactive technologies that allow the body to generate and control music. In order to better understand this kind of musical expression, we need to understand the body and her perception. Embodied contemplative practices (like Qigong or Yoga) have developed a knowledge of the body that can be helpful to understand human perception: phenomenology and embodied cognition have studied and adopted this knowledge, in order to scientifically consider first hand experiences without reductionism. If the role of the body is so important for interactive music performance, we need to consider and include this perceptual knowledge into interactive music practices. The goal of this doctoral research is to develop an interactive music system that supports and helps the development of specific abilities of embodied contemplative practices: proprioception, self-observation and introspection.

CCS CONCEPTS

• **Human-centered computing** → **Auditory feedback**; *Empirical studies in HCI*; • **Applied computing** → *Performing arts*;

KEYWORDS

Music, Interactive Systems, Embodiment, Contemplative practices

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1 INTRODUCTION

The role of the body in musical expression has lately gained a lot of attention, especially because of interactive technologies that allow the body to generate and control music. If human movement has become so central for music performances, it is essential to better understand how the body works not only on a conceptual level but also at a pre-reflective and perceptual level. This kind of

knowledge is already available in many bodily practices: from them it is possible to learn a lot about human perception.

My doctoral research has the goal to bring together this kind of perceptual knowledge and the use of interactive technology for musical expression. This will be done:

- (1) using research methods that allow to discover and understand human perception from a phenomenological point of view.
- (2) using technology and interaction design strategies that allow to get information from human beings without reducing them to a simple remote interface.

2 MOTIVATION

My academic career has been a mixture of humanities, computer science and computer music. This doctoral research is an opportunity to bring together this different knowledge and combine theory and practice.

In the last five years I have been working on different projects, in particularly Motioncomposer¹ and Metabody² where I had the chance to work with some experts on the theme of interactivity, both at a theoretical as well at a practical level³⁴⁵⁶. At the same time I have been experiencing myself practices like meditation, Qigong and Tai Chi. All these experiences allowed me to understand and select which strategies, technologies, mapping, quality of movement and concepts can now become part of this doctoral research.

3 CONTEXT

A common tendency of western culture is the description of human beings as body and mind, where the mind, and so the thought, has the priority. This idea has been an important philosophical question and reason of big discussions since Plato and later even more relevant with Descartes.

There are also other theories and practices⁷, that describe the human being as a complex system of relationships, the thought is understood as an embodied practice.

These two attitudes can be easily found in the different aspects of our culture, also in music. Computer music has these two tendencies particularly intensified: on one hand music playing has become an almost mental activity, where body movement is very limited; on the

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¹<http://motioncomposer.com/>

²<http://metabody.eu/>

³<http://www.palindrome.de/AD24.PDF>

⁴http://www.palindrome.de/mb_affording_difference

⁵<http://metabody.eu/tools-for-understanding/>

⁶<http://metabody.eu/journal/>

⁷A few important names: Baruch de Spinoza, Edmund Husserl and see *Body producing music*

other hand technology allows more possibilities for the expression of the body as human movement can control and produce music, what is commonly called "interactive computer music" [9] [8].

The strong relationship between body and mind is common in many traditional art forms and it is often about finding your true nature or existence through bodily practices⁸. The art of 20th century has also been exploring such subjects, looking for similar goals and adopting more and more different bodily practices that created some kind of new spirituality and possibilities for a development of consciousness [12]. What both traditional and contemporary art have in common, is this quest for self-knowledge through embodied practices. This is also the motivation of this work, as I would like to connect this artistic and scientific search, through the use of interactive technology.

3.1 Body producing music

The theories of embodied cognition have extensively shown, how human perception an active process is, that happens in a context of relationships. The understanding of human perception has got a more complex meaning: it is not a passive reaction to a stimulus but an actual activity, that involve the whole experience of human beings and their context [13].

Interactive sound art makes this process even more evident to see and to hear, because there is a clear connection between body movement and music control or generation: this creates new space for a variety of bodily and musical expression. Body movement becomes a kind of musical instrument, so we need and develop a high awareness and perception of our whole body, that again is used to make music. If body movement becomes such an essential part of a music performance, it is now clear why we need to better understand human perception, in order to understand music production.

3.2 Contemplative practices

Awareness, self-observation and body perception have been more and more researched in the last years, both in neuroscience and in social and human science, especially because the potential positive influence on human health. Neuroscientists have been mainly focusing on sitting meditation practicing; recently also meditation practices that involves movement (like Qigong, Yoga, Feldenkreis and so on) have received more interest. We will call this kind of practices *movement-based embodied contemplative practices*, i.e. MECPs [10].

MECPs can help us understanding how body perception works and how it can be understood in movement. Some of these practices are very old and many people have been building up this knowledge based on their perception and experience: this is a valuable perceptual knowledge of the body. Some MECPs have been already studied using a phenomenological approach [5][11] and provide the starting point of our research.

4 LITERATURE

The role of the body in musical expression is still a subject that has not been much considered and researched in the field of musicology [6]. However the body and her expression has been more and

more considered by nowadays human science, certainly by phenomenology but also by sociology and cultural studies. My doctoral work is going to add up another perspective in this field that gives value to the human body and her potential for musical expression.

In the last twenty years a way to study consciousness that considers the first person experience has been developed by researchers like Francisco Varela, Jonathan Shear, E.T. Gendilin, Pierre Vermersch, Claire Petitmengin-Pegeut [11], Evan Thompson [13]. They created a methodology that allows to study scientifically subjects like introspection, self-observation and body perception, they called it second-person-perspective⁹.

Very central for our research is the analysis of human perception: this is something that happens at a deep level of our experience and it is difficult to analyse only through an external observation. For this reason it is needed a strategy that allows an analysis of the lived experience.

In order to successfully apply this research method, the mediator (in this case myself) must be trained. My Phd supervisor, Prof. Jin-Hyun Kim has been knowing and using this system since many years and can easily teach it and assist me. Moreover she has produced valuable research methods and strategies [2] [1] [3] [4] that will be essential for my work.

Another important paradigm of my research is the work of Haruhiko Murakawa, in particular his Phd dissertation, where he phenomenologically analysed the experience of Qigong [5]. This study provides a paradigm to understand the experience of a contemplative practice, trying to overcome the dichotomies of mind and body.

5 RESEARCH METHODOLOGY

This research will not happen in a laboratory but in a real world situation, a so called *real world research*[7]. We need a method that can be adapted to this context and can also highlight the different aspects of the human experience. As the researched subjects are proprioception, self-observation and introspection (all very intimate aspects of our perception), a typical third-person-perspective would not be enough, in order to give value to the lived experience without reductionism.

The already mentioned second-person-perspective (see Literature) phenomenological method will be the basis of this research. This involves an encounter between the person who lived the experience and the researcher. Through a talk (possibly short after the event), the experience that is not explicitly available to the owner of this experience is made explicit. The researcher has the stimulating role of being between the first- and second-person-perspective; he will also put questions, but his role is to play the mediator: guide and support the reports of the interviewee in order to point out aspects that are deep and relevant to the research.

The other considered method is the structured observation. This system has been developed to analyse qualitative data but producing quasi quantitative outcomes. This is accomplished by video recording the event to be analysed and then using a coding system to classify it in clear and unique categories: this classification can be then reliably repeated by different observers and with consistent results.

⁸For example: dance, prayer, energy work or rituals

⁹for a detailed description of this method, see section *Research Methodology*

This two methods will provide a way to understand how much the different interactive systems are able to develop contemplative behaviours in the users. This outcome will be the valuable basis for the further design and development. Afterwards the systems will be tested again and another evaluation will be take place. A few phases of testing, evaluation and redesign are planned in the course of the next three years.

6 MAIN RESEARCH OBJECTIVES AND QUESTIONS

My thesis is that the close sensorial connection between body movement and sound control can promote the development of awareness and self-observation, because two different senses (hearing and proprioception) are involved and thereby a high level of presence is needed. This state of consciousness is similar to other MECPs: in both cases it is possible to experience and discover a development of our perception, that bring us to a position of observer of our own actions and perception.

Can interactive music improve proprioception, self-observation and introspection? At what extent can we become more aware of our body, using a system that sonifies our movements? What are possible design strategies to create an interactive music system that allows us to become aware of our body and increase self-observation? How can we *sense* the body through technology and how can the body *sense* this technology?

In order to be able to answer to these questions, a few MECPs will be considered as paradigmatic activities that increase proprioception and a few different interactive sound systems will be designed and developed. This sound environments will be tested in different contexts (working environment, rehearsal, show, installation, workshop) and involving different people (technicians, musicians, dancers, people with disabilities). This test situations will provide the perfect context to study the experience of the participants, using the tools of the structured observation and of the phenomenological interview. This feedback will flow then in next step of the design and development of the system, in order to improve or extend the contemplative element.

7 PROJECT DESCRIPTION

The goal of this project is to create an interactive music system that promotes proprioception and self-observation. The starting point is to select some interactive technologies and strategies that will be used to create some artworks. These artworks will be then analysed, in order to evaluate if they satisfy our initial goals. The resulting feedback will be valuable in order to improve or select strategies, technologies and uses. Improvement to the systems will be applied and new tests and evaluation will be done.

7.1 The technologies

I selected four technologies that will be used. This does not exclude other technologies that will be available in the future and relevant to this project.

- (1) Motion tracking. I will use the motion tracking system of the project Motioncomposer, that is a specific version of Eyesweb¹⁰. Possibly also the software Eyecon¹¹
- (2) Accelerometers and Gyroscope, using the sensestage platform¹²
- (3) a proximity/touch Sensor. Whether the *Closer*¹³ sensor or a self made version using a sound card
- (4) possibly some kind of muscle sensor, whether the Myo¹⁴ or the Xth Sense¹⁵

8 PLANNED ACTIVITIES

Since the beginning of my doctoral research I started to plan combined situations where a certain interactive system can be practically used and also researched (with interviews and structured observation). This will be the field of work of my research and the actual situation to test the development. These different projects and experience will lead to one artwork that will combine the different knowledge accumulated: about human perception, interaction design, technology and sound.

8.1 Motioncomposer

Motioncomposer is a device that turns music into movement using a motion tracking system, based on the Eyesweb software and developed by Casa Paganini¹⁶. The system has been developed with a special care for disabled people: if any movement can produce music it does not matter what your body can or cannot do. The system has been extensively used in workshops, performances, presentations. The tool has been conceived by Robert Wechler. I have been working on this project since 2012, I am the music director of the project and developer of one of the environments used.

Workshops with disabled people are one of the most common use of this system. In these situation I am planning to accomplish part of the research, recording videos and interviewing people. This outcome will be the material to evaluate if we are going to use this system and if yes, how.

8.2 Last-minute failure

Last-minute Failure is a performance about how can we use interactive technology to control, change or trigger sounds based on the proximity and touch of two (or more) persons. The concept is based on the philosophical ideas of Maurice Merleau-Ponty and investigate how our perception changes, depending on how another person approaches or touch us. For this work we have used the already mentioned proximity/touch sensor Closer. I took care of the interaction design and the sound. Rebekka Boehme and Clara Gracia are the performers and choreographers.

At the moment it is a working progress, a very first version of the performance is available online¹⁷. The next working sessions

¹⁰http://www.infomus.org/eyesweb_eng.php

¹¹<http://eyecon.palindrome.de/>

¹²<http://sensestage.eu/>

¹³<http://www.design-research-lab.org/projects/closer/>

¹⁴<https://www.myo.com/>

¹⁵<http://xth.io/>

¹⁶<http://infomus.org/>

¹⁷<https://vimeo.com/178807655>

and performances will also include extensive interviews with the dancers and video recording, in order to deeply understand the perceptual potential of this tool.

8.3 Sentire

Sentire is an Italian word that means both to feel and to hear: this resume the senses that will be subject of this installation. Together with the artist Olga Kozmanidze¹⁸ I have been working on creating an installation using the proximity and touch sensor and sonify this events. This work can be enjoyed by one visitor at a time. The goal is to offer the visitor a chance to discover her feelings getting closer to Olga and eventually also touching each other.

Sofar there has been two private rehearsal with external visitors and one public event at Spektrum Berlin¹⁹. Both the rehearsals and the shows has been followed by extensive phenomenological interviews to discover what the visitor experienced; the results of these interviews and analysis has been feeding the design of the system and the mapping of the sounds. A video of the last rehearsal in December 2016 has been edited to show the working situation²⁰.

8.4 Further works

More works are going to happen and they will involve the use of accelerometers and muscle sensors. They will be again installations, performances and workshops.

9 CONCLUSION

In the last few years I have been working intensively on interactive music technology, embodied bodily practices and phenomenology. During this interdisciplinary work I noticed that the knowledge that some contemplative bodily practices have developed, can be very useful for understanding human perception: this important element is not always considered in interaction design and not much researched in the field of musicology. If we can give value to these experiences and translate them in the context of interactive music, we have the chance to create and use technologies that takes into high consideration the human being. To accomplish this we need specific methods, like phenomenology and embodied cognition, that give value to the lived experience, scientifically and without reductionism.

For this reason, the goal of this doctoral research is to develop an interactive music system that support and help the development of specific abilities of embodied contemplative practices: proprioception, self-observation and introspection. In order to do this, we have selected some technologies and strategies that can give value to these human aspects. We have been working and we are going to work more on creating different artworks and analyse the experience of the participants: this will provide material to adapt and improve the analysed systems. These single artworks and researches will build up the foundation for a interactive music environment that will include the most valuable aspects in order to develop contemplative abilities of the user.

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¹⁸<http://okozmanidze.tilda.ws/>

¹⁹<http://spektrumberlin.de/>

²⁰<https://vimeo.com/199049743>