Acts for Telematic Painting and Live Coding

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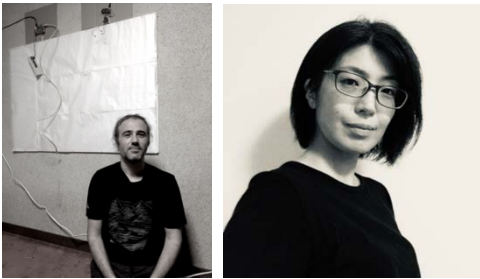*https://vasileios.github.io*
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Abstract

This paper aims to reveal a compositional methodology for the performance work of "Acts for Telematic Painting and Live Coding" with exploration of aesthetic and technical potential of using telematic and sensing technologies. This paper also discusses about composers' strategies for embodiment of audio-visual performance, taking advantage of expanded performing space while comparing with traditional art forms such as calligraphy, painting and several performance styles.

This work is a telematic live coding performance with the application of real-time gestural painting for sound generation, realised by microcomputer and sensing technology. In addition, by means of a telematic technology of OSC communication protocol this work is intended to be performed in remote sites such as

Greece and Japan simultaneously. In this performance it is aimed to explore the novel artistic expression and creative potential that lies between portrayal actions, graphical elements, poetry and sonic events with investigation into appropriate interconnected system structure. This work will be performed by two performers: each has own system that consists of interlinked aural and visual materials, and the work will be constructed through the extemporisational dialogues of drawing (gestures and images) and sonification between them.

One performer uses SuperCollider and the other uses Max, and both try to interpret their gestural and graphical events into sonic events via OSC communication protocol, whilst their mapping strategies are compared on the different sound programming environment.

Introduction

This work presents a multimodal environment that combines gesture with software, computational creativity and technical processes. Our inspiration comes for our interest in cross-disciplinary research such as computational creativity and performing practices. Our experience in multimodal interactive synthesis [4][5] allow us to make the next step and to experiment with other art-forms such as painting and dancing in

order to convey meanings through audiovisuality. Figure 1 s hows a s nap-shot of our live painting rehearsal.

Fig. 1 : A View of Rehearsal

At the same time we investigate the aesthetic and feasible potential of manipulating the sound telematically using performers in a remote space. Ascott in his book [1] about telematics he suggest that the text is the cheaper and easier to process. In this work we use a c heap and easy way to manage data in real time by sharing messages through OSC communication. Additionally, nowadays, the concept of creating systems that can manage telematic technology has increased. There are frameworks in programming environments such as Super-Collider that contain classes that deal with telematic technology and on t he fly processing. One example is, SC-Hacks: A Live Coding Framework for Gestural Performance and E lectronic Music for SuperCollider [2] which we found suitable to experiment with.

Artistic concept

In this project we present an interactive performance which combines traditional art such as gestural painting and a cting (using traditional painting tools and materials) with computer music and el ectronics. In out opinion this experimental work

can suggest new relations between senses, subjects and technologies.

Our concept is to manage to communicate meanings out of this multimodal composition using symbolism, and with our interpretation to express the significance of a poem's words and to achieve conceptual integration.

We found poetry the most suitable way to convey meanings through symbolism. The poem we chose to audiovisually represent in the Moonlight Sonata by Iannis Ritsos. We decided to poetically relate telematics with the meaning of *the vision of life from distance* that also derived of the poem's meanings. Moonlight Sonata poem deals with the situation of an ol d woman being alone and intense portrayal of the subject of loneliness and alienation of the uncommitted individual [11].

Thus, we decided to translate the poem's important words that, in our judgement, convey the poem's meaning using symbolism. Our painting aesthetics are inspired by Japanese calligraphy (Kanji symbols). At the same time we focus on sonification of the poem and the manipulation of sound through the movement and gestures.

Additionally, we suggest an al ternative - poetic way to present live coding (notation paradigms) by writing/painting on an interactive canvas. In this case our coding language is the symbols that are related to meanings of words and t o the code that is responsible for the sound synthesis. The strategy is to use the painting process as the mechanism that triggers the sound by executing the code in our programming environments. In this case the performers can produce the sound by touching and drawing into the interactive canvas and then to manipulate it using gestural symbolism.

In this way the performers can decide when the sound can be part of the overall

performance. While the performers paint onto the canvas the movement of performers can manipulate the sound.

At the same time data form performers in remote sites can manipulate the sound. Figure 2 shows the stage diagram of the performance.
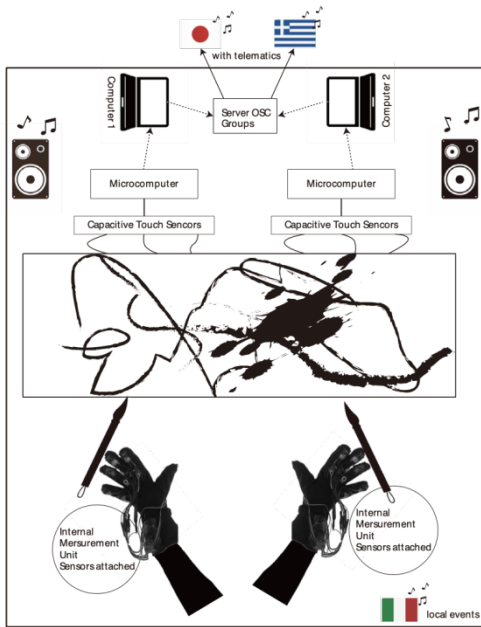

Fig. 2 : Stage diagram of the performance

Our purpose is to sonify movements/actions (gestural symbolism) related to poem's words in our try to communicate meanings. Gestures are important to music as the force that brings life to music [6]. We use compositional strategies to generate products - such as the graphical and the sounding results of performer's actions. We experiment with gestures mappings across domains (real space and mental model of an element).

Additionally, it is possible for the canvas to be reused after the performance as an Interactive installation (performance re-producibility). The audience can freely experiment with this technology and try with their gestures to poetically reproduce sound that is processed while touching the ink. In this case other algorithms such as chaos and self-similarity among others are evaluating to generate sound [8].

Compositional strategies (plot)

The act is a dialogue between the performers, who paint kanji on the canvas to progressively reveal the poem's broader meaning. Real-time sound synthesis is triggered by the performers' painting on the canvas. The act of painting or writing generates sound that can be c ontrolled telematically (between performers in different locations) by employing gestures as conceptual metaphors. In order to do this, we developed an interactive canvas and used sensors that could detect movement (accelerometer). We use the SuperCollider and Max programming environments to create the sound using computer music techniques. During the performance we can use our live coding libraries [7] to switch between sounds synthesis techniques. We can use various sound synthesis techniques such as additive synthesis, fm synthesis, waveshaping, granular and subtractive synthesis among others. Part of our research is to create sounds that in our opinion are aesthetically related to the meaning of words. For example, the word pain (kanji symbol 痛) can be expressed by harsh noise and the word sorrow (kanji symbol 悲哀) by some frequency acceleration in sustained sounds. At the same time we explore the possibility of manipulating sound using gestures while painting. In this work we focus on *online gestures* [5] for direct manipulation of sound properties. For instance, the motion of the hands may map onto the motion of

the referent (motion-for-motion mapping). For instance, to symbolise the meaning of the word 'sorrow' we can imitate while painting the gestural movement of violinist's bow arm mechanics while he i nterprets vibrato or whole notes.

The sound aesthetics ranges between ambient/drone sounds and noise so that they can create the atmosphere that is related to the poem's meanings.

Research Focus, Objective, Research Questions

Exploring the aesthetic and technological potential of using multimodal compositional strategies to create sound and generally art on t he fly. The objective is to experiment with new environments and expressive methods in computer music and performing practices. We try to extend traditional art forms such as calligraphy/painting and performing using embodiment and telematics practices.

We try to use painting-gesture-sound combination in order to achieve better results in expressing the meaning. Gestures based on iconic mapping as a central mechanism of meaning construction [5]. Additionally, we investigate alternative ways of interaction between performers and art forms.

Designing the system

The design of the system is simple and easily installed. It consists of an a. interactive canvas (embed with microcomputers, and sensors), b. extended painting brushes (embed with microcomputers, and sensors) and c. conductive ink.

To build our painting canvas, we use a sheet of paper that is 1 × 1 metres on a polymer sheet. We installed onto the canvas sensors that detect electricity

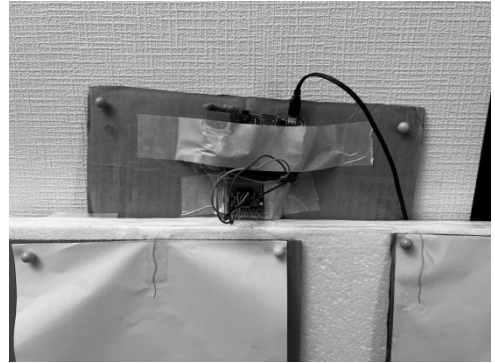which we translate to numerical values using programming.

Fig.3: Microcomputer-sensor and wire channels on canvas.

The pins of the capacitive touch sensors are connected with wires that are placed to grooves in the polymer base to keep them stable and separated. This happens to prevent false communication. The wires are also connected with the paper in vertical lines configuration across canvas as seen in figure 3,4.

Fig. 4: Painting in extended canvas

On the middle top of the polymer sheet, we additionally attach the microcomputer (Raspberry Pi) and t he sensor (12-pin MPR121 capacitive touch sensor) to a foundation.

To trigger events we paint with conductive materials on t he canvas such as

conductive ink. To create conductivity between the canvas and our bodies while painting, we attached conductive material (thread) to the painting brushes as well. The brushes also contains the system that calculates and send movement data to our computer.

We use python code to communicate with the sensor and send OSC messages form microcomputer to our computers. Thus, from the microcomputer we send OSC messages to SuperCollider and Max Msp. We experiment with two different technologies to communicate and send data to our computers. One is to communicate through wifi technology and another one is based on radio transmission. Both systems can respond well in transmitting data from sensors. Then from our computers we can send and receive data locally but also to other remote sites (globally) for instance, Italy and Japan. To achieve this we use OSCgroups [10] and sc-hacks redux [2] SuperCollider framework.

Artistic possibilities of Telematic tech (Discussion)

Telematic technology establishes connections amongst people on earth.

It allows collaboration [9] and reproducible research, code sharing, exchanging ideas, rehearsals from distance. We made an effort to metaphorically tie telematics to ideas or meanings like metamorphosis and metafora and to communicate the meanings of poem such as *the vision of the life from distance*. Telematic process depends on the internet and on bad internet connection there is the possibility to interrupt the connection between remote sites. This can cause communication problems during the performance.

Conclusion

Live performances are known for their capacity to spontaneously vary the music with each performance and allow for the unique contributions of each performer to each piece [6].

With the use of technology we can extend the possibilities of expressing ideas using an artwork that consists of multimodal environment such as sound, gestures, graphical elements and data manipulation. Thus, with the use of gestural symbolism, graphical symbolism, sound behavior and acting we can reach an ideal level of conveying meanings.

We combine traditional art with digital technology and internet and we tried to ensure that technology and poetry/aesthetics have an equal influence on the final product and to communicate both the idea/concept but also the technological advantages. Regarding the system's liability we ensure that a. the wifi transmission depends on stable internet connection. Telematic process can have best results when performed on stable internet connection with large bandwidth. If the internet connection is unstable the communication will be lost and as a result to interrupt or to terminate the performance. In the other hand the connected clients of an internet connection can be reduced if we don't use wifi communication between sensors and computer. In this way a stable radio transmission for communication between sensors and computer will be ideal. The radio transmission depends only on stable communication between transmitters and receiver. That means that the ability and the range of transmission depends on their hardware specifications. For example, a radio receiver with bigger antenna can communicate in bigger distances with the transmitter. Furthermore, an internet connection that can be private (network between performers) can be an

ideal option for wifi based communication sensors and telematics.

Future implementation-ideas

A future idea is to experiment with art forms such as experimental theatre, musical, contemporary dance, sculpting among others, and to use computational creativity to test various combinations of modalities as paradigms of communicated meanings and ideas. We also do research in data transmission technology to build a system that is more powerful, liable, cheaper and easily reproducible than their predecessors. We are also interested to add to our system *offline gestures* implementation for gesture recognition purposes amongst others.

References

[1] Ascott, R. (2003). Telematic embrace: Visionary theories of art, technology, and consciousness. Univ of California Press.

[2] Zannos, I.: (2019). SC-Hacks: A Live Coding Framework for Gestural Performance and Electronic Music. In: Proceedings of the 2019 Linux Audio Conference. pp. 121-128. CCRMA, Stanford University.

[3] People in the Dunes videos, https://vimeo.com/user88406194, last accessed 2021/06/15.

[4] CyberTouch os, https://www.youtube.com/watch?v=b7TJtWHLilg&ab_channel=VasilisAgiomyrgianakis, last accessed 2021/09/21.

[5] Parrill, F. & Sweetser, E. (2004). What We Mean by Meaning: Conceptual Integration in Gesture Analysis and Transcription. Gesture. 4. 197-219. 10.1075/gest.4.2.05par.

[6] Collins, K., Kapralos, B., and Tessler, H. eds. (2014). The Oxford Handbook of Interactive Audio. (p. 333). Oxford University Press, Oxford.

[7] Agiomyrgianakis, V. (2021). Live Gloving: Experimental schemes for live coding performances. International Conference DCAC. Corfu.

[8] Agiomyrgianakis, V. (2019). Live coding and Poetry: A data-driven synthesis technique in Musical Live coding. International Conference DCAC. Corfu.

[9] Hirayama, H., & Zannos, I. (2021). Towards an Aesthetic of Hybrid Performance Practice: Incorporating Motion Tracking, Gestural and Telematic Techniques in Audiovisual Performance. CMMR, 251.

[10] Ross Bencina OSCgroups: http://www.rossbencina.com/code/oscgroups.

[11] Fifis, H. (2006). Yannis Ritsos' The Moonlight Sonata· the Cognition of the city and the Vision of Life from a Distance. Open Journals. Culture and Memory (Special issue). https://openjournals.library.sydney.edu.au/index.php/MGST/article/view/6762.