Touch and Go is published in collaboration with Watermans and Goldsmiths College in occasion of the Watermans’ International Festival of Digital Art, 2012, which coincides with the Olympics and Paralympics in London. The issue explores the impact of technology in art as well as the meaning, possibilities and issues around human interaction and engagement. **Touch and Go** investigates interactivity and participation, as well as light art and new media approaches to the public space as tools that foster engagement and shared forms of participation.
Touch and Go

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Touch and Go is a title that I chose together with Irini Papadimitriou for this LEA special issue. On my part with this title I wanted to stress several aspects that characterize that branch of contemporary art in love with interaction, be it delivered by allowing the audience to touch the art object or by becoming part of a complex electronic sensory experience in which the artwork may somehow respond and touch back in return.

With the above statement, I wanted to deliberately avoid the terminology ‘interactive art’ in order to not fall in the trap of characterizing art that has an element of interaction as principally defined by the word interactive; as if this were the only way to describe contemporary art that elicits interactions and responses between the artist, the audience and the art objects.

I remember when I was at Central Saint Martins writing a paper on the sub-distinctions within contemporary media arts and tracing the debates that distinguished between electronic art, robotic art, new media art, digital art, computer art, computer based art and new media. At some point of that analysis and argument I realized that the common thread that characterized all of these sub-genres of aesthetic representations was the word art and it did not matter (at least not that much in my opinion) if the manifestation was material or immaterial, conceptual or physical, electronic or painterly, analogue or digital.

I increasingly felt that this rejection of the technical component would be necessary in order for the electronic-robotic-new-media-digital-computer-based-internet art object to re-gain entry within the field of fine art. Mine was a reaction to an hyper-fragmented and indeed extensive and in-depth taxonomy that seemed to have as its main effect that of pushing these experimental and innovative art forms – through the emphasis of their technological characterization – away from the fine arts and into a ghetto of isolation and self-reference. Steve Dietz’s question – Why Have There Been No Great Net Artists? – remains unanswered, but I believe that there are changes that are happening – albeit slowly – that will see the sensorial and technical elements become important parts of the aesthetic aspects of the art object as much as the brush technique of Vincent Willem van Gogh or the sculptural fluidity of Henry Moore.

Hence the substitution in the title of this special issue of the word interactivity with the word touch, with the desire of looking at the artwork as something that can be touched in material and immaterial ways, interfered with, interacted with and ‘touched and reproduced’ with the help of media tools but that can also ‘touch’ us back in return, both individually and collectively. I also wanted to stress the fast interrelation between the art object and the consumer in a commodified relationship that is based on immediate engagement and fast disengagement, touch and go. But a fast food approach is perhaps incorrect if we consider as part of the interactivity equation the viewers’ mediated processes of consumption and memorization of both the image and the public experience.

Nevertheless, the problems and issues that interactivity and its multiple definitions and interpretations in the 20th and 21st century raise cannot be overlooked, as much as cannot be dismissed the complex set of emotive and digital interactions that can be set in motion by artworks that reach and engage large groups of people within the public space. These interactions generate public shows in which the space of the city becomes the background to an experiential event that is characterized by impermanence and memorization. It is a process in which thousands of people engage, capture data, memorize and at times memorialize the event and re-process, mash-up, re-disseminate and re-contextualize the images within multiple media contexts.

The possibility of capturing, viewing and understanding the entire mass of data produced by these aesthetic sensory experiences becomes an impossible task due to easy access to an unprecedented amount of media and an unprecedented multiplication of data, as Lev Manovich argues.

In Digital Baroque: New Media Art and Cinematic Folds Timothy Murray writes that “the retrospective nature of repetition and digital coding—how initial images, forms, and narratives are refuged through their contemplative re-citation and re-presentation—constantly inscribes the new media in the memory and memorization of its antecedents, cinema and video.”

The difference between memorization and memorization may be one of the further aspects in which the interaction evolves – beyond the artwork but still linked to it. The memory of the event with its happening and performative elements, its traces and records both official and unofficial, the re-processing and mash-ups; all of these elements become part of and contribute to a collective narrative and pattern of engagement and interaction.

These are issues and problems that the artists and writers of this LEA special issue have analyzed from a variety of perspectives and backgrounds, offering to the reader the opportunity of a glimpse into the complexity of today’s art interactions within the contemporary social and cultural media landscapes.

Touch and Go is one of those issues that are truly born from a collaborative effort and in which all editors have contributed and worked hard in order to deliver a documentation of contemporary art research, thought and aesthetic able to stand on the international scene.

For this reason I wish to thank Prof. Janis Jefferies and Irini Papadimitriou together with Jonathan Munro and Ozden Şahin for their efforts. The design is by Deniz Cem Öndüygu who as LEA’s Art Director continues to deliver brilliantly designed issues.

Lafranco Aceti
Editor in Chief, Leonardo Electronic Almanac
Director, Kasa Gallery

1. “Nevertheless, there is this constant apparently inherent need to try and categorize and classify. In Beyond Interface: an exhibition I organized in 1998, I established ten categories: net.art, storytelling, socio-cultural, biographical, technological, performance, analog-hybrid, interactive art, interactivity + artifacts. David Ross, in his lecture here at the CADRE Laboratory for New Media, suggested 21 characteristics of net art. Stephen Wilson, a pioneering practitioner, has a virtual – albeit well-ordered – jungle of categories. Rhizome has developed a list of dozens of keyword categories for its ArtBase. Lev Manovich, in his Computing Culture: Defining New Media Genres symposium focused on the categories of database, interface, spatialization, and navigation. To my mind, there is no question that such categorization is useful, especially in a distributed system like the Internet. But, in truth, to paraphrase Barnett Newman, “ornithology is for the birds what categorization is for the artist.” Perhaps especially at a time of rapid change and explosive growth of the underlying infrastructure and toolkits, it is critical that description follow practice and not vice versa.” Steve Dietz, Why Have There Been No Great Net Artists? Web Walker Daily 28; April 4, 2000, http://bit.ly/qEwWf (accessed July 1, 2012).

2. This link to a Google+ conversation is an example of this argument on massive data and multiple media engagement across diverse platforms: http://bit.ly/pGgDsS (accessed July 1, 2012).

Touch and Go: The Magic Touch Of Contemporary Art

It is with some excitement that I write this preface to Watermans International Festival of Digital Art, 2012. It has been a monumental achievement by the curator Irini Papadimitriou to pull together 6 ground-breaking installations exploring interactivity, viewer participation, collaboration and the use or importance of new and emerging technologies in Media and Digital Art.

From an initial call in December 2010 over 500 submissions arrived in our inboxes in March 2011. It was rather an overwhelming and daunting task to review, look and encounter a diverse range of submissions that were additionally asked to reflect on the London 2012 Olympic and Paralympic Games. Submissions came from all over the world, from Africa and Korea, Austria and Australia, China and the UK, Latvia and Canada and ranged from the spectacularly complicated to the imaginatively humorous. Of course each selector, me, onedotzero, London’s leading digital media innovation organization, the curatorial team at Athens Video Art Festival and Irini herself, had particular favorites and attachments but the final grouping is believed does reflect a sense of the challenges and opportunities that such an open competition offers. It is though a significant move on behalf of the curator that each work is given the Watermans space for 6 weeks which enables people to take part in the cultural activities surrounding each installation, fulfilling, promoting and incorporating the Cultural Olympiad themes and values ‘inspiration, participation and creativity.’

Some, like Gail Pearce’s Going with the Flow was made because rowing at the 2012 Olympics will be held near Egham and it was an opportunity to respond and create an installation offering the public a more interactive way of rowing. Some, like Phoebe Hui’s Granular Graph, a sound instrument about musical gesture and its notation.

Audiences are invited to become a living pendulum. The apparatus itself can create geometric images to represent harmonies and intervals in musical scales. Finally, Joseph Farbrook’s Strato-caster explores the topography of power, prestige, and position through an art installation, which exists in the virtual world of Second Life, a place populated by over 50,000 people at any given moment.

Goldsmiths, as the leading academic partner, has been working closely with Watermans in developing a series of seminars and events to coincide with the 2012 Festival. I am the artistic director of Goldsmiths Digital Studios (gds), which is dedicated to multi-disciplinary research and practice across arts, technologies and cultural studies. Gds engages in a number of research projects and provides its own postgraduate teaching through the PhD in Arts and Computational Technology, the MFA in Computational Studio Arts and the MA in Computational Art. Irini is also an alumna of the MFA in Curating (Goldsmiths, University of London) and it has been an exceptional pleasure working with her generating ideas and platforms that can form an artistic legacy long after the Games and the Festival have ended. The catalogue and detailed blogging/documentation and social networking will be one of our responsibilities but another of mine is to is to ensure that the next generation of practitioners test the conventions of the white cube gallery, reconsider and reevaluate artistic productions, their information structure and significance; engage in the museum sector and create an installation offering the public a more interactive digital / new media work. The mentoring scheme involves video interviews with the 6 selected artists and their work, briefly introduced earlier in this preface, and discussions initiated by the student. As so often debated in our seminars at Goldsmiths and elsewhere, what are the expectations of the audience, the viewer, the spectator, and the engager? How do exhibitions and festival celebrations revisit the traditional roles of performer/artist and audiences? Can they facilitate collaborative approaches to creativity? How do sound works get curated in exhibitions that include interactive objects, physical performances and screens? What are the issues around technical support? How are the ways of working online and off, including collaboration and social networking, affecting physical forms of display and publishing?

As I write this in Wollongong during the wettest New South Wales summer for 50 years, I want to end with a quote used by the Australia, Sydney based conjurers Michele Barker and Anna Munster: Illusions occur when the physical reality does not match the perception.

The world is upside down in so many alarming ways but perhaps 2012 at Watermans will offer some momentary ideas of unity in diversity that the Games signify and Unity proposes. Such anticipation and such promise!

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University of London, UK

23rd Dec 2011, University of Wollongong, NSW, Australia
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INCARNATED SOUND IN MUSIC FOR FLESH II

Defining gesture in biologically informed musical performance

A B S T R A C T

Think about your body. Consider its capability of channeling articulate information with a single gaze, the dramatic force of a gesture propelled by muscle tissue contractions, the sympathetic rhythmic changes in the heartbeat when listening to someone else's palpitations, the meaningful shifting patterns of the brain wave cycles when drifting from relaxation to heightened mental activity. These are nothing but physiological and intimate processes that become externalized to affect the people and the space surrounding us. Once tangible, those processes can be captured, observed, strumentalized or augmented through technology, and become therefore informative (or shall we say informatic) media that are biological in nature.

In contemporary electronic music performance this paradigm has exposed creative strategies that had been overlooked so far. This article places the biological media in the 'broken ground' where body and computational system interact musically with each other. It questions and defines the qualities of a gesture in the context of biologically sensitive musical instruments, providing therefore a framework to introduce a visceral model of electronic music performance; one in which the sonic matter incarnated within the tissues of the body rises and breaks through the skin to become tangible and shared experience.
BODY, BIOLOGICAL MEDIA, AND COMPUTING SYSTEMS

In his seminal work *What is Biomedia?,* Eugene Thacker underlines the informative character of biological media when he notes that “not only can everything be understood as information, but information is everything, in that everything as a ‘source code.’” Information Technology (IT) and defense industries have not overlooked the instrumental potential of this model. NEC, a Japanese IT giant, has tested digital walls that depend on a custom facial recognition system to gather information about passers-by and serve real-time, physiologically and demographically targeted ads.

In the United States a program named FAET has been started by the Department of Homeland Security’s Science & Technology Directorate. The program investigates the use of sensor arrays to covertly conduct surveillance on individuals that are not yet suspected of a crime. In an attempt to pre-know the advent of criminal activities, the system describes the criminal potential of a subject by secretly observing and storing a diverse range of data among which “cardiovascular signals, pheromones, electrodermal activity, and respiratory measurements.”

Machines seamlessly infiltrate a body to track down electrical pulses of neurons, cellular reactions, and pailpitations of the flesh. An organized yet unpredictable system is revealed; a networked order of integrated agents capable of learning, reasoning, reacting, and interacting in conjunction with other entities. In other words, the body is shown in its inherent form, an actual technology. Here the meaning of technology is to be understood as a complex, emergent system of rules and living matter, rather than a situated, deterministic automaton. Its complexity and unpredictability make the body technology rather difficult to fully integrate with the machine technology. Thinking about music, the integration between body and machines suffers of a heavily mediated relationship, which too often resolves around either the ‘disappearance’ of the former, or the celebration of the latter. Since the ’70s music devices sensitive to biological signals are being used in an attempt to virtually portray the processes behind human affect.

The aim is not to subject the body to a sort of biodata-mining as corporations and governments do, but rather to envision unexplored musical strategies; the artistic and academic communities strive for informing the body and the mind with ‘digital prostheses’ and augmented sound environments. This idea is embodied in the development of what can be called Biosensing Digital Musical Instruments (bomem).

These are electronic music systems that use computers to mediate between the potentials of the inner body and a virtual sonic universe.

Being a music performer with an obsessive attraction for everything carnal, the contemporary ontology of a body that becomes informatic and ephemeral is something I am truly concerned with. When designing *bomem,* and the way one performs with it, the questions are in which ways can we avoid the deceptive fascination of a merely quantitative analysis of the physical body? How can we keep safe the natural expressivity of the body technology when its endogenous mechanisms are mediated with the ‘disinterested’ circuitry of a computer?

To tackle these issues, it may be useful to discuss the elements that characterize the gesture of a *bomem* performer, and thus understand the role of the body in this context.

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sound experience is the sole body. A gesture exhibiting a weak sense of agency undermines the listener’s interpretation of a performance; the player’s physical body becomes immaterialized within and disconnect ed from the virtual sound world s/he creates. Here lies the expressive gap that sometimes creates that uncanny feel of disbelief in a performance.

In turn, the feeling of agency in a musical gesture depends on a large degree on the apparent effort exhibited by the player while mastering its instrument. Norman, Waisvisz and Ryan convincingly describe how “[a] singer’s effort in reaching a particular note is precisely what gives that note its beauty and expressiveness. The effort that it takes and the risk of missing that note forms the metaphor for something that is both indescribable and the essence of music.” I believe the same applies to biosensing music performance, although there is a crucial distinction to be done. According to each specific instrument, we can say that gestural effort can be integrated or instrumental. The integrated effort is intended as a bodily impulse which is either directly mapped to continuous control parameters, or the actual source of sound. As for instruments based on muscle tension and muscle sounds, the outward sonic form is directly proportioned to the apparent effort of the gesture. The continuity of musicianship and musicality is made transparent throughout the performance; what you see is what you get. In its instrumental form instead, effort is primarily cognitive. This is the case of the Brain-Computer Interfaces (bci), that require the player to control his/her heartbeat rate to achieve a pre-determined physiological state, which eventually triggers musical patterns. The effort is physical too, but it is not easily discernible, nor its effect on the music are. In this case, the audience is required to decode the performance to fully appreciate the music.

Metaphor is another key to the audience’s understanding of the music being played. With or without the performer’s willingness, each musical gesture contributes to the real time construction of sonic metaphors that invade the listener’s mind. The metaphor is a key element in the study of bioM and digital musical instruments in general as it “enables device designers, players and audience to refer to elements that are ‘common knowledge’ or cultural bases... Through metaphor, transparency increases, making the device more expressive.” However, metaphor can emerge in different ways. When a metaphor comes in the form of a tangible and evident quality, it becomes embodied. Imagine a performer slowly increasing the frequency and loudness of a sine wave by lifting her arms toward the ceiling. In contrast, a syncretic metaphor is one in which two different or even contradictory elements are coupled within a gesture. For instance, a player that sits still while a growling sound appears abruptly in the sonic field.

Each diverse combination of these dimensions can produce a different answer to the questions advanced above. Far from wanting to elaborate all the possibilities that come into play in this scenario, I shall frame now the performance of bioM within the context of my own practice. Driven by the idea of approaching the biological body as a self-contained musical entity, the interaction I investigate is one in which a high degree of experienced and perceived agency is critical, the effort is integrated within the musical system, and metaphors are embodied in every musical gesture. Such approach led me to move away from bioelectric controllers, and prompted the conception and implementation of an original biologically informed music, what I term biophysical music.

PERFORMING INCARNATED SOUND

The foundations of the biophysical music model are to be found in the collision of interactive music performance, biomedical engineering and musical embodiment. The model depends on the muscle sounds (also called mechanomyogram or mmG): evanescent, low frequency sound waves produced by muscular contractions. Muscle sounds are acoustic vibrations released by the body in the exact moment in which the chemical material of the muscle tissues is transformed into kinetic energy to exert movement. Although the systematic study of muscle sounds started around the 1980s so far it had found actual applications only in the medical field.

A naked ear will find difficult to hear them because of their low amplitude and frequency response; yet, they can be captured, amplified and heard through loudspeakers or headphones. This is how I started this musical journey; after few listening sessions in...
which I would use some rudimentary custom sensors to amplify the sound produced by the flexion of an arm, it became clear that those little, yet detailed vibrations would have served well in a musical context. Ever since I have been developing the free and open project Xth Sense (XS), a novel biophysical system for interactive music performance and responsive milieux.

21 The instrument is composed of custom wearable sensors and an ad hoc computational engine.

22 In mFii two XS biosensors are placed on my forearms; the hardware is composed of a custom microphone sensor that captures the mmG sound wave, avoiding direct contact with the skin. Then the audio stream is sent to a computer provided with the relevant software. By extracting a number of characteristics (i.e. features) of the mmG the computer develops an understanding of my kinetic behavior. The different contractions and frictions of my muscles not only provide acoustic sounds, but also variations on continuous parameters that process the same audio stream. Simply put, the inner sound of my body is live sampled and played back through loudspeakers. Once it becomes a tangible sound wave in the concert space, it violates the outer world to reach for the listener’s tympanic membrane. Eventually, I find myself embodied in a corporeal soundscape, that I can dynamically shape into diverse forms. Being that the effort required by the gesture is integral to the generation and manipulation of sound, a high degree of agency is transparently perceivable.

SOUND-GESTURE AND VISCERAL EMBODIMENT

While performing mFii the body physio-somatic behavior and the computer extended circuitry become intertwined; the interrelation of player’s interpretation and machine computing capabilities seeks to be sophisticated in form and color; an embodied metaphor. Nonetheless, to achieve a satisfying musical richness, biological data are not enough on their own. The visceral coupling of player and machine that the XS puts forth is exemplified by a compounded interpretation model, which I term sound-gesture (sG). The basic foundation of the sG model can be understood through the wise words of Winkler, who in 1995 noted that “The composer’s job... is not only to map movement data to musical parameters, but to interpret these numbers to produce musically satisfying results.”

Turning back at the Bdmi field, the logic is the same: a mere quantitative analysis does not alone ensure the musical success of a piece of music; also the qualities of the biological media needs to be considered to unveil the full potential of Bdmi performance.

The signal analysis and processing operated by the XS software is designed to seamlessly enhance the inherent interactions that bond the player’s kinesis and the muscle sounds. By nature, a sudden and strong flexion/extension of the limb produces a loud sound with a sharp attack and a very short release. Strength of the contraction and perceived loudness of the mmG are tightly related, therefore a specific mapping technique can extend that relationship by adding multiple dimension to it. The dynamics of each mmG sound is used as a continuous event to manipulate the qualities of the resulting sound. In order to ensure a fair amount of complexity and richness, up to 8 simultaneous sampling dimensions are available to the player.

It is clear now that a sG is not constituted by the mere empty-handed gesture on its own; it is in first place the enactment of an endogenous neural impulse, that generates a given muscular excitement (i.e. a specific mmG sound). On the flipside, the sG would completely
lack of effectiveness and expressiveness if it could not rely on a set of sound design and mapping definitions that live inside the circuits of the computer. Hence, the SG can be seen as a techno-epistemic enactment of a dormant sonic capability of the body system.

Before diving into the nature of a SG, I would recommend to view the video recording of a performance of mFii, which is available on-line. The video can be a useful reference while reading the next paragraphs.

A SG performed within the context of the XS is an extended and anomalous instrumental gesture. Wanderley and Cadoz exclude the empty-handed gesture from the instrumental category, for it owns only the semiotic function of the human gestural channel; that of communicating information toward the environment. They explain that this kind of gesture lacks of the ergodic and the epistemic functions; respectively, the existence of a direct contact with the instrument, and the performer’s use of his/her “tactile-kinaesthetic perception” to play the instrument. However, in the case of the XS, the instrument that a performer manipulates is not an external object, but the muscle fibre of his/her own body. The basic capability of the XS to deploy musically the muscle sounds produced by a performer challenges the nature of an instrumental gesture: the player does not act upon the external environment, but rather within his/her own intimate, bodily milieu. One can therefore observe that a performer can produce “specific (physical) phenomena” by mastering the tension of his/her own body (the ergodic function), while experiencing the enactment of a higher muscular and articulatory sensitivity (the epistemic function).

Although it is during the composition of a piece that a SG vocabulary is established, such musical and symbolic jargon is not static during a performance; in fact, different SG definitions can be loaded into the XS software at a given time, providing a compelling set of musical behaviors. For instance, during the fourth movement of mFii strong and wide contractions of my left forearm consistently repeated for more than 30 seconds prompt the computer to playback the muscle sound in its purest form: that of a deep, low frequency vibration between 3Hz and 40Hz. At the same (logical) time, the machine samples the nascent muscle sound and slightly transposes it up to 60Hz so to enhance its auditive impact; finally, according to the dynamic features of my physio-somatic behavior the computer recodes the mmG audio sample through granular synthesis, delay lines and pitch bending. The subcutaneous, low rumble of my flesh is amplified and made audible through subwoofers; simultaneously, a new textural layer appears: the grave, muscular sound wave mutates in high pitched grains that I can scatter and spatialize by nervously contracting my wrist. Then, I suddenly stop for about ten seconds; the break allows the machine to enter a condition of stand-by. In a couple of seconds I reach the required concentration to release my muscles completely, avoiding involuntary tension. At this point, all control values gradually fall down to 0, triggering a drastic, yet con-

Photographer: Dimitris Patrikios.
The border between physical and virtual body is blurred and dissolved. By harvesting pure kinetic energy from corporeal sounds, incarnated gesture and concrete vibrations, the piece actualizes before the audience a visceral and cognitively challenging territory.

ACKNOWLEDGEMENTS

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REFERENCES AND NOTES

9. For an historical review of this field I would recommend the work of Alvin Lucier and David Rosenboom.
10. Data-mining is a relatively recent field of computer science that studies the modalities by which recurrent patterns can be extrapolated from large data sets by means of artificial intelligence and statistics. Here the term is purposely stretched to encompass biotechnology.
21. The project can be viewed on-line at http://marcodonnarumma.com/works/xth-sense
22. The work is available on-line at http://marcodonnarumma.com/works/music-for-flesh-ii
26. The last paragraphs are a refined version of an idea that was originally conceived for my paper Marco Donnarumma, “Music for Flesh II: informing interactive music performance with the viscosity of the body system,” Proceedings of the NIME-12 Conference on New Interfaces for Musical Expression (NIME 2012), Ann Arbor 2012.