NTU/ADM Symposium on Sound & Interactivity 2013

SI13

Welcome

Vibeke Sorensen
Professor and Chair

School of Art,
Design and Media
Nanyang Technological
University, Singapore

It is with pleasure that I welcome you to the Symposium on Sound and Interactivity 2013. This event brings together experts from Singapore and abroad to discuss current research and practice in a dynamic and expanding terrain that ranges from musical performance, creative interactive multimedia and installation art, to cognitive and computer science, acoustics, perception, and beyond. It furthers our School's longstanding engagement with interdisciplinary, creative innovation and scholarly research in multisensory multimedia, including sound and interactivity, and reinforces our School, College and University's deep commitment to NTU's Five Peaks of Excellence, particularly New Media. I am sure you will find the talks and presentations both informative and insightful, and that they will inspire many new conversations and creative collaborations. Enjoy!

PerMagnus Lindborg
SI13 Symposium Chair

On behalf of the SI13 organisers, it is a great pleasure to welcome researchers, artists, scholars, students, and interested parties to the NTU/ADM Symposium on Sound and Interactivity. We hope it will be an enjoyable and stimulating experience.

One of our aims is to continue in the spirit of last year's Symposium on Visual Music held at ADM, and bring together researchers at the cutting edges of new technical development with artists working creatively with such technologies. The theme at SI13 is Sound and Interactivity, indicating a broad, inclusive approach. You will find that concert pieces and exhibited artworks as well as proceedings papers aim to connect different sensory modalities: hearing, proprioception, sight, taste, touch, and so forth. The fluency of sound, its invisible and intangible nature, and because it can only happen inside time, seems key to an understanding of the human condition - brain, body and soul. In numerous fields of application, sound integrates with other media, often in a supportive but essential capacity. The Symposium puts a focus on sound in itself and its relation to other media, enabling interactivity.

We are thrilled to have Roger T. Dean and Diemo Schwarz as keynote speakers. Diemo embodies the computer scientist who is also a software developer and laptop musician. Roger unites empirical research in performance physiology with musicianship in unique ways. We are delighted to welcome all the symposium participants, and to those of you travelling from far-away places, we extend our warmest greetings and wishes for a pleasant stay in Singapore.

Thanks to staff, students, and colleagues who have helped in preparations, and to the College's Centre for Liberal Arts and Social Sciences, without whose support this event would not have been possible. Last but not least, thanks to all the authors and artists for sharing your work at SI13 and thereby contributing to our creative communities.

Schedule

*All Sessions will take place at the 3D Screening Room, ADM Level 2

See previous page for location map.

Thursday, 14 November

1900 SI13 Concert
ADM Auditorium
School of Art, Design and Media Level 2

Friday, 15 November

1300 Introduction
Welcome Address by ADM Chair
Vibeke Sorensen

Opening Notes by Symposium Chair
PerMagnus Lindborg

1330 Keynotes
Interactive Sound: Generative Approaches from Computation and Cognition
Roger T. Dean

Interacting with a Corpus of Sounds
Diemo Schwarz

1530 Break

1600 Session 1: Performance & Aesthetics
Integrating Live Performance, Poetry, Sound, and Video in a Multimedia Theatre Production of T.S. Eliot's The Waste Land (1922)
Joyce Beetuan Koh & Steve Dixon

A Pragmatic Aesthetics of Interaction in Live Coding
Renick Bell

One at a Time by Voice: Performing with the Voice-Controlled Interface for Digital Musical Instruments
Stefano Fasciani & Lonce Wyse

1800 Dinner

Saturday, 16 November

1000 Coffee

1030 Session 2: Sound in Multimedia
V I E: An Automata Sequencer
Jingyin He, Jordan Hochenbaum & Ajay Kapur

Why call them video games? Investigating the Relative Importance of Audio in Video in Computer Games
Rachel Chen Siew Yoong & PerMagnus Lindborg

Playing The Archive: Transforming Cross-Disciplinary Research Through Visual and Sonic Immersion
Candice Ng

1230 Lunch

1330 Session 3: Interactive Sound
Interactive Sound Synthesis Mediated through Computer Networks
Kameron Christopher, Jingyin He, Ajay Kapur & Dale Carnegie

An Agent Based Performance System
Michael Spicer

>> Session 3 continued
Symbolic Representation of Tonal Progressions for Rule-based Evaluation
Eddy Chong, Ding Qin, Zhenyu Yu & Ruitao Jia

1530 Break

1600 Session 4: Sound & Perception
Defining the Dominance Axis of the 3-D Emotional Model for Expressive Human Audio Emotion
Simon Lui

Investigations on Sonic Narratives of Future Spaces of Human Being
Mriganka Mdhukaillya & Siddhant Yadav

Foodfrequency: a food and sound cross-modal immersive experience.
Sara Lenzi & Gianpaolo D'Amico

1730 Closing Notes
Closing Notes
PerMagnus Lindborg

Committee & Reviewers

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V. Somasundram
Poh Zhuang Yi
Muhammad Mustajab Bin Mohamad

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Pete Kellock, PhD
Joyce Beetuan Koh, PhD
PerMagnus Lindborg
Diemo Schwarz, PhD
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NTU/ADM Symposium on Sound and Interactivity 2013

14 – 16 November 2013
Singapore

PerMagnus Lindborg
Symposium Chair, Proceedings Co-Editor

V. Somasundram
Proceedings Co-Editor

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Nanyang Technological University
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Concert

Programme

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Serial Collaborations 2
Live Audio Performance
Roger T. Dean

2
Playing the Sound Space
Live Audio Performance
Diemo Schwarz

3
Duo
Live Audio Performance
Roger T. Dean
& Diemo Schwarz

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One at a Time by Voice
Live Audio Performance
Stefano Fasciani

5
Live Coding Improvisation
Live Audiovisuals Performance
Renick Bell

6
...and everything he touched, was turned into Gold...
Game as Performance
Luis Hernandez-Galvàn

7
The Fire Sermon (part 3 from The Waste Land)
Audiovisuals and Actor Performance by Steve Dixon
Steve Dixon & Joyce Beetuan Koh

Sound Engineer
Yong Rong Zhao

SI13

Artists and Performance

Roger T. Dean
UK/Australia

Dean is a composer/improviser, and a researcher in music cognition/computation. He founded the ensemble australYSIS, which has performed in 30 countries. His performing experience as double bassist, pianist and computer artist ranges from the Academy of Ancient Music to the London Sinfonietta, his improvising collaborations range from Ted Curson to Evan Parker. Dean's work is on >50 commercial audio cds, and in many digital multimedia and installation pieces (in collaborations with artists such as Keith Armstrong, Will Luers, and Hazel Smith). His creative work centres on keyboard/ensemble improvisation, and computer music composition. Improvisation and computer-interaction merge in his solo MultiPiano Event (live acoustic grand piano, real-time audio processing, generative piano, and electroacoustic sound).

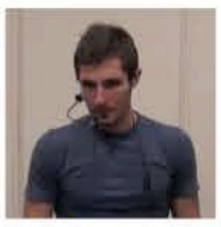
www.australysis.com

Image Credit: Shun Kamiya

Diemo Schwarz
France

Diemo Schwarz is a researcher and developer in real-time music interaction at Ircam, Paris, composer of electronic music, and musician. His compositions and live performances, under the name of his solo project Mean Time Between Failure, or improvising with musicians such as Frédéric Blondy, Victoria Johnson, Hans Leeuw, Emmanuelle Gibello, George Lewis, Evan Parker, or as member of the ONCEIM improviser ensemble,explore the possibilities of corpus-based concatenative synthesis to recontextualise any sound source by rearranging audio into a new musical framework using interactive navigation through a timbre space, controlled by gestural input devices. He's composing for dance and installations, collaborating with artists such as Franck Leibovici, Cecile Babiole, Christian Delecluse.

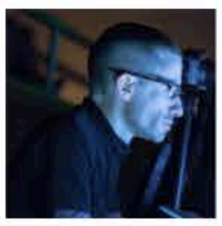
diemo.concatenative.net



Stefano Fasciani
Italy/Singapore

Stefano Fasciani graduated from the university of Rome ‚ÀúTor Vergata‚Àù with a Bachelor (2003) and Master (2006) in Electronic Engineering. From 2006 until 2010 he joins the Atmel Advanced DSP Group in Rome, working in the team that developed the Diopsis 940HF. In 2010 he joins the National University of Singapore as a Research Fellow in the Multimodal Analysis Lab, developing audio analytical tools for social scientists. Later he joins the NUS Graduate School for Integrative Science and Engineering Ph.D. programme working on vocal control of sound synthesis and processing in the Arts and Creativity Lab. He is currently enrolled in the last year of his doctoral studies. His paper has been published in conferences such as NIME, ICMC and DAFX. He has been involved in performances, productions and DIY instruments since more than 15 years, with releases with independent recording labels in Italy, Singapore and US and gigs in local underground club scene.

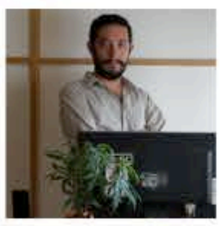
stefanofasciani.com



Renick Bell
USA/Japan

Renick Bell is a doctoral student at Tama Art University in Tokyo, Japan. His current research interests are live coding, improvisation, and algorithmic composition using open source software. He is the author of Conductive, a library for live coding in the Haskell programming language. Previously, he was a doctoral student at Tokyo Denki University. He has a masters degree in music technology from Indiana University and an interdisciplinary bachelors degree from Texas Tech University. He has performed in Australia, Austria, Japan, Taiwan, and the United States. He is from West Texas but has lived in Tokyo since 2006.

www.renickbell.net



Luis Hernandez-Galvàn
Mexico/Singapore

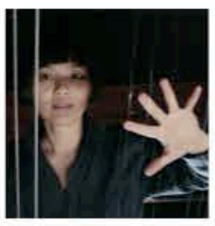
Luis Hernández-Galván has an academic background on Architecture and Media Studies. He works at the intersection of space, society and technology and his work ranges from installation to quasi-architecture to interactive 3D, mostly expressing himself by the means of game engines. He has had art shows, given conferences and workshops as well as given formal presentations and performances in Europe, America and Asia and has been resident artist in places in Europe and the American continent.

ungravity.org

Steve Dixon
UK/Singapore

Professor Steve Dixon is President of LASALLE College of the Arts in Singapore. He is a renowned multi-media theatre artist and Director of The Chameleons Group (since 1994), which produces innovative works for theatre, installation, and interactive media. His research focuses on the incorporation of media technologies in live performance, and he is co-founder and Advisory Editor of The International Journal of Performance Arts and Digital Media. His 800-page book Digital Performance: A History of New Media in Theater, Dance, Performance Art and Installation (MIT Press, 2007) has won two international book awards.

en.wikipedia.org/wiki/Steve_Dixon_(actor)



Joyce Beetuan Koh
Singapore

Joyce Beetuan Koh's artwork comprising concert music compositions, dance collaborations, and sound installations, have been performed widely in Europe and Asia. Key presentations include at World Stage Design (2013, Cardiff, UK), Birmingham Frontiers Festival, International Computer Music Conference (2011, Huddersfield UK) and (2013, Perth Australia), Singapore Arts Festival 2010, International Symposium on Electronic Arts (2009, Singapore), Biennale Musiques France (2004), and Melbourne Arts Festival (2001). Commissions and collaborations highlights are Arts Fission Dance Company, The Netherlands Nieuw Ensemble, Singapore Take Five, Ensemble Contemporaine de Montréal, Australia Song Company, BBC Symphony Orchestra, Hungarian Radio Orchestra, Norwegian Stavanger Symphony Orchestra, Hong Kong Chinese Music Virtuosi. Two piano works are published by ABRSM. Joyce holds a Ph.D in Composition (York, UK) and Post-graduate Diploma in Music Computing (IRCAM, Paris). After 20 years in Europe, she now works in Singapore. Her research interests are architecture, and interdisciplinarity.

www.jbtkoh.net

1 Serial Collaborations 2
Roger T. Dean

The work is based on live keyboard performance, and interactive use of live algorithms. The algorithms are embodied in a software entity called the Serial Collaborator, written by Dean. This performs real-time transformations of sequential symbolic musical features (notably, pitch, but also potentially rhythm, timbre etc) based on the ideas of the 2nd Viennese School and the Total Serialists. However, it is susceptible to a variety of controls and perturbations which take its range of outputs outside the normal range of the ideas those groups developed. In this performance, its function will be concerned with pitch, and with generating a keyboardist which collaborates with the keyboard playing of the composer. It can operate on tonal as well as non-tonal thematic material, and in both contexts, it permits passing or 'grace' notes which are not necessarily bound by the serial principles. Two of the interesting aspects of using the Serial Collaborator as a keyboardist are: how its essentially monodic sequential symbolic output is converted into both melody and harmony, and how it responds to input pitch structures.

2 Playing the Sound Space
Diemo Schwarz

The piece is an exploration of different collections of sounds, made accessible by the technique of corpus-based concatenative synthesis, where sound segments are laid out in a multi-dimensional space of sound characteristics obtained from automatic audio descriptor analysis. Playing this sound space means navigating through it with the help of gestural controllers that lets the performer reconquer the expressivity that has been lost in many laptop based performances. Stroking an XY-pad, scratching contact-mic equipped surfaces, shaking a tablet computer are all possible gestural interactions that bring back the immediacy of physical action and sonic outcome. The performer re-combines prerecorded or live-recorded sound events into new rhythmic and timbral structures, simultaneously proposing novel combinations and evolutions of the source material. The metaphor for composition is here an explorative navigation through the ever-changing sonic landscape of the corpus being built-up from live recording. Despite the startling nature of some of these sounds, the use of corpus-based concatenative synthesis techniques in the performer's CataRT system makes it possible to compose smooth evolutions and soothing combinations of timbres, thereby reflecting on the inner qualities of these sounds that are richer than they appear when we just let them float by.

> *"The performer re-combines prerecorded or live-recorded sound events into new rhythmic and timbral structures, simultaneously proposing novel combinations and evolutions of the source material."*

3 Duo
Roger T. Dean & Diemo Schwarz

This is an improvisation piece to be done through a live collaboration between Roger T. Dean and Diemo Schwarz.

4 One at a Time by Voice
Diemo Schwarz

This is a performance exclusively based on the Voice-Controlled Interface for Digital Musical Instruments (VCI4DMI), in which one instrument at a time is driven by the performer's voice and then looped, building up an improvised composition. The pool of instruments used in the performance is hosted in a DAW and it comprises eight synthesizers and four effects. These and the related vocal interface settings were selected to demonstrate the wide range of sonic interaction capabilities offered by the interface. The use of buttons is limited to the interface preset selection, while a led matrix provides visual feedbacks. The VCI4DMI is an alternate controller conceptually designed to be an extension to traditional touch-based musical interfaces. It allows simultaneous control of an arbitrary number of real-valued instrument parameter by variation of the performer vocal sound timbre, and optionally it can generate note messages as well. The generative and adaptive dual-layer mapping strategy makes an extensive use of unsupervised machine learning and dimensionality reduction techniques to compute hoc voice map for musical control. The aim is to maximize the breadth of explorable perceptual sonic space of specific digital musical instruments, providing dimensionality reduction of the instrument control space and adaptation to the vocal characteristics of the performer.

> *"These and the related vocal interface settings were selected to demonstrate the wide range of sonic interaction capabilities offered by the interface."*

5 Live Coding Improvisation
Renick Bell

This performance of improvised programming generates percussive music emphasizing generative rhythms and their variations. A live coding performance consists of a network of potential percepts such as rhythms, timbres, event density, rate of change, programming libraries, projection contents, and performance space.

> *A live coding performance consists of a network of potential percepts such as rhythms, timbres, event density, rate of change, programming libraries, projection contents, and performance space.*

A custom live coding system, a software programming library called Conductive, was written to deal with the time constraints of live coding. It triggers a simple custom software sampler built with the SuperCollider synthesizer and loaded with thousands of audio samples. That library and other prepared code are loaded into an editor, vim, and edited. New code is also written. Code is sent at will to the interpreter for the Haskell programming language, GHCi, where it is executed. Doing so, Bell manages multiple concurrent processes that spawn events, including the number of processes, the type of events spawned, and other parameters. Software abstractions can be directly perceived or indirectly felt through their influence on other percepts. Among these abstractions are those which represent generative processes, which in this performance are mostly related to rhythm. Sets of rhythmic figures are generated stochastically. From them, figures are selected at random and joined to form larger patterns which are then processed to generate a stack of variations with higher and lower density than the original pattern. Simultaneously, patterns in which audio samples and other synthesis parameters are assigned to time intervals are generated. The concurrent processes read the generated data and use it to synthesize sound events. Bell's interaction largely involves generating such data and continuously reselecting which data to use throughout the performance. By watching Bell's interaction with the code and interpreter, which is projected on the screen, the audience can see to some extent how the generative processes are represented in code and employed to produce music.

6 ...and everything he touched, was turned into Gold...
Luis Hernandez-Galvàn

"...and everything he touched, was turned into Gold..." is a relational artwork that will be produced specifically for this symposium, by the means of game art strategies. While interacting with the piece, the participant(s) will be able to explore a bit of unreality which is nonetheless grounded in current world affairs. Navigating through an abstract, noise-triggered soundscape whose three dimensional imagery has been built inside a game engine under the pretense of ludoforming (recreating 'real' places in 'virtual' space, or viceversa), the player will be able to freely experiment with audiovisual imageries which might trigger different experiential reactions. Although built inside a game engine, this project privileges paidia over ludus: That is playful, unstructured and spontaneous activities (i.e. attaining an aesthetical experience by the means of sheer exploration) against the structured ones which bear the implicit rules that we normally associate with videogames (loosing-winning condition, increasing levels of difficulty etc). This project builds an contrasting pleasurable, soothing scapes to misophonic ones in the context of three dimensional spatial navigation within –n degrees of freedom. The project is an immediate response to the WestGate mall affair, although the participants should not know in advance and let out to figure it out (or not) by themselves. This project does not try to pass any judgment or have any political understatement what so ever.

7 "The Fire Sermon (Part 3 of T.S. Eliot's The Waste Land)"
Steve Dixon & Joyce Beetuan Koh

T.S. Eliot's iconic 1922 poem is dramatically brought to life in a multimedia theatre collaboration between performer/filmmaker Steve Dixon and composer/sound artist Joyce Beetuan Koh. On stage, a man recites and begins to 'relive' modernism's greatest text, accompanied by an atmospheric and complexly layered soundscape. On a screen behind him, the poem's imagery unfolds in an increasingly breathless stream of visuals. Meanwhile, Eliot's bizarre characters appear as movie characters on screen, coaxing, seducing, and terrifying the man... [This performance is a section of a longer, 50 minute work, with stage direction by Tony Knight].

> *"On a screen behind him, the poem's imagery unfolds in an increasingly breathless stream of visuals."*

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1330 Keynotes

Interactive Sound: Generative Approaches from Computation and Cognition
Roger T. Dean

Interacting with a Corpus of Sounds
Diemo Schwarz

1530 Break

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Integrating Live Performance, Poetry, Sound, and Video in a Multimedia Theatre Production of T.S. Eliot's The Waste Land (1922)
Joyce Beetuan Koh & Steve Dixon

A Pragmatic Aesthetics of Interaction in Live Coding
Renick Bell

One at a Time by Voice: Performing with the Voice-Controlled Interface for Digital Musical Instruments
Stefano Fasciani & Lonce Wyse

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An Agent Based Performance System
Michael Spicer

>> Session 3 continued

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Sara Lenzi & Gianpaolo D'Amico

1730 Closing Notes

Closing Notes
PerMagnus Lindborg

Interactive Sound: Generative approaches from Computation and Cognition

Roger T. Dean
MARCS Institute, University of Western Sydney, Australia
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How can we usefully structure real-time interactive music generation systems? I am considering here two kinds of situation in which I and many others practice music-making. First, the juxtaposition of acoustic instruments (the piano in my own case) with computational sound generation processes. Second, purely electronic computer-interactive performance. In the first case, a key feature is that performer generated or –realised musical strands feed into the performance, and potentially to the computer-interactive system. And here it is important that a performer who has considerable facility on their instrument (itself a kind of interface) can participate. In the second case, a musician can develop substantial facility with the computer-interactive interface itself, using gesture, controllers or voice, but only with the voice will their input be itself a musical stream, and one which can contribute immediately to the overall sound stream. In both situations, many real-time computational approaches are applicable, and a key distinction seems to me, as just implied, to be the nature of the input stream that the performer provides: whether primarily musical, or primarily a stream of generative or controller information. After the stage of musical stream input, the opportunities of the two situations are essentially identical, and these are my topic. So I focus on algorithms which may be used in acoustic, purely electronic/computational, or hybrid circumstance. I consider in particular 'live algorithms', those whose path can be perturbed in flight. One might say, those with chinks in their black-box armour. I make some contrasts with 'live coding', where there is at the outset generally little or no armour, no carapace, just a jelly of wobbling potential.

Interacting with a Corpus of Sounds

Diemo Schwarz
Institut de Recherche et Coordination Acoustique/Musique (IRCAM), France
schwarz@ircam.fr

Corpus-based concatenative synthesis (CBCS) is a recent sound synthesis method, based on descriptor analysis of any number of existing or live-recorded sounds, and synthesis by selection of sound segments from the database matching sound characteristics given by the user. It is used in various context of music composition, live performance, sound design, installations, and allows to explore a corpus of sounds interactively or by composing paths in the descriptor space, and to recreate novel timbral evolutions while keeping the richness and fine details of the original sound. CBCS can be seen as a content-based extension of granular synthesis, providing direct access to specific sound characteristics. While the previous phase of research focused mainly on the analysis and synthesis methods, and handling of the corpus, current research now turns more and more towards how expert musicians, designers, the general public, or children can interact efficiently and creatively with a corpus of sounds. After a brief definition and peeks into the history of CBCS, we'll look at gestural control of the navigation through the sound space, where each combination of input device and synthesis mode redefines the

Considering Interaction in Live Coding through a Pragmatic Aesthetic Theory

Renick Bell
Tama Art University, Japan
renick@gmail.com

Live coding is the interactive control of algorithmic processes through programming activity, a definition derived from Brown, Collins, and Ward. Live coding can be considered aesthetically with a pragmatic aesthetic framework based on Dewey's "Art as Experience". Through a revised framework, it can be seen that emotional states (affects) are experienced by audience members (affectees) as a result of experiencing a network of percepts (affectors). Value is assigned to the experience according to the context of the experience and the previous experience and knowledge of the affectee, and that evaluation is perpetually evolving with the apprehension of new knowledge. Live coding consists of a network of affectors such as the musical output, programming languages and libraries used, and projection contents. To the extent that affectees, including the performer as first audience member, are aware of the interaction, the interaction method becomes an affector in that network either indirectly as a result of its influence on other affectors or perceived as a primary element of the experience. It therefore affects the value assigned to the experience. An interaction method itself is a compound affector, consisting of various influencing aspects: usability, appearance, historical position, and so on. Interaction in live coding can be classified into two categories: an orthodox style and idiosyncratic styles. Though not perfectly uniform, the orthodox style involves a text editor and an interpreter, and it can be observed in live coding performances by McLean and Sorensen among others. Idiosyncratic styles may or may not involve the former, but they can include graphics, animation, or other interactive elements. Examples of idiosyncratic live coding interaction styles include performances and systems by Griffiths and Zmoelnig. The performer interacts with generative processes producing sound through abstractions and their notation, and that interaction is typically presented to the audience through a projection. It is also typically improvised to some extent. The focus on processes and improvisation places live coding in the field of experimental music as defined by Nyman, as opposed to what he calls the avant-garde. In doing so, a historical comparison with other experimental musicians and their methods of interaction can be informative. Using the aforementioned framework, live coders can make practical adjustments to performances in order to more effectively achieve performance goals. It is hypothesized that by considering exactly what a live coder is interacting with, how that interaction occurs, and who is observing the interaction, adjustments can be made to improve the aesthetic effect of performances. The adjustments follow from a consideration of purposes, including those of the performer and the audience. Audience purposes can range from dancing (as seen in algoraves) to deep consideration. Performers themselves have various purposes, including enjoying exploration, elucidating abstractions, or obfuscating data for the creation of mystery. One strength of the pragmatic aesthetic framework can be seen in its flexibility, which provides facility in dealing with these various intentions.

Foodfrequency: A Food and Sound Cross-modal Immersive Experience

Sara Lenzi & Gianpaolo D'Amico
Lorelei Sound Strategies, Singapore & Media Integration and Communication Centre, Italy
sara@loreleiproject.com

This paper describes the background and development of Foodfrequency, a sound installation which involves attendees to live a multi-sensory experience based on food tasting and soundscape deep listening. The audience participates in a new but quite engaging way: eating and drinking during a special dinner. Each moment of the culinary experience is guided by binaural soundscapes and auditory cues, which are played respectively via headphones and a multichannel sound system, in order to provide information and suggestions about the cultural identity and the origin of food. Thus attendees become part of a collective performance in which the perception of flavour and taste is enhanced by the listening of specific soundscapes. Each soundscape is recorded on purpose to match each dish. The sound artists and the chef work closely together. The proposed recording technique is binaural recording. This technique allows for a more immersive experience, with a 360° reproduction of the aural space. The binaural soundscapes become the means of communicating the cultural significance of food, through the immediate representation of the territory of origin and the identity of each dish. At the same time, the use of soundscapes connected to a specific taste and flavors have proved to positively affect and enhance the gustatory experience. Different tests have been performed with some attendees in order to evaluate the effectiveness of the proposed experience.

>> continued

Interacting with a Corpus of Sounds

affordances of the interaction and thus a new digital musical instrument. When CBCS is controlled by descriptors analysed from audio input, it can be used to transform sound in surprising ways, to create augmented instruments, or to transcribe and re-orchestrate environmental sound. This special case of CBCS is commonly called "audio mosaicing". For live performance, especially in an improvisation between a instrumental and a CBCS performer, recording the corpus live from the instrument creates a symbiotic relationship between the two performers, and creates a stronger and more direct coupling between them, compared to traditional improvisation where abstract musical ideas are exchanged. CBCS also found a very promising application in environmental sound texture synthesis for audio-visual production in cinema and games, and sound installations such as the Dirty Tangible Interfaces (DIRTI), that opens up discovery and interaction with rich sound corpora to the general public and children.

Integrating live performance, poetry, sound, and video in a multimedia theatre production of T.S. Eliot's The Waste Land (1922)

Joyce Beetuan Koh
Independent composer

Steve Dixon
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This paper sets out to examine the interactions between the various modalities — poetry, stage acting, sound and video - in a new version of T.S. Eliot's 'The Waste Land'. It is a collaboration between Steve Dixon who produced, directed, acted, and created the video; and Joyce Beetuan Koh who composed the music and soundscape for the performance. Built on Eliot's 434-line poem, organised in 5 parts, the production is an one-man multimedia theatre performance of 45 minutes' duration, integrating live performance, poetry, sounds and video projections. On stage, a man recites and dramatically relives the poem while on a giant screen behind him, the poem's imagery starts to unfold in an increasingly breathless stream of visuals. Meanwhile, Eliot's characters – from clairvoyant Madame Sosostris to Tiresias and Cleopatra – appear as movie characters on screen, coaxing, seducing, and terrifying the man. Musical references such as Richard Wagner's 'Tristan and Isolde' and a Rag-Time were used in the poem. In the area of sound and interaction, these references were re-contextualised and manipulated. Eliot's poem includes rhythmic usage of sanskrit words with strong assonance, such as 'dhamyata, datta, dayadhvam' and these suggested a particular musical treatment in the soundscape. We will focus on the interaction between the stream of visuals and the foreground and background layering of soundscapes. The relationship between images and sonic motives, formal organisation, as well as the motivation behind making these decisions will be discussed. The performance/ recitation of poems in theatrical setting has a long history. With the digital means of video projection and soundscaping, the performance is now multi-layered and possibly offers some new insight into the poem. This multimodal experience opens up ways of perceiving notions of time and space, and evoking symbolic images and metaphors.

One at a Time by Voice: Performing with the Voice-Controlled Interface for Digital Musical Instruments

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The Voice-Controlled Interface for Digital Musical Instruments is an alternate controller conceptually designed to be an extension to traditional touch-based musical interfaces. It allows simultaneous control of an arbitrary number of digital musical instrument parameter by variation of the performer vocal sound timbre. The generative and adaptive dual-layer mapping strategy makes an extensive use of unsupervised machine learning and dimensionality reduction techniques to compute hoc voice map for musical control. The aim is to maximize the breadth of explorable perceptual sonic space of specific digital musical instruments, providing dimensionality reduction of the instrument control space and adaptation to the vocal characteristics of the performer. Previous publications were mainly focused on the theoretical and technical aspects of the interface and of its sub-components, while in this paper we discuss application and user perspective of the interface, together with a high level overview of the system. We describe the necessary steps to train and setup the system as well as the available user options and their effects on the interface response and instrument interaction. Finally, we introduce a performance exclusively based on the Voice-Controlled Interface for Digital Musical Instruments, in which one instrument at a time is driven by the performer's voice and looped, building up an improvised composition. The pool of instruments and interface settings were specifically selected to demonstrate the wide range of sonic interaction capabilities offered by the interface. The performer uses a single button to change instrument interface preset, while visual feedback are provided on either a screen or a LED matrix.

V I E: An Automata Sequencer

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V I E is a VST sequencer, driven by the notion of formalizing multiple depths of structure and musical time scales through the metaphorical representation of an organic systemization. Contrary to most Game of Life inspired sequencer that interprets the automata linearly (stepping through x and, or y-axis), V I E derives the time interval between each generation from tempo, enabling access to mapping options of up to 121 discrete notes in each generation. The main features of V I E include: Sync to external clock DAW's clock, quantization of length of each generation to note duration (up to 32nd-note), variable width and height of grid array (changeable dynamically in real-time), static and dynamic velocity, and automation for all parameters. V I E is open-source and realized in C++ programming environment, using JUCE library. The creation of V I E in a universal VST format encourages artists of all levels to approach performance and composition in a different perspective. Furthermore, its open-source format allows informed users to modify V I E at a lower level according to their needs in stylistically individualized applications. Future implementations include internal independent clock, and

>> continued

V I E: An Automata Sequencer

a dynamic switching system that allows the user to choose either Game of Life, or one-dimensional cellular automaton. Video examples of V I E's prototype written in ChucK and Processing and its application in a live performance can be found at http://vimeo.com/56225496 and http://vimeo.com/55973717 respectively. A screen capture of the current version can be seen at http://goo.gl/CiGBNx.

Why call them video games? Investigating the Relative Importance of Audio and Video in Computer Games

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This paper examines the role of audio in gameplay within computer games. We propose a framework for analysing the relative importance of audio and video as an essential measure for game classification. Audio plays an important role in commercially available console and computer games, and has always been vital to their success. A distinction between 'audio game' and 'game audio' must first be made. Audio that compliments video within gameplay is 'game audio', while games where audio is used as an essential element of play are 'audio games'. Investigating the frequency of game-related keywords using Internet search engines shows that "video game" is the most prevalent term with regard to commercially available games. Terms including "audio" are less frequent. However, computer game play is a multisensory experience. It therefore seems advantageous to seek meaningful classifications that reflect the relative importance of the various media involved. The proposed analytic framework introduces a single dimension along which a given game can be assigned a value. Tentatively labeled "Audio-Visual Balance", the dimension is anchored by 'audio only' and 'video only'. It is conceptually, albeit not practically, continuous. The paper will analyse games using this framework and discuss implications for further research.

Playing The Archive: Transforming Cross-Disciplinary Research Through Visual and Sonic Immersion

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Playing the Archive is an interdisciplinary project undertaken by Studio|Lab's core research group - Nilam Ram, Brian Orland, Candice Ng, Michael Caccia, Matthew Kenney and invited collaborators Simone Osthoff, Mark Ballora and visiting percussionists Robyn Schulkowsky and Joey Baron. Approaching nine different archives that consists of scientific data as well as historical and artistic data, the project brought together social scientists, artists and musicians to experiment with both digital and live sonification, visualization and materialization of data into new aesthetic forms. The hypothesis is that the interplay among musicians, visual artists, and data analysts—working together to simultaneously perform and display the archive in multiple formats and media—will enrich and shape the ways researchers render and engage information. Our experiments with multi-modal visualization and sonification are already changing our understanding of how and why we, as individuals

>> continued

Playing The Archive: Transforming Cross-Disciplinary Research Through Visual and Sonic Immersion

and as a collective, approach archives, and more generally, our history, our work, and our world. These in return allowed for new ways of interpretation to form within these research inquiries. Being involved in the project as both an artist as well as a coordinator, this presentation at SI13 will include sharings on the outcome of the project and a small exhibition on iPads to discover the work.

Interactive Sound Synthesis Mediated through Computer Networks

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Network music is the paradigm in which music is created through technology mediated communication. In a world where we have become significantly dependent upon computer communication to relay and interact with affective information, methods of networking to generate music are becoming increasingly relevant to the way in which we communicate. The body of works in network music extends decades back to the music of The League of Automatic Music Composers. Still today, much of the work in network music has focused on the manipulation of parameters among group members, rather it be mediated through score, improvised, or arbitrary. The field of network music has yet to thoroughly explore the idea of using network as a tool for synthesis. Motivated in part by research into the microsonic components of sound creation, this paper presents the methodology of using network communication protocols for sound synthesis in live performances. A discussion of the authors' prior works highlights the considerations in software and hardware, and explains techniques that use the less-explored and intangible characteristics of network systems to generate sonic materials in a live performance setting.

An Agent Based Performance System

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This paper describes the approach the author has adopted for creating real time systems whose musical output is created by the interactions of a human performer and an ensemble of software "improvisers". This approach has been used with notated compositions, free improvisation performances and for creating installations. The music produced typically consists of several distinct textural layers, where all the sounds produced are transformations of the sound made by the human performer. This type of system can be thought of as an "extended" instrument, where the performer effectively "plays" the ensemble. The design of the virtual performers is based on the concept of autonomous agents, a popular approach borrowed from Computer Science. One benefit of this approach is that it provides a unified way to encapsulate numerous algorithmic compositional techniques within one system. This system makes use of two broad categories of agent: performers and controllers. Performer agents transform the live sound

Proceedings

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1 DIRTI

Matthieu Savary, Denis Pellerin, Florence Massin (UserStudio) & Diemo Schwarz

Interactive Multimedia

Create music and graphic animation with expressive gestures, mold sonic landscapes by plowing through the granular interaction material of the DIRTI tangible interface! Dirty Tangible Interfaces (DIRTI) are a new concept in interface design that forgoes the dogma of repeatability in favor of a richer and more complex experience, constantly evolving, never reversible, and infinitely modifiable. We built a prototype interface realizing the DIRTI principles based on low-cost commodity hardware and kitchenware: A video camera tracks a granular or liquid interaction material placed in a glass dish. The 3D relief estimated from the images, and the dynamic changes applied to it by the user(s), are used for expressive audio–graphic music performance, both the relief and real-time changes are interpreted as activation profiles to drive corpus-based concatenative sound synthesis, allowing one or more musicians to mold sonic landscapes and to plow through them in an inherently collaborative, expressive, and dynamic experience.

Bio

This project was made by the designers Matthieu Savary, Denis Pellerin, and Florence Massin from UserStudio, with the help of researcher Diemo Schwarz and the work of the IMTR (Real-Time Music Interaction) team at Ircam, sound designer Roland Cahen, composer Éric Broitmann from Motus, the early help of Romain Pascal, the support of Christian Jacquemin, and the French National Research Agency funded research project Topophonie.

2 Playing the Archive

Candice Ng & Studio|Lab

Interactive Multimedia

Playing the Archive is a project that presents nine different archives of sonification that consists of scientific data as well as historical and artistic data. Working closely with renowned percussionist Robyn Schulkowsky, Joey Baron and music technologist Mark Ballora, Studio|Lab's core research group collaborated closely with them to experiment with both digital and live sonification, visualization and materialization of data into new aesthetic forms. The hypothesis is that the interplay among musicians, visual artists, and data analysts - working together to simultaneously perform and display the archive in multiple formats and media — will enrich and shape the ways researchers render and engage information.

Bio

Studio|Lab is a research initiative at Penn State University that emerged from the idea that arts and science are complementary. The initiative provides space and opportunity for undergraduate students, graduate students, and faculty to fuse their creative and experimental impulses into ideas in a wide range of fields. In its most literal sense, Studio|Lab is a "studio" for scientists to refine the aesthetic dimensions of their work, and a "laboratory" for artists to test the performance and impact of their work. Brought together, we attempt to contribute to the powerful nexus of creativity and empirical inquiry from which innovation emerges.

3 A Journey Beyond the Event Horizon

Julius Bucsis

Interactive Multimedia

"A Journey Beyond the Event Horizon" is a computer based installation that provides an interactive audio and visual experience to participants. The piece functions by having participants interact (through the use of the mouse) with the user interface objects on the computer screen. The piece depicts an imaginary crossing of the event horizon of a black hole. Current scientific understanding does not provide a clear description of what takes place beyond the event horizon of these objects. The piece therefore presents an interactive aural and visual voyage into the unknown.

Bio

Julius Bucsis is an award winning composer, guitarist, and music technologist. His compositions have been included in many juried concerts, conferences, and festivals worldwide. He also frequently performs a set of original compositions featuring electric guitar and computer generated sounds. His artistic interests include using computer technology in music composition and developing musical forms that incorporate improvisation.

4 iSiD

Siddhant Yadav

Sound Installation

The iSiD installation is a prototype, investigating systems for interactive interior sound design. The larger exploration is on interactivity and dynamism of interior acoustic spaces of being. The intention is to provide an acoustic palette of sounds to work with towards the composition of interior sound designs, provide an acoustic freedom by providing for a participation in deciding what is heard how in the physical space, freeing from what is being imposed upon the architecture and explore, if the same physical space can wear different acoustic clothes.

Bio

Siddhant is a graduate from the Department of Design at Indian Institute of Technology Guwahati, India. His explorations are spread into Art, Design, Media, BCI, Human-nonHuman Interaction, Ecological Sustainability and Activism.

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5 The Thing About Listening is...

Brona Martin

Fixed-media Sound

The idea for this piece began in July 2012 when I attended the Global Composition Conference in Dieburg, Germany. I went on a soundwalk with Hildergard Westerkamp and came away feeling very lucky to know and understand what a soundwalk was. I decided to organise a soundwalk in my hometown. The idea was to teach people a little about soundwalking and how to listen to their environment. I took about 15 people on this 50 minute walk and the group ranged from about 3-65 years of age. My interaction with the local community and the creation of the soundwalk had a significance influence on the locations of my recordings and the compositional process. The Thing About Listening is.....brings together thoughts, experiences, stories and sounds that were discussed and recorded as a result of the soundwalk. I would like to thank Rosemary Porter and Brian Johnson for allowing me to record our conversation about listening and using it in the piece.

Bio

Brona Martin is an Electroacoustic composer and sound artist from Banagher, Co. Offaly, Ireland. Brona started her PhD in September 2010 under the supervision of Professor David Berezan at NOVARS Research Center, University of Manchester. Her research interests include narrative in Electroacoustic music, soundscape composition and acoustic ecology. Her site specific works composed in stereo, 5.1 and 8 channel have included the creative exploration of soundscapes from Ireland, Manchester, West Coast Australia, Spain and Germany. Her works have been performed internationally at EMS, ACMC, ICMC, NYCEMF, ISSTA, NOISEFLOOR, Balance/Unbalance, SSSP, iFIMPaC and MANTIS.

6 kernel_panic

Jerod Sommerfeldt

Fixed-media Sound

"kernel_panic" is a fixed-media work that explores the use digital audio artifacts as musical material: The byproducts of aliasing, quantization noise, and clipping are liberated to the forefront of the composition process. Tiny grains of nearly inaudible sounds collide and mix with one another in a sonic collage that follows a trajectory from quietude to loud fervor.

Bio

Jerod Sommerfeldt's music focuses on the creation of algorithmic and stochastic processes, utilizing the results for both fixed and real-time composition and improvisation. His sound world explores digital audio artifacts and the destruction of technology, resulting in work that questions the dichotomy between the intended and unintentional. An active performer as both soloist and collaborator in interactive digital music and live video, he is Assistant Professor of Electronic Music Composition and Theory at the State University of New York at Potsdam Crane School of Music and director of the SUNY-Potsdam Electronic Music Studios (PoEMS).

7 Locust Wrath Epilogue

PerMagnus Lindborg

Fixed-media Sound

This piece is a binaural version of the surround sound for the epilogue of "Locust Wrath", a dance and multimedia performance directed and choreographed by Angela Leong, danced by ArtsFission, with set design and music by Joyce Beetuan Koh, and sonofications by PerMagnus Lindborg. It was presented in Singapore, 27–28 September 2013. The sonofications were made from data provided by the Tropical and Marine Science Institute, NUS. The "Epilogue" expresses the predicted weather in South-East Asia in the years between 2080 and 2099, a not-so-distant future. The data are played by a virtual ensemble of 18 'harps' with 352 strings in total. A plucked-string synthesis model produces sounds reminiscent of biwa, guzheng, lyre, or pipa. If there is rainfall in one geographic area on a certain day, then one specific string will be played at the corresponding time in the piece. If it is a hot day, the string will ring longer. The higher the atmospheric pressure, the more detuned it will be. Humidity is mapped to vibrato depth. The wind speed affects the quality of the plectrum that plucks the string, so that stronger wind gives a sharper tone. Sonofication compresses time. The climate is rendered as a music whose form — gesture, timbre, intensity, harmony, spatiality — is determined by the data.

Bio

Composer, sound artist and researcher PerMagnus Lindborg is assistant professor at ADM/NTU, Singapore and member of the Society of Norwegian Composers. He obtained degrees in composition and music computing from Oslo (Music Academy) and Paris (IRCAM, Paris-4). His compositions, interactive sound installations, and performances have been presented in more than 20 countries. Research interests include soundscape perception, semantic spaces, and multimodal experience design.

www.permagnus.net

8 NanoBalad

Roland Cahen

Fixed-media Sound

Did you know that Music has its own body?
Music is an immaterial invisible, untouchable, furtive body. The promise of spatialization is not only to immerse the listener in moving sounds; it is the embodiment of music. It is to sense the body of music resonating with ours. As the music is composed of relations of continuities and differences between sounds, kinetic music consists of relationships between spatial sound figures, identity, contrasts and variations. In other words, we are witnessing the birth of a musical language of space. Similar to choreography, kinetic music has an open-ended, plural and fluid body. Its structure is made up of varying masses, rhythmic topophony and temporal space. Nano is a ride, a walk in the clouds, une balade. Not far from a ballad; epic or gently balancing music, but at the time of nanos — the grammar already zapped one L. Nan (= Not a number, computer invalid operation). If numbers soon become material and in real time, what will happen when there is a bug? NanoBalad music is a venomous and monumental music, a non-judgemental vision, a poignant questioning about the present and the future. Commissioned by and composed in the INA/GRM studios in 2012.

Bio

After studying with Pierre Schaeffer and Guy Reibel at the Paris Conservatory (1977—1980), Cahen co-founded the class in electroacoustic music of Amiens (1983), and the Workshop in Sound Design at NHS Montbéliard (1993) and finally the Studio Sound at the Ecole Nationale Supérieure de Création Industrielle. He composes for stage, concert, multimedia and interactive installation, develops original sound forms in the field of spatial sound distribution. His writes books of 'ludo-pedagogical' character as well as articles on sound design, music, and interactive contemporary music research.

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