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DOCTOR OF PHILOSOPHY

An invitation to listen

exploring engagement in technologically mediated music. A portfolio of compositions

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AN INVITATION TO LISTEN

Exploring Engagement in Technologically Mediated Music

A Portfolio of Compositions

by

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A PORTFOLIO OF COMPOSITIONS

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ABSTRACT

This portfolio of compositions and its software appendix consists of acousmatic, instrumental, and electroacoustic pieces in the form of live electronics. What lies underneath and interconnects these eight compositions is the concept of having ideas in the core of each composition that everyone can engage with; regardless of whether they are performed by specialists or non musicians. The opening acousmatic pieces *Peri-Phonis* and *Morir* use one of the most familiar sound to everyone; the human voice and present it at various audiences such as university concerts and theatrical plays respectively. The instrumental piece *Ice* for small ensemble, undertakes the well known dramatic voyage of the Titanic and through complex compositional processes which are based on familiar sounds such as sea waves, a ship's horn, and ice breaking into smaller pieces combines spectralism with tonality.

The shift to live electronics comes with a trio of compositions: *Alilepidrasi, Pandora,* and *Awakening* which are based on a gestural approach to composition by using modern technology such as mobile phones, and motion sensors, along with custom software developed in Max-MSP, and performed by both specialists and non-musicians. By developing and reusing my ideas and sounds; a process I always undertake with great enthusiasm, these three pieces merge into the *Strings On The Rocks;* an acousmatic composition that embodies everlasting fluctuation. The "coda" of the portfolio comes with the acousmatic piece *7 Doors* that combines the human voice of the opening works, and the gestural mobility of the later works.

This portfolio presents my basic perception towards sound and music, my fascination about its interconnections with everything that surrounds us, and every inspiration I have had over the years by composers such as Tristan Murail, Iannis Xenakis, Andrew Lewis, and Denis Smalley.

To my parents

Georgios Grigoriadis (1954), Foteini Koullia (1957)

ACKNOWLEDGEMENTS

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COMPOSITIONS: SUMMARY OF WORKS AND PERFORMANCE INFORMATION

SUMMARY OF WORKS

This portfolio consists of the following compositions in various formats as presented below in chronological order:

PERI-PHONIS	Acousmatic (octaphonic)
MORIR-SOUNDTRACK	Acousmatic (stereo)
ICE	Instrumental
ALILEPIDRASI	Live electronics (octaphonic)
PANDORA	Live electronics (octaphonic)
AWAKENING	Live electronics (octaphonic)
STRINGS ON THE ROCKS	Acousmatic (stereo)
7 DOORS	Acousmatic (stereo)

PERFORMANCE INFORMATION

Peri-Phonis

Risk of shock, Powis Hall, Bangor, 13.02.2011 (performed by Kimon Emmanouil Grigoriadis)

Leicester University, 16.01.2013 (performed by: Prof. Andrew Lewis)

Morir (Μια Στιγμή Πριν)

Orfeas Theatre, Isle of Kos, 16.7.2011, 17.7.2011 (written by Sergei Belbel, and performed by the Municipal Theatre Group of Kos: Vassilis Papantoniou, Angela Anthi, John Kamateros, Maria Charamanta, Charikleia Vamvakidou, Kontesa Oikonomidi, George Anthoulis, Smaragdi Skaleri, Kaarina Hakkarainen, Christina Theologitou, Sofia Papachristou, Sotiris Palaskas, Paris Nikiforidis)

Π.Ε.Κ.Ε.Β Theatre, Isle of Chios, 15.10.2011 (written by Sergei Belbel, and performed by the Municipal Theatre Group of Kos: Vassilis Papantoniou, Angela Anthi, John Kamateros, Maria Charamanta, Charikleia Vamvakidou, Kontesa Oikonomidi, George Anthoulis, Smaragdi Skaleri, Kaarina Hakkarainen, Christina Theologitou, Sofia Papachristou, Sotiris Palaskas, Paris Nikiforidis)

Ice

BNMF, Powis Hall, Bangor, 16.02.2012 (performed by the Ensemble Cymru)

Alilepidrasi

INTER/actions, Powis Hall, Bangor, 11.04.2012 (performed by: Katherine Betteridge - Violin, Dafydd Goodwin - iPhone, Kimon Emmanouil Grigoriadis - iPhone)

LiveART, Sfageia, Kos, 27.08.2012 (performed by: Christos Konstantinidis - Drums, Stathis Paraskeuopoulos - Contrabass, Marios Valinakis - Saxophone and Keyboards, Kimon Emmanouil Grigoriadis - iPhone)

LiveART, Sfageia, Kos, 28.08.2012 (performed by the audience as a sound installation)

Playground, Old Fire Station, Oxford, 23.09.2012 (demostration by: Kimon Emmanouil Grigoriadis)

Pandora

Electroacoustic Wales at the *BNMF*, Powis Hall, Bangor, 13.03.2013 (performed by Despina Goula - Dancer)

Awakening

Electroacoustic Music Dance, DJ Recital Hall, RAM, London, 13.03.2013 (performed by Despina Goula - Dancer, and Katherine Betteridge - Violin)

All compositions are available on the media that accompanies this commentary. (See Media Contents for further information.)

The following eight chapters will detail the compositions individually and examine their key features.

MEDIA CONTENTS

Attached to this commentary is a USB flash drive, the contents of which are folders as specified below.

0. Kimon Emmanouil Grigoriadis: An Invitation To Listen

    1. Reports

    2. Max_Library_InvitationToListen

    3. Peri-Phonis

        3.1 Peri-PhonisOctaphonic, *(48 KHz, 24 bit)*

        3.2 Peri-PhonisStereo, *(44.1 KHz, 16 bit)*

    4. Morir

        4.1 Soundtrack, *(48 KHz, 24 bit)*

        4.2 Graphics

    5. Ice

        5.1 IceScore

        5.2 LiveRecordingMono(Archive), *recorded by BNMF[1] (44.1 KHz, 16 bit)*

    6. Alilepidrasi

        6.1 Graphics

        6.2 Software

            6.2.1 Grm presets

            6.2.2 Max6

                6.2.2.1 AlilepidrasiScore

                6.2.2.2 VSTLoader

            6.2.3 TouchOSC

        6.3 Videos(Archive)

            6.3.1 INTERactions, *recorded by Xenia Pestova (.mov)*

            6.3.2 LiveART, *recorded by Alavanos Emmanouil (.m4v)*

            6.3.3 Playground, *recorded by Eythimios Chatzigiannis (.m4v)*

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[1] The file is a monophonic recording starting at bar 12 in the score.

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INTRODUCTION

This commentary is the supporting document for the accompanying Portfolio of Musical Compositions and its software appendix. It will discuss aesthetic and technical issues for each composition of this portfolio.

RESEARCH PROPOSAL

The original proposal was based on my main interest at the time; to enhance audience engagement in new music and sonic art creation either by the use of technology and commercially available gestural interfaces or by composing music based on material that is easy for someone to relate to.

Electroacoustic and instrumental music created by algorithms and studio techniques has always fascinated me. However, I also wanted to question the idea that musical composition is a field that can be explored only by specialists.

Technology and its applications played a major role for choosing this path, as it has always been a driving force of interest for composers; it not only gives birth to unlimited possibilities for investigation, but also attracts people regardless of their age and background. I decided to focus on existing commercially available and open-source technology, after some experimentation with various DIY interfaces, which can be used, among other things, for musical composition.

COMPOSITIONAL PROCESS

This portfolio begins with acousmatic pieces *Peri-Phonis* and the soundtrack for the theatrical play *Morir* that both use the human voice as their core, a sound that is very familiar to every person. It continues with a fully scored ensemble piece *Ice* that also uses familiar sounds, such as the sound of ice breaking into smaller pieces, a ship's horn, and sea waves, as a central idea.

Even though every piece is composed with rather complicated techniques (that is, complicated for a non-expert in music creation), the result seems to have many aspects one can easily relate to. I believe this is more apparent with the works *Alilepidrasi, Pandora,* and *Awakening* because they use gestural interfaces to produce the sound. The last two compositions are acousmatic pieces that play the role of a summation for the portfolio. *Strings On The Rocks* is the longest piece in duration and is composed with sounds that derive from almost every recording I made within my three-year study. The result was a massive number of sound files that needed more than twenty minutes to be presented as a piece of art. *7 Doors* serves as a coda of all the previous works. It combines the human voice used in the opening works with the density and mobility of gestural definition complimenting the later works.

Many common elements can be traced between the compositions of this portfolio, regardless of whether the outcome is in the form of acousmatic music, instrumental or live electronic music. They all share my basic perception towards sound, which can be better expressed with words such as shape, gesture, colour, and inertia.

Visualising sound, either by the use of technology such as spectral analysis (FFT) or even by the limitless capabilities of the imagination, has a critical and practical application in my compositional techniques. In addition, the timbre of sound has been used as a point of reference in my approach to sonic art as it is the one characteristic of sound from which I prefer to extract every material I would later use in a musical composition; including harmonic relationships, rhythmic and melodic patterns, frequency density, structural elements etc..

GESTURAL APPROACH TO COMPOSITION

This portfolio includes a series of projects, which serve as a way to engage not only composers and musicians but also various groups of people in the compositional process and performance. My focus was to find ways that are more intuitive and easier to master than the conventional musical instruments,

which require a lot of practice for a performer to produce an interesting sonic result. In order to bypass this difficulty and make the compositional process available to any non-specialists, I believe one not only has to create tools that produce exciting sounds with as little effort as possible by the "performer", but also to give an improvisatory character to the procedure.

From my point of view, the sonic outcome has to be linked to the performer's intention, and also to be generated by simple body movements, unlike conventional instruments that need great precision. This led me to the use of everyday objects as musical instruments or even to the use of no objects at all, which is possible due to the rapid development of technology.

INFLUENCES

Sound has always been my passion. Since my early childhood I was fascinated by the various sounds an object can produce in various environments and settings. I was introduced to the piano at the age of five and that served as a catalyst on many different levels. As a child I was thrilled when I realised that music wasn't merely just some notes on a piece of paper I should be studying, but rather that musical sound should be investigated in ways rich enough to express its potential. It took me years to realise and accept that I had been introduced only to the surface of a vast ocean and that music is multidimensional and cannot be limited to just one traditional educational approach. This realisation was part of my experiences as a student at Anglia Ruskin University (Cambridge Campus)

During my three years in Cambridge as an undergraduate student I encountered numerous types of musical expression, and became aware of music's interrelationship with everything else I could see, touch, taste, smell, think or hear. I was intrigued by John Cage's and Iannis Xenakis' approach to composition, and their devotion to philosophy and mathematics. Also, I was intellectually stimulated when I first listened to Denis Smalley's[2] *Pentes*

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[2] I was also influenced by several writings by Denis Smalley (please refer to the bibliography section)

(1974), and this led to my turning to the electroacoustic medium, seeking a path to express what were, at the time, my unidentified musical ideas. While fascinated by what, for me, was a new field I came to the realisation that it has had a significant influence on instrumental music, and vice versa. I decided to delve into learning both conventional harmony and electroacoustic techniques.

My fascination with how humans perceive sound within the realm of a musical composition, along with my need to create music, directed me to my MMus and PhD studies at Bangor University, a very influential environment. Composers such as Tristan Murail, Gerand Grisey, Andrew Lewis, Pascal Dusapin, and Karlheinz Stockhausen greatly influenced my perception and elevated my creativity. Spectral and electroacoustic music fused into a single way of articulating my musical thoughts.

PERI-PHONIS

Year of composition: 2011

Format: multichannel fixed media (octaphonic)

Duration: 14:08

Acousmatic

CONCERT PROGRAMME NOTES

Peri-Phonis is an eight-channel acousmatic piece composed in 2011. Using the female voice as a source, this piece explores pitch recognition and spatial perception. Shifting between the percussive nature of short scattered sounds and the spectrum of long sustained sounds, the composition is sonically based on the traditional Welsh song "Lisa Lân" sung by the postgraduate student Nia Williams.

PERFORMANCE SET-UP
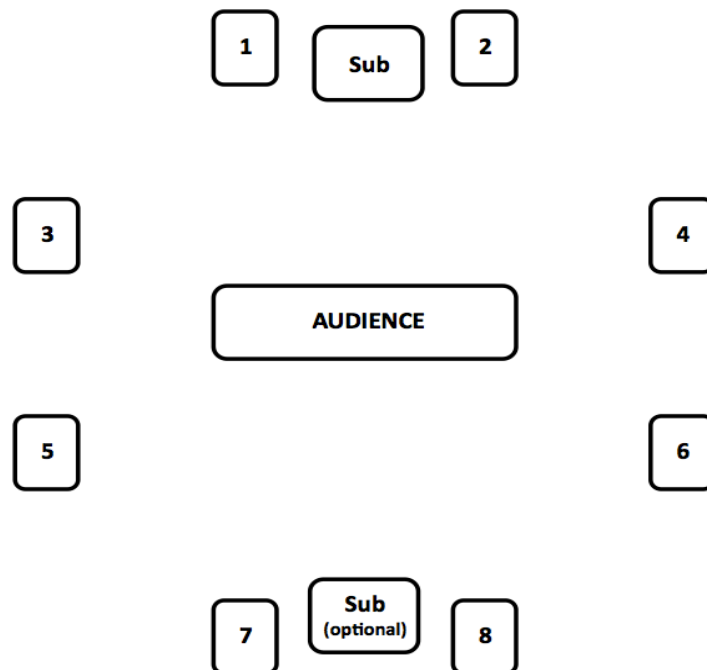
The suggested set-up for the speakers is as follows:

Figure 1 – *Peri-Phonis*: speaker set-up

SYNOPSIS

Peri-Phonis (Greek: 'all about the voice') is an acousmatic piece composed entirely in the studio. It presents material previously recorded in the studio, which served as the basis for this eight-channel piece as well as for the music of the theatrical play *Morir*. The recording took place in 2010 with the student Nia Williams. These voice recordings permeate the composition, which explores my personal[3] artistic interest in human perception and cognition of the human voice presented at various speeds, at different central frequencies, with a variety of durations, and as scattered fragments of human singing. Most of the sounds forming the piece are generated from the recording of the traditional Welsh song "Lisa Lân".

COMPOSING THE PIECE

After having recorded the traditional Welsh song "Lisa Lân" and some harp sounds, such as buzzing sounds on the lower string by moving the pedals or by stopping the strings gently with a piece of carton and still rods, harmonics, and glissandi, I then started editing the sounds to create libraries which would shape the structure of the piece. The aim was not to create a musical composition with these two instruments (human voice and harp) in their traditional or in a digitally augmented form, but rather to import these sounds into the acousmatic realm and manipulate them to the point where the link between the sonic result and the original sound is sufficiently blurred and the listener can barely associate *Peri-Phonis* with the traditional love song "Lisa-Lan". On the other hand, the listener can clearly recognize the timbre of the human voice, which is very distinct at some moments and vague at others.

SOFTWARE

This piece was created in Pro Tools 8 by using the Waves and GRM plug-ins. In addition to Pro Tools, which was used as the main DAW, Max-MSP was used to generate and record octaphonic sounds particularly using CATart,

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[3] My personal interest in having the human voice as the core for an acousmatic composition was greatly stimulated by the music and writings of Trevor Wishart (notably *Audible Design,* and *On Sonic Art*, see bibliography)

SuperVP and other audio manipulation software by IRCAM such as AudioSculpt. The surround treatment for this piece is based on a Max-MSP patch, part of the BEASTtools (University of Birmingham), which converts stereo files into octaphonic sound by positioning a 2D slider, and another patch that I created in addition to control this 2D slider with the accelerometer of the iPhone. Both patches and their improved versions have been widely used in the Max-MSP software included in this portfolio.

CONCLUSION

Peri-Phonis is my first composition for the human voice. During this period I realised how familiar one is with the harmonic structure of the human voice, how hard it is to manipulate it to the point where it is unrecognizable, and that interesting results can arise while a composer is trying to interfere with its timbre. In addition, I found that the human voice can also be so distinct that even an extremely short grain of its sound can be perceived clearly compared to every other sound we come across during our lives. My attention was caught by the richness of vowels, their spectral difference with consonants, and their internal spectral structure, which can be artificially synthesised to mirror their nature. Last but not least, this piece reflects my perception towards space, which derives from a mental picture I always encounter when composing a multi-channel piece. I find myself being surrounded by the sound, immersed in it as if it was in liquid form; similarly to a scuba diver experiencing the surroundings while underwater.

MORIR
(Μια Στιγμή Πριν)

Year of composition: 2011

Format: stereophonic

Duration: 8:56

Acousmatic

PERFORMANCE PROGRAMME NOTES

(synopsis of the theatrical play)

"A modern modular drama. Seven stories in a modern city, which although seem independent from one another, are guided by something that connects an ambitious screenwriter, two clumsy policemen, a nasty nurse, a professional killer, a neurotic mother, a thinker addict, a lonely lady, a girl in the crisis of adolescence, an unlucky rider. A play that celebrates the oddities, and focuses on our choices and their impact in our own lives."

Dionysia Kasiou, Director of Municipal Theatre Group of Kos.

Writer: Sergei Belbel

Municipal Theatre Group of Kos (Director: Dionysia Kasiou, Stage Scenery: Kostas Matthaios, Costumes: Milka Stojanovic, Original Music (soundtrack): Kimon Emmanouil Grigoriadis, Choreography: Linda Ntolezalova Koulia, On Stage Projected Video Editing: Sotiris Palaskas - Vladimir Djordjevic, Lights: Manthos Armpelias, Video projections : Toula Pazina, Sound Engineer: Eirini Dimopoulou, Makeup Artist: Milka Stojanovic - Katerina Maroulis , Stage Technician: Despina Economides Claus Papantoniou, Editor: John Kamateros)

PERFORMANCE SET-UP (for the speakers)

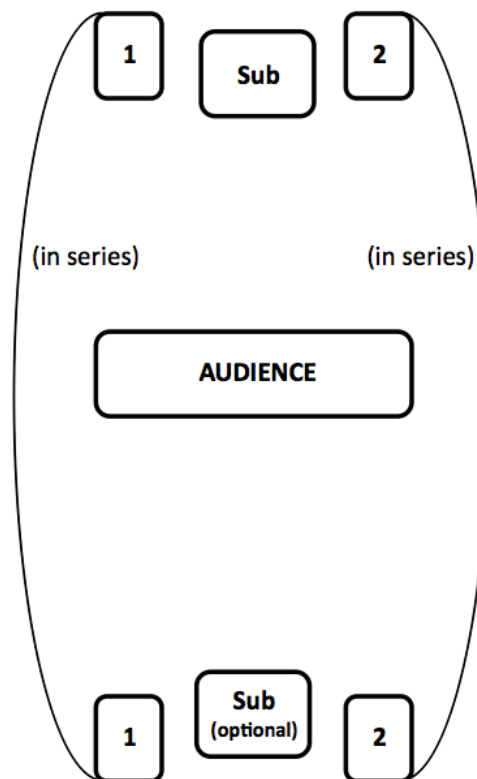The suggested set-up for the speakers is as follows:

Figure 2 – *Morir*: speaker set-up

SYNOPSIS

This project was realised in 2011. A series of previous collaborations with the Municipal Theatre Group of Kos led to this wonderful opportunity to engage theatrical audiences in the electroacoustic realm. *Morir* uses samples and extracts from *Peri-Phonis* recomposed in order to fit the needs of a theatrical play according to the director's guidelines. Some of these guidelines include the duration of the pieces, the sonic aesthetics of each piece, and the fade-in and fade-out envelopes of each piece.

COMPOSING THE SOUNDTRACK

This set of pieces follow the structure of the play *Morir* written by Sergei Belbel and performed by the Municipal Theatre Group of Kos, Greece. The play is divided into two parts, each one consisting of seven stories presented on stage by the following duets and monologue:

- Script Writer and Wife
- Heroin Addict and Sister
- Mother and Daughter
- Patient and Nurse
- Lady (monologue: talking on the phone.)
- (police) Man and (police) Woman
- Murderer and Victim

The first part reveals the seven stories with dramatic endings by having death as the core concept at the end of every individual story in contrast with the second part, which goes back in time and rewrites all the stories to have happy endings. Nevertheless, both parts are dramatic in their subject and development.

The soundtrack consists of nine pieces; one for each of the seven stories, an introductory piece for the second part *Part 2*, and a coda piece *Finale*. The first seven pieces serve as introductions between each scene but only the first six tracks are identical in both parts of the play.[4] According to the director, the reason for this identical repetition is to prevent any unnecessary revelation of happiness until it appears in the script. Since this does not happen until the very end of each story, it is a welcoming surprise for the audience. The seventh track of the first part *Murderer and Victim* has been replaced by another composition that indicates the notion of moving back in time; a key milestone in the play. The final piece named *Finale* is based on an extract

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[4] Director's way to interconnect each story (Part 1) to its alternative version (Part 2)

from the final movement of *Magic Marble for eight speakers* composed in 2009 and is not officially included in the portfolio.[5]

- Script Writer and Wife | 0:54
- Heroin Addict and Sister | 0:57
- Mother and Daughter | 1:30
- Patient and Nurse | 1:01
- Lady (monologue) | 1:32
- (police) Man and (police) Woman | 1:02
- Murderer and Victim | 0:58
- Part 2 | 1:02 *(Murderer and Victim)*
- *(police) Man and (police) Woman*
- *Lady (monologue)*
- *Patient and Nurse*
- *Mother and Daughter*
- *Heroin Addict and Sister*
- *Script Writer and Wife*
- Finale | 2:17

CONCLUSION

The soundtrack of *Morir* is my first attempt to introduce electroacoustic sound to an audience utterly unfamiliar with this kind of music. The premier was in Kos, Greece, and people mostly used the words "sound" or "sound effects" to describe their experience with the sonic part of the theatrical play. There were very contradictory comments about the music and most of these were influenced by the audience's limited relationship with music and drama. On the other hand, the play as a whole found more enthusiastic audiences in Chios at the 23rd Aegean Theatrical Troupe Festival 2011 "*23η Συνάντηση Ερασιτεχνικών Θιάσων Αιγαίου 2011*", where audiences were more accustomed to experimental plays and performances.

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[5] Please note that the quick fade-outs built in to some of the tracks were included at the insistence of the Director, for practical theatrical reasons.

REVIEWS

(23rd Aegean Theatrical Troupe Festival 2011)

"A great show! The minimalist aesthetics of the show flourished under the directorial guidance of Dionysia Kasiou. The interpretations are coherent; the scenery simple and effective, and the experimental electronic music enhances the atmosphere of the play. Morir *is a fast-paced play with doses of social and political reflection"*
Kleomenis Tzannetos, Director.

"Very interesting play! The inventiveness of the script manages to connect seven seemingly unrelated stories. The freshness of the performers' interpretations were able to elevate the play and ensure the interest of the audience. The music is completely consistent with the aesthetics of the play, and acts as another invisible actor – commentator that rivets the audience."
Stelios Markou, Director.

"I think that the immediacy and the suggestibility of electroacoustic music in a theatrical play is such, that I would be intrigued to use again in a contemporary play or even ancient drama."
Dionysia Kasiou, Director of Municipal Theatre Group of Kos.

ICE

Year of composition: 2011-2012

Format: score

Duration: 10:00

Instrumental: for String Quartet and Clarinet in B flat.

CONCERT PROGRAMME NOTES

Ice is an acoustic piece for String quartet and Clarinet in B-flat. The theme is the sinking of the Titanic. Also, its core lies on the spectral analysis of a single sound clip (ice cracking into pieces), which was recorded by Prof. Andrew Lewis. This sound is used to create textures for the acoustic instruments with sonorities that suggest the cracking of the ice. The piece was commissioned by the Bangor New Music Festival and performed by the Ensemble Cymru in Powis Hall as part of the 2012 festival.

PERFORMANCE SET-UP
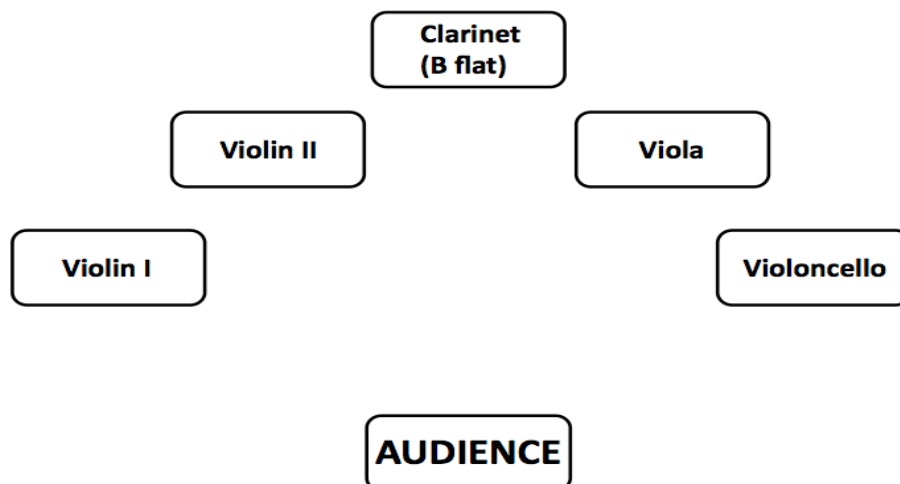
The suggested instrument placement is as follows:

Figure 3 – *Ice*: instrument placement

SYNOPSIS

Ice is a composition for String Quartet and Clarinet in B-flat, and its theme is the sinking of the Titanic. Among other things, this theme suggests a central contradiction: the Titanic sank during its maiden voyage despite being regarded as a marvel of engineering and design at the time; looking back it seems very archaic. Therefore various technological compositional techniques are used, such as spectral analysis[6], in order to highlight the contemporary design of the ship. These elements were contrasted with strong counteractive tonal elements presented in the form of regularly repeated semitones, in order to create the sensation of looking back to what was once exceptionally advanced.[7] The piece took approximately five months to be completed, and was performed by Ensemble Cymru. *Ice* was commissioned by the *Bangor New Music Festival,* and its premier took place at *Bangor University* in March 2012.

At this early stage in my PhD studies I was exploring ways that technology might help to make music more accessible to various audiences. The idea of analysing the spectrum of the ice was an early attempt to make a connection between academic music and a real-world physicality (the sound of ice breaking into pieces), which everyone can easily relate to. My later work on gestural interfaces extends this idea a bit further by using human gestures that are even easier to relate to. This piece is a very important milestone of this portfolio because it explores how technology can impact different kinds of composition, even when the performance includes only acoustic instruments.

COMPOSING THE PIECE

Ice is a composition for acoustic instruments that perform material transcribed (intuitively) from a Fast Fourier Transform (FFT) analysis of a pre-recorded

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[6] Spectral analysis as a base for composing instrumental music has been widely used by composers such as Tristan Murail and Gérard Grisey whose music motivated me to explore this technique.

[7] Having metrical pulses also has the practical benefit that it makes the performance a lot easier for the performers. This contrasts with the rhythmic freedom a composer has when composing an acousmatic piece.

sound. The original sound was recorded by Prof. Andrew Lewis in the area of North Wales and is that of ice breaking into smaller pieces. The sound sample has a unique character in its entirety but only six seconds of the original sample were needed for this piece. This small segment of frequencies interacting with each other formed not only the structure of the piece, but also shaped every other parameter – except intuition. The macro-structure of the piece derives from the spectral analysis of this sound clip, which is also used to create textures for the acoustic instruments with sonorities that suggest the cracking of the ice during Titanic's collision with the iceberg.

The six seconds sound clip's waveform is shown below.
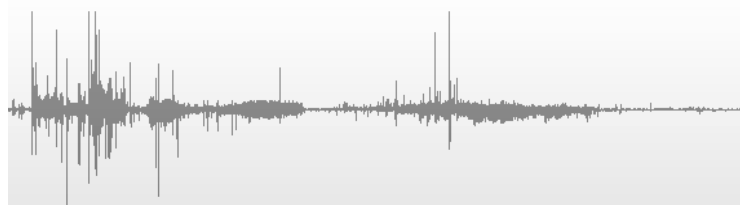
Figure 4 – *Ice*: Sound clip's waveform (recorded by Prof. Andrew Lewis)

According to historical data the Titanic side-swiped a massive iceberg. The sonic density of the composition is based on an imaginative graphical representation of this collision with the iceberg (originally 10 seconds in duration) stretched to a ten-minute timeline (points 1 - 10 figure 5.). This artistic representation of its deceleration served as a compositional tool; a structural element, with the climax of the piece right at the peak of the collision (point 4).
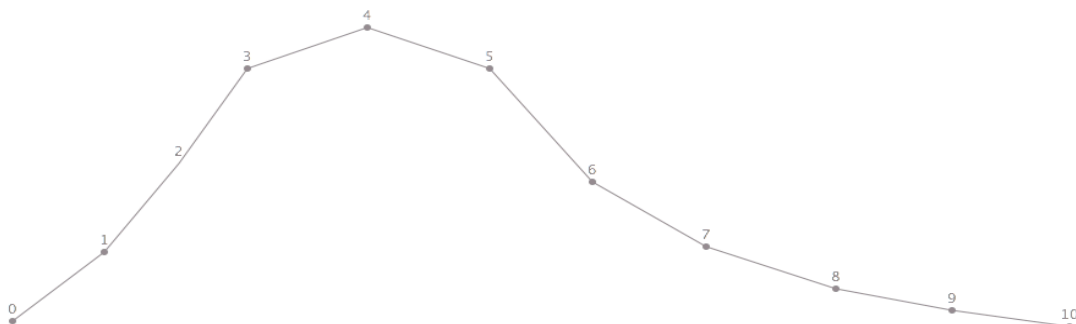

Figure 5 – *Ice*: Composition's Sonic Density

Similarities can be seen between not only the visual representation of the initial sound clip and the "Sonic Density" curve but also between the resultant waveform of the whole piece and the initial sound clip as shown below.

Figure 6 – *Ice*: Composition's waveform

The piece starts with sonorities that suggest the ship's horn signaling the beginning of a voyage with playful textures that lead to a climax. This section is far more tonal than the rest of the piece, which resolves into a gradually calmer section with counter moving glissandi that conjures images of sea waves. As the piece progresses to its end the sonic result becomes less dissonant and ends with another ship's horn giving hope to the survivors.

In order to accomplish this, I had to focus on the sonorities of the ice breaking from a technical point of view. Therefore, this rich spectrum was initially analyzed using FFT, in order to get a glimpse of the sound's visual representation in AudioSculpt and thus create a model with which I could work more intuitively. Having followed the same procedure with the sound of the horn, I end up with two acoustic models[8] (ice and horn), in addition to the ocean waves presented as glissandi and hyper vibrato in the string section. Furthermore the clarinet serves as a reminder of the past using tonal elements to emphasize and trigger the string section's sonorities. Another element used as a secondary process in this piece is that of perpetually rising frequency known as the "Shepard Tone".[9] This process is clearly apparent in

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[8] The intension (for these acoustic models) is to be as clearly perceivable by the listener as possible.
[9] Shepard R. N. (December 1964) Circularity in Judgments of Relative Pitch. Journal of the Acoustical Society of America, 36:12: pp. 2346–53.

the string section after the climax and it symbolises a hypothetical state of mind when humans are in disastrous and life threatening situations, trying to find the will and strength to stay alive. *Ice* utilises this technique and extends it by having both falling and rising frequencies, as an indication of reality versus human will. At the last few bars of the composition these unreasonable hopes are answered with the distant sound of a ship's horn (the rescue ship *Carpathia)*, with a calm and assertive timbre.

SOFTWARE

The software used for this composition is mainly Sibelius, AudioSculpt, OpenMusic (OM), and Logic Pro. OpenMusic is a graphical programming language, which makes complicated algorithms, such as spectral analysis of sound files and conversion into MIDI data, relatively easy to calculate. I used OM patches to manipulate the resulting MIDI files in such a way that the material would be both musically useful and practicable in live performance. The patches used for this piece were constructed during my MMus studies and are simply tools that reproduce random upper harmonics of a note.

CONCLUSION

Ice is a composition in which I use acousmatic studio techniques as the basis for instrumental music. Having worked extensively in the electroacoustic domain, I found it fascinating and very exciting to work with traditional instruments and to compose music that emphasizes extended techniques in order to produce sonic results similar to electroacoustic music's richness and agility. Despite the fact that a composer needs to bear in mind the performer's limitations, something that is not necessary when composing an acousmatic piece, I found the procedure very similar to composing in the studio. This prompted me to use my next piece to explore electroacoustic sound in the form of live electronics, with a live performer shaping with hand movements the sounds that a violin player is generating. This minor unpredictability in the sound led me to a new appreciation of live performance.

ALILEPIDRASI

Year of composition: 2011-2012

Format: software / performance

Duration: 9:00 - open form

Live Electronics: for Violin and two iPhones

CONCERT PROGRAME NOTES

Alilepidrasi is a piece for a solo violin, with live electronics controlled by two iPhones. The piece consists of:

- A score suggesting textural guidelines upon which the performer is expected to improvise.
- A violin performer who provides the acoustic sound source upon which the electronics are based.
- Two iPhones that control the Max-MSP patch, by sending OSC messages through a network, providing the computer with data such as accelerometer (x, y, z) coordinates.
- A Max-MSP patch that makes use of various VST plug-ins and defuses the sound to an eight-channel speaker system.

The aim of the piece is to explore human gestures as a way of generating sounds and to involve non-musicians into the compositional process such as the performer Dafydd Goodwin who does not have any musical experience or background other than singing.

PERFORMANCE SET-UP

The suggested set-up for the speakers is as follows:
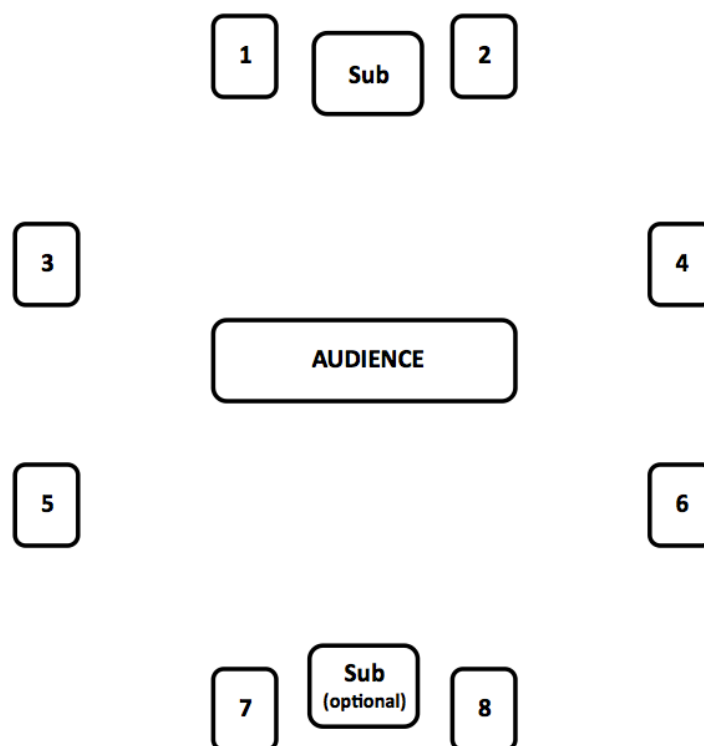
Figure 7 – Alilepidrasi: speaker set-up

SYNOPSIS

Alilepidrasi is a live performance for a solo violin, with live electronics controlled by two iPhones. The piece was premiered at *INTER/actions* festival at Bangor University in 2012, by Katherine Betteridge (violin), Kimon Emmanouil Grigoriadis (composer/ iPhone), and Dafydd Goodwin (iPhone), who was a psychology student at the time.

Alilepidrasi is my first piece of the gestural approach to composition and is based on the utilization of new technologies applied in musical composition and live performances. The aim is to generate and manipulate sounds in a more intuitive way using real objects, body movements, and interaction between the physical and the digital domain. Although this first step is limited to hand movements, the opportunities are endless.

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ALILEPIDRASI – SCORE

The score is a software running on a Macintosh computer,[10] which applies a probabilistic algorithm to choose from predefined violin extended techniques. These extended techniques are divided into two categories; the first (Category A) consists of elements that could be performed either with a long or a short attack, and the second (Category B) consists of techniques that can only have a short attack.

In addition, the time interval in which the software chooses the desired technique is anything between 5 and 15 seconds and changes every time a new result is presented. Also, the probabilistic ratio between Category A and B gradually shifts from 80% - 20% to 30% - 70% respectively and back to 80% - 20% in order to have even more unpredictable results between the suggested techniques. Exploring the various effects and extended techniques created by the stringed instruments within *Ice,* gave me similar ideas and sounds when approaching *Alilepidrasi.* Furthermore, I research into other composer's works that used the same techniques (e.g. Pascal Dusapin - *String Quartet n°2 Time Zones*, 1989)
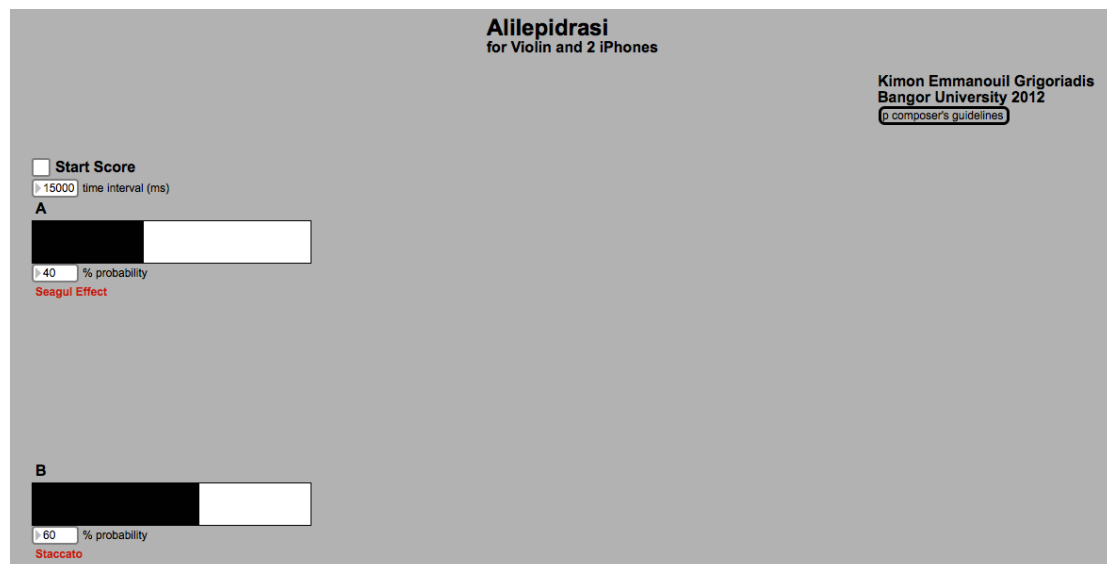
Figure 8 – *Alilepidrasi*: score

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[10] Please note that the Alilepidrasi-Score software is running on a separate computer from the main software for audio manipulation (VSTLoader) due to great demand of processing power.

Category A

Tremolo norm: *is a both hands tremolo with irregular rhythms having the bow hand at a normal position.*

Tremolo sul tasto: *similar to* Tremolo norm *with the bow hand in sul tasto position.*

Tremolo sul pont: *similar to* Tremolo norm *with the bow hand in sul pont position.*

Note: *playing any note without vibrato having the bow hand at a normal position.*

Note sul pont: *playing any note without vibrato having the bow hand at a sul pont position.*

Note sul tasto: *playing any note without vibrato having the bow hand at a sul tasto position.*

Note glissando sul pont: *starting from any note a glissando in any direction without vibrato having the bow hand at a sul pont position.*

Note glissando sul tasto: *starting from any note a glissando in any direction without vibrato having the bow hand at a sul tasto position.*

Note Hyper Vibrato: *playing any note with vibrato having the bow hand at a sul tasto position. The vibrato has to be a whole tone wide.*

Harmonic: *open harmonic on any string.*

Harmonic sul tasto: *open harmonic on any string having the bow hand at a sul tasto position.*

Harmonic sul pont: *open harmonic on any string having the bow hand at a sul pont position.*

Seagull effect: *a stopped harmonic beginning in a very high position with an octave span between the fingers. Glissando down the length of the fingerboard, without adjusting the space between the fingers.*

Category B

Ricochet: *starting on any note the bow should rebound freely from sul pont to sul tasto until it stops.*

Staccato: *any staccato note.*

Pizzicato: *any pizzicato note.*

Tapping-body: *tapping the instruments body with one finger.*

String-slapping: *slapping any string by pulling it outwards producing a buzzing sound.*

Scratch Tone: *playing any note by pressing the bow down to the strings producing a scratching sound.*

In addition to the score, which serves as a guideline only, the performer is required to follow the techniques displayed with big fonts and improvise on the pitch, rhythm, and density to meet or contradict the electronic sound. The reason for having the performer improvise to such a degree does not necessarily mean a composer could not use the *VSTLoader* software along with a fully scored piece but it rather reflects my personal perspective regarding but not limited to musical composition. I like to think of mistakes as accidents which, when welcomed, can be transformed into new ideas, regardless of whether it occurs in a live performance or in the studio. From my point of view, in order for someone to fully appreciate this perspective one has to keep in mind that this controlled unpredictability[11] is an idea embedded into most of my compositions. This is similar to the away a chess player is free to improvise, but within the strict rules of the game.

The two iPhone performers should aim for synchronous gestures with the bow hand of the violinist. The main iPhone performer is required to improvise by switching freely between the five presets of the TouchOSC[12] template (see Appendix 1).

COMPOSING THE *VSTLoader*

The core idea behind the mapping is to explore ways of controlling data, which affect one or more parameters of each audio effect in real time. This is

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[11] The controlled elements are the guidelines regarding the techniques to be performed and the nature of the algorithms of VSTLoader. The unpredictability refers to the performer's improvisation and unfortunately to occasionally apparent technological constraints.

[12] TouchOSC is widely used in the creative community for a wide variety of purposes one of which is interactive music (http://hexler.net/software/touchosc).

similar to the automations an acousmatic composer would draw for every audio track in a DAW software when working in the studio, but intuitive enough for non-musicians to be able to generate and repeat sounds intentionally. For the performance of *Alilepidrasi* I occasionally control all the parameters of each GRM tool[13] used for this piece by taking advantage of the built-in preset slider. In other instances such as when generating the digital feedback[14] I tweak two parameters in GRM Shuffling audio effect to create the desired sonic result. This feedback sound is extensively used in this piece and other compositions of this portfolio.

The "object" I used to generate data for this piece is the *iPhone 4S*.[15] The main tool that transcribes the hand movements into useful data received by the computer is the built-in accelerometer of the iPhone. The accelerometer's data comes in packages of lists, which represent the x (horizontal axis), y (vertical axis), and z (depth axis). These packages of data can be sent to a computer via the UDP-OSC protocols when the IP addresses are known and correctly set on the two devices. Thus, one can control a virtual potentiometer on one computer by sending these data over the Internet or over a local network. When the computer receives a list, there are more complex algorithms that convert these numbers into more interesting and useful data that will generate richer and more musical sounds. For this to be accomplished I had to create another layer of "effects" which I call "DATA-effects". These "DATA-effects" can be considered as dynamic molds, each one with different characteristics depending on the original values of the (x, y, z) list at any given moment. These three "DATA-effects" can be found in the "p parameters" sub-patch in *VSTloader*. They are the following:

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[13] *VSTLoader* is created to work mainly with GRM tools. Nevertheless the user can easily use other audio effects too.
[14] This audio feedback needs the *Delay* slider of the GRM shuffling to be no higher than 200ms for better results and the *Feedback* slider above 50%.
[15] The user can chose any other device that sends accelerometer data wirelessly.

- The raw accelerometer data (ACCxyz)
- The speed in which these data change over time (SPEED). The user can also smooth the output list of values, which makes it more useful when controlling an audio plug-in.
- The (SLIDE), which creates an envelope and is very useful for sudden hand movements. This effect will take a list and output it by sliding from the current value to the highest one available and back to the initial one. The user can also control how fast it will move upwards and downwards by the smoothing parameters named "attack" and "decay".

All the lists are then scaled to any given pair of numbers between 0.0 and 1.0 (float numbers). As mentioned above I chose to use the preset slider at the bottom of each GRM tool to take advantage of an extra layer of presets that the user can store inside the audio effect itself.[16]

These moulds behave like a balancing force between the unpredicted lists of numbers generated by a hand gesture and the strictly categorized bands of preferable combinations of numbers that control the sound effects. The same way one can clearly notice that the geographical structure of a riverbed is shaping the mass of water but cannot evidently perceive the motion of each individual water molecule. By repeating a hand gesture, the user can produce similar versions of one sound, while being confident that this will not result in an unexpected sonic outcome. Instead, it will result in a sound that displays characteristics appropriate to the overall aesthetic.

Furthermore, in order to create a structure, which would imply a unity between multiple performances, the addition of another layer of presets was necessary. These "GLOBAL PRESETS" control the value of every parameter needed and create the structure of the piece. In other words, these presets control the shape of the "riverbed". Being improvisatory in nature, this piece gives the performers the ability to trigger each preset whenever he or she

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[16] This GRM internal preset slider is not present in any other audio effects I have encountered but it can be easily created in a programming environment such as Max-MSP if needed.

feels it is more appropriate to do so, in order to produce a more unified structure. In this case the main iPhone user hits the buttons on the TouchOSC (a template created especially for this project) in much the same way the master drummer in some African drumming and Balinese Gamelan traditions signals the next transformation to be made by the ensemble[17]. The following figure shows how the audio signal and OSC data flow within the *VSTLoader*. This software is a platform created to meet my personal needs in controlling the GRM plug-ins (and any other VST plug-in) for a live performance. The sonic outcome could also be generated in the studio using commercial DAW software. As with any VST plug-in the result is based on the way the composer uses the available tools and the material one chooses to work with. The following figure is a graphical representation of the *VSTLoader* that shows the signal and OSC flow.
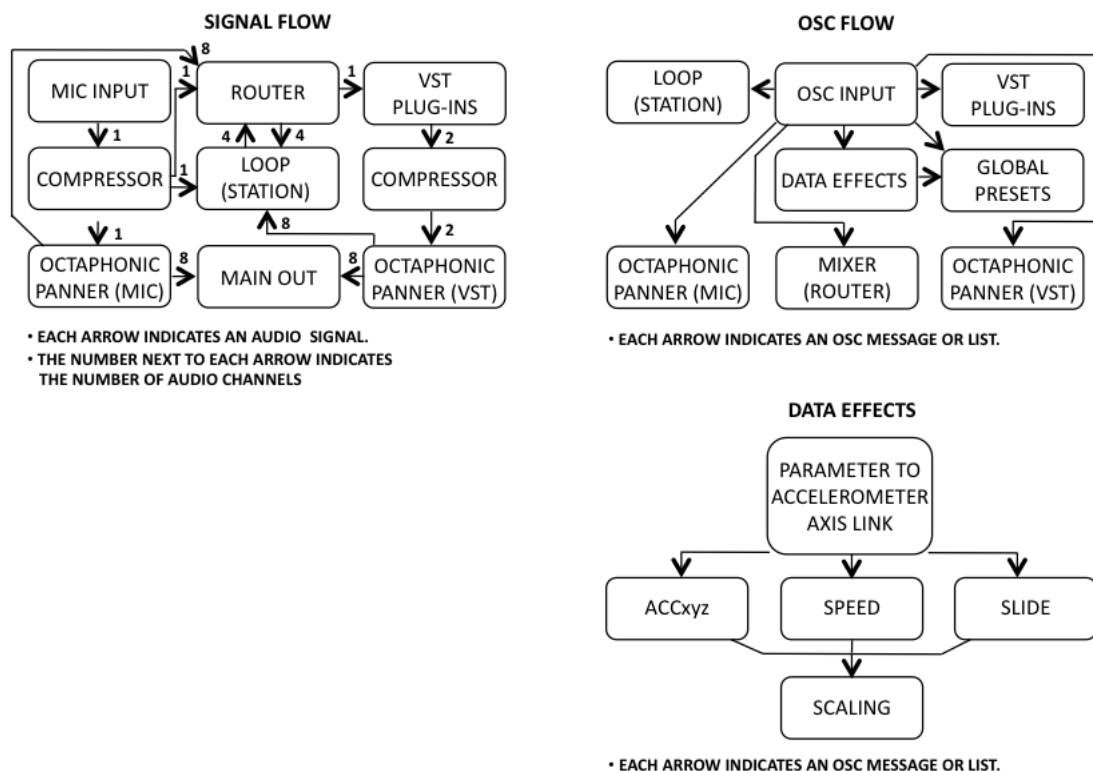
Figure 9 – *Alilepidrasi*: signal and OSC flow in *VSTLoader*

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[17] In these traditions the Master Drummer acts as a performer as well as a conductor of the ensemble, signaling each upcoming transitions with short musical cues.

SOFTWARE

The software assembling the overall set-up for the piece is partly created especially for this project and partly commercial/open-source. TouchOSC runs on the iPhones and provides a platform for the user to create custom templates to fit the needs for any given situation by sending OSC messages over a network as mentioned above. The *VSTLoader* software running on the Macintosh computer is created in *Max6* by *Cycling '74* (www.cycling74.com).

CONCLUSION

As shown in the video of the *Oxford Playground* demonstration *(media folder: 6.3.3-Playground)* the general feedback for this project was very positive. The audiences were very kind in showing interest in something that seemed new and promising. This approach of using non-conventional techniques to compose music seems to have a great appeal to young children too.

Despite this positive reception, there is still plenty of room for improvement and development, or even for a change of direction if needed. It seemed to me at the time that having one performer generating the acoustics sounds (sound source) and another controlling the manipulated electronic sound was problematical[18] as the two performers had to be strictly "in time". Therefore, I chose to assign both acoustic and electronic sound to one performer for the next project named *Pandora*.

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[18] Due to the partly improvisatory character of the piece, synchronisation issues arose between the sounds produced and the gesture that produced them. Some of them were due to technological constraints and others due to network data transfer delay.

PANDORA

Year of composition: 2013

Format: software / performance

Duration: 7:00 - open form

Live Electronics: for a dancer

CONCERT PROGRAMME NOTES

Pandora is an electroacoustic composition with live electronics controlled by a human body. By tracking the movements of a dancer, the software is able to manipulate and diffuse the sound accordingly to the eight-speaker surround system. In other words, the dancer conducts the music to which she dances. The aim of this project is to explore human gestures and body movements as a way of manipulating sounds, and to involve non-musicians in the compositional process.

This composition uses technologies such as the Microsoft Kinect - a controller for the XBox used for tracking the human body, software such as Synapse[19] for Kinect, and a Max-MSP patch developed by the composer.

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[19] Synapse software is created by Ryan Challinor (http://synapsekinect.tumblr.com)

PERFORMANCE SET-UP

The suggested set-up for the speakers is as follows:
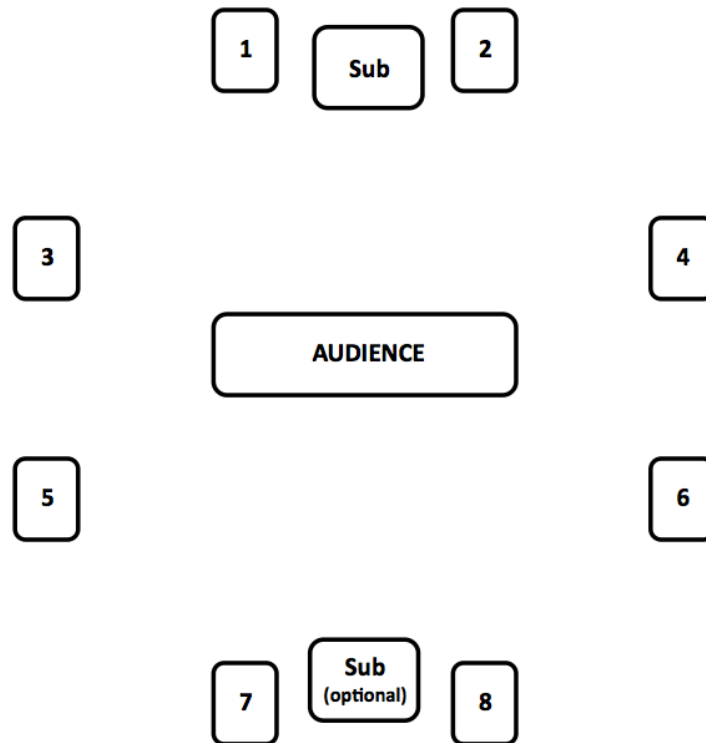
Figure 10 – *Pandora*: speaker set-up

SYNOPSIS

Pandora is a live performance for a solo dancer, and is chronologically the second project following *Alilepidrasi* that utilizes new technologies in the compositional process and performance. This composition takes the gestural approach one step further by having a dancer as the only music performer, capturing the motion with the Microsoft Kinect and transcribing the data into sound. The dancer triggers, manipulates and diffuses the sound into eight speakers with body movements that control the *Pandora Software* created for this piece. The piece was premiered by the dancer Despina Goula at the Electroacoustic Wales concert at Bangor University during the Bangor New Music Festival 2013.

COMPOSING THE SOFTWARE

Pandora uses a different approach to *Alilepidrasi's* flexible structure. What was previously left up to the performer is now strictly positioned along a timeline in the form of individual events, which are triggered by the dancer at specific moments in time. These triggers are clearly indicated by a downward motion of the dancer's right hand from *above the head* to *below the torso*. The dancer not only triggers pre-recorded sounds but also dynamically manipulates them in real time.

The fixed sounds that are used for this piece are based on a bell like sound recorded in the studio in 2009, and on another recording which uses rocks on metallic cases recorded in 2010, in order to give a more industrial sonority to the piece. Nevertheless, the treatment of these sounds in the studio was controlled in such a way that they would reach their final state only after the live manipulation of the dancer's gestures. This technique not only makes it easier to associate the body movements with the sonic result but also creates a safety net that ensures that, in the case of an unexpected occurrence during the performance, the sonic outcome will still be interesting enough to camouflage the incident.

The core of this composition lies upon making the choreography simple enough for the Kinect to track the body movements successfully, but also interesting enough to aesthetically enhance the surround sound produced. In addition, I created an instrument based on Prof. Andrew Lewis' *Shuffle* (part of BAT software) named "*Andys*", which would track the position of both hands and legs on x-axis and playback the corresponding grains of a pre-recorded sound file. The tracking is either continuous or scattered (see Appendix 1 - Software) in order to generate different sonic results. In addition to the selected grains, this instrument has various parameters (transposition, grain size and panning) that would change from one event to the next, in order to create a development in the sound. Moreover, other instruments such as GRM-Doppler, GRM-Bandpass filter, and GRM-Comb filter were used in various combinations along the timeline, unfolding the structure of the piece.

The GRM-Doppler effect adds a natural sensation of motion to the pre-recorded sounds and is linked to the speed of both hands. Similarly, the GRM-Comb filter emphasizes different frequencies depending on the hands' position on the y-axis. Finally, the GRM-Bandpass filter uses the higher and lower values of both hands on y-axis in order to limit the spectrum of the overall sound to these boundaries, creating a very effective visual-sonic result. The following figure is a graphical representation of the *Pandora Software* that shows the signal and OSC flow.
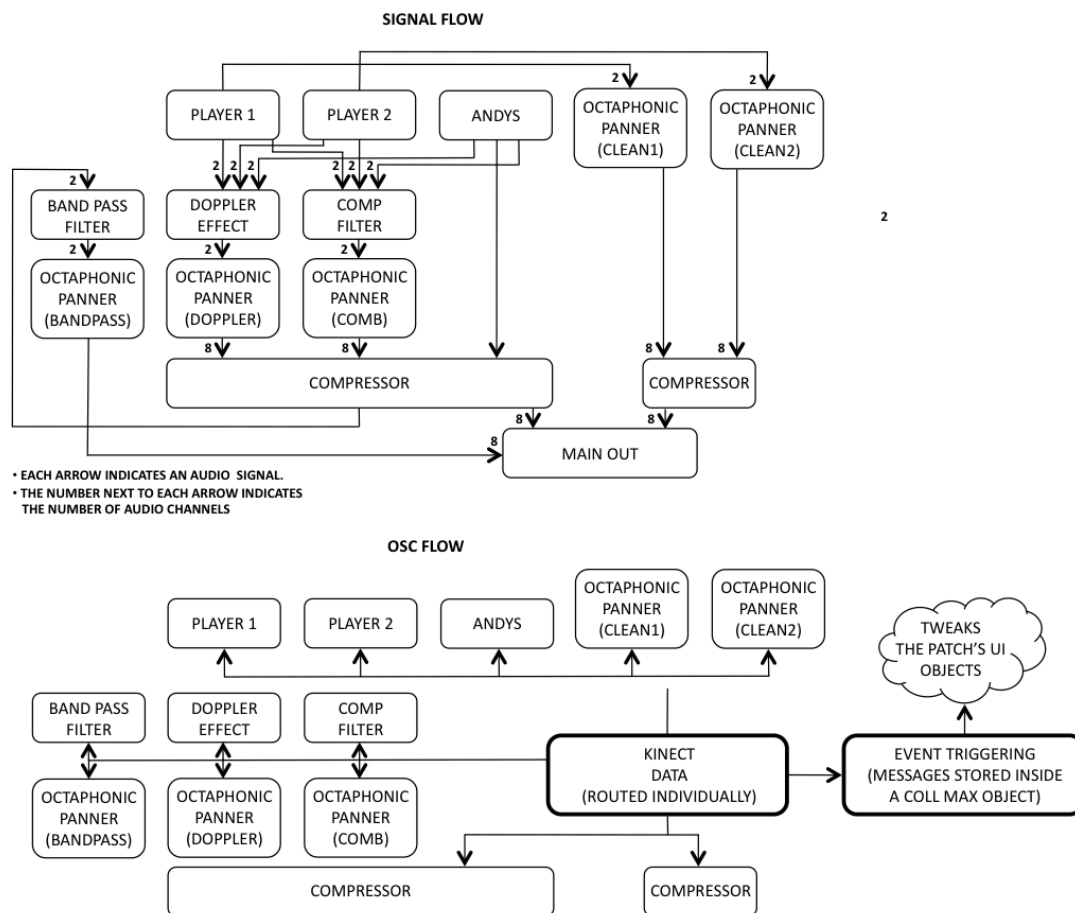
Figure 11 – *Pandora*: signal and OSC flow in *Pandora Software*

PANDORA – SCORE

Pandora's score is divided into two parts, one of which is in the form of a software application running on a separate[20] Macintosh computer that displays a timer and the other is a series of events written in a text form and

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[20] The *Pandora Score* and *Pandora* software should run on separate computers.

stored in a coll max-object as part of *Pandora Software*. After each trigger takes place, there is a time window, presented as a timer on a laptop monitor in front of the dancer that disables the triggering for the corresponding duration. This laptop also connects the Kinect with the main computer via a local network. When the timer finishes counting down to zero it changes colour to indicate to the performer the need to trigger the next event. This technique is used in order to gain the visual-sonic synchronisation needed, but also to apply a more sophisticated structure to a live performance that also gives some room for improvisation. Each event sends information to every parameter of the software that needs to be adjusted.

As shown below (fig 12), there are three main components to the score.

- The circular *timer* in its initial state (dark green) that changes to light green when the triggering should take place.
- The *Open Close* box, which is linked to the *GRM Band* Pass *Filter* and changes from red to green when is triggered. The name "Open Close" seemed to be more memorable to a non-musician than the "Band Pass Filter".
- The *SHARP* box, which is linked the *GRM Comb Filter* and changes colour similarly. The name corresponds to a specific sonic result apparent when the left hand was in its lower possible value.
- The buttons on the right hand side, which are only for the composer to have direct access to the IP addresses of the two computers, as well as to the coll max-object, and the Synapse sub-patch if needed.

The score does not include other parts of the *Pandora Software* such as the *Andys* sub-patch and the *GRM Doppler Effect* as they have a secondary role in terms of structure, and they were enabled for almost the whole duration of the piece while their parameters where changing.
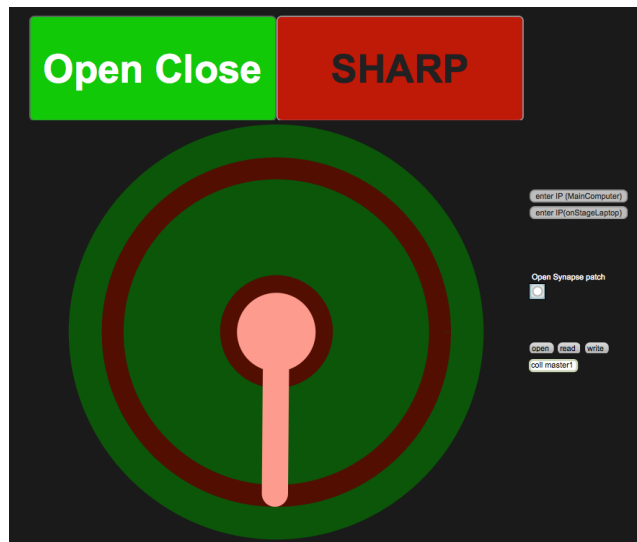
Figure 12 – *Pandora*: score

STRUCTURE AND THE [COLL] MAX-OBJECT

There are seventeen[21] events used for this performance that are stored in a coll max-object in the form of OSC messages. Each event consists of a series of messages that adjust various parameters of the *Pandora Software* in the same way a composer would do manually in the studio, for example, volume and/or panning automations etc. The example shown below is taken from the second event and focuses on the messages sent to the *Andys* sub-patch:

/andys /duration /1 71 74, (sets the range of the grain duration for hand1)
/sec 60";(creates a 60 second window by a virtual gate for the next trigger)

Every message contains the "/sec (integer)" ending, which is used as the duration of the time window for the gate to disable the triggering. The necessity for this gate was apparent to me after much experimentation with various gestures that Microsoft Kinect was able to capture. Even though I decided to use a single gesture that would not interfere with the choreography, the simplicity of my choice was problematic when the dancer was performing complex body movements. Kinect[22] could not clearly distinguish the different body parts when the dancer was spinning around or

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[21] The reason for the seventeen events is due a personal interest in prime numbers.
[22] The version of Kinect (1) used for this project proved not very accurate in capturing the initial choreography.

when she was lowering the upper body closer to the ground. As a result it was possible that the computer would react as if the hand had moved from *above the head* to *below the torso*, which is the chosen movement for triggers. Thus, by disabling the triggering, the dancer could move freely for the duration of the time window, making the choreography more interesting by eliminating unwanted results.

SOFTWARE

The *Pandora Software* I created for this piece runs on the main computer and works along with the Synapse software that runs on the laptop on stage. See Appendix 1 for more information on the software.

CONCLUSION

The performance of this composition received very enthusiastic comments from the audience[23], as it was new and unique to some people. Nevertheless, I realised that from the sonic perspective, the structure did not meet my expectations, regardless of the precision with which I composed the score (the text file of the coll max-object). I found that some events were rather ineffective and some others even more effective than intended, with the Band Pass filter being the most visually exciting of all, despite its simplicity. Furthermore, the result suggested that either a more precise choreography with less room for improvisation or a more improvisational sonic character is needed in order to realise the composition's full potential. Nevertheless, having a non-musician performing a sonically complex piece was very satisfying and rewarding.

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[23] Steph Power wrote "an intriguing piece in which electronic sounds were triggered live by the movements of a dancer" on *http://www.walesartsreview.org/bangor-new-music-festival/*

AWAKENING

Year of composition: 2013

Format: software / performance

Duration: 8:30 - open form

Live Electronics: for Violin and Dancer

CONCERT PROGRAMME NOTES

Awakening is a computer-assisted composition for Violin and Live electronics controlled by a dancer. By tracking the movements of the dancer, the software is able to manipulate and diffuse the violin sound to an eight-speaker surround system. This composition uses the Microsoft Kinect camera for tracking the human body, and Max-MSP patches developed by the composer.

PERFORMANCE SET-UP

The suggested set-up for the speakers is as follows:
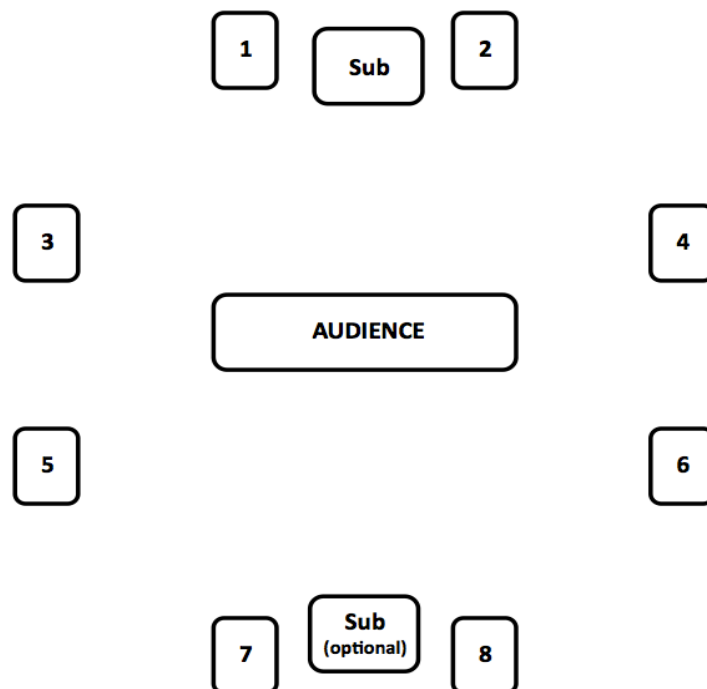
Figure 13 – *Awakening*: speaker set-up

SYNOPSIS

Awakening is the third piece of the gestural approach to composition and is composed for a Violin and a Dancer utilizing various elements from the *Alilepidrasi* and *Pandora* projects. The aim is to manipulate the improvised violin sound in an intuitive way having a dancer connecting the electroacoustic and acoustic sound diffusing it into an audiovisual octaphonic performance.

COMPOSING THE SOFTWARE

Awakening introduces a more "game-like" approach to the compositional process. The software is built in such a way that the dancer is enclosed in a virtual 3D bubble with its centre at the torso. All the body parts are calculated as vectors from the torso, and they control different "instruments" using various parameters of each corresponding vector, such as "real" speed, acceleration, angular speed, as well as the values of distance for each of the three axes independently, always in relation to the torso. In addition, the three axes' linear speed and acceleration is also used where needed. Since all these values are in close relation with one another provided they derive from the same gesture they create a more complex yet intuitive sonic result for the user (dancer). Each one of these "instruments" is enabled during the corresponding "movement" forming the overall structure of the piece. The "Timeline" section of the software indicates these eight "movements" which are triggered by the composer. In addition to the three GRM plug-ins used for this project (GRM BandPass, GRM Shuffling, and GRM CombFilter) the dancer has continuous access to an individual "instrument" called *Front* as well as to the five octaphonic panners. *Front* stands for "front wall" and is a virtual wall, which will play back a granulated bell like sound when touched by the dancer. Like the *Pandora* project there is a fixed duration to each movement and a timer that changes colour to provide useful information for the composer and the dancer. The eight movements consisting the Awakening's structure are:

- **CombFront:** the first movement uses the GRM CombFilter and its duration is two minutes.

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- **BandPass:** the second movement uses the GRM BandPass filter and its duration is twenty seconds.
- **Shuffling:** the third movement uses the GRM Shuffling and its duration is one minute.
- **BandPass:** the fourth movement uses the GRM BandPass filter and its duration is thirty seconds.
- **Shuffling(Comb):** the fifth movement sends the signal from the GRM Shuffling to the GRM CombFilter and its duration is one minute.
- **BandPass:** the sixth movement uses the GRM BandPass filter and its duration is forty seconds.
- **Comb(Shuffling):** the seventh movement sends the signal from the GRM CombFilter to the GRM Shuffling and its duration is two minutes.
- **BandPass:** the eighth movement uses the GRM BandPass filter and its duration is one minute.

("*FadeOut"* triggers a five-second fade-out volume ramp at the end.)

The following figure is a graphical representation of the *Awakening Software* indicating the signal and OSC flow.
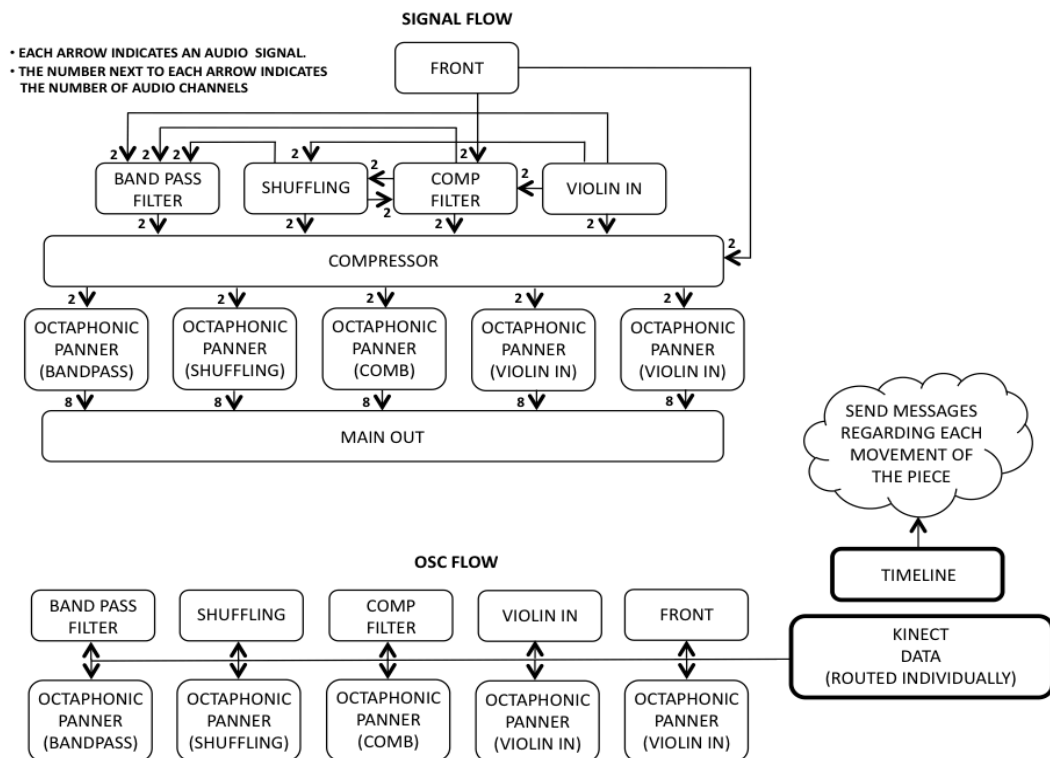
Figure 14 – *Awakening*: signal and OSC flow in *Awakening Software*

AWAKENING – THE SCORE

The score consists of two software applications one for the dancer and one for the violinist.

The former is very similar to the one used in the *Pandora* project having the circular timer and displaying the current "movement" as presented in the timeline section with the exception that the fifth and seventh movements are displayed as "Shuffling" and "Comb" respectively**.**
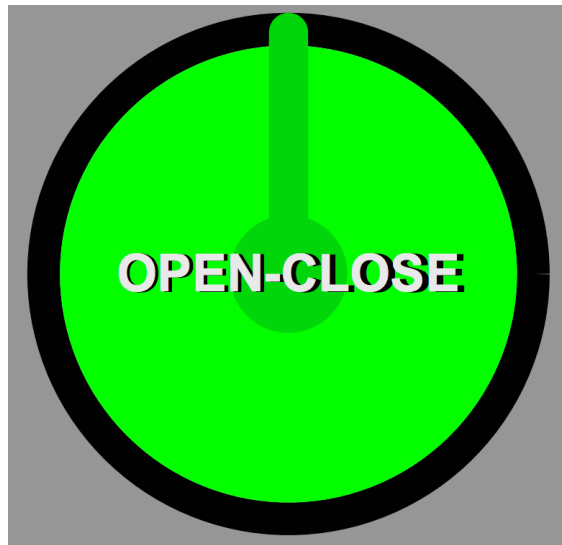
Figure 15 – *Awakening*: score for Dancer

The score for the violinist is very similar to *Alilepidrasi's* score. The only difference is that for this composition the violinist is expected to follow the movements of the dancer as the guidelines change.

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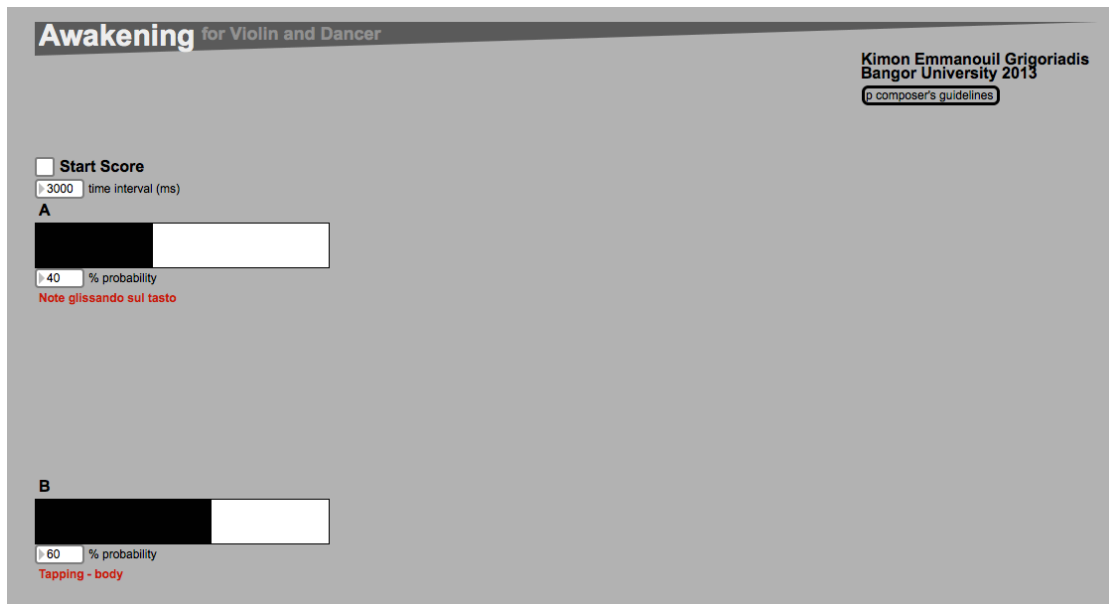
Figure 16 – *Awakening*: score for Violin.

SOFTWARE

The *Awakening Software* I created for this piece runs on the main computer and works along with the Synapse that runs on the laptop on stage.

CONCLUSION

The simplicity of this composition in comparison to the previous attempts (*Alilepidrasi* and *Pandora*) was beneficial and it proved to be more intuitive and musical. Nevertheless, there were some technical difficulties at the performance at RAM[24] in London, which led to a malfunction. Although it was never confirmed, the error was probably due to some permission problems with the main computer. Nonetheless, the piece was performed smoothly with two minor changes. Instead of using the GRM BandPass VST plug-in I used a sub-patch I created to replace the problematic VST plug-in, and instead of having the violin score running on a laptop the performer improvised. Because of the improvisational nature of the piece, it had little effect on the performance except that I had to reduce the overall duration. Having an acoustic instrument accompanying the dance proved to be considerably effective both visually and sonically as there was a question - answer concept

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[24] RAM: Royal Academy of Music, London.

employed between the Violin and the electronic sound or between the Violinist and the Dancer, as I like to think of it.

STRINGS ON THE ROCKS

Year of composition: 2014

Format: stereo fixed media

Duration: 21:00

Acousmatic

CONCERT PROGRAMME NOTES

Strings on the Rocks is a stereo acousmatic piece composed in 2014. Using sounds generated by software created by the composer, which involve a gestural approach to sonic art, the composition uncovers a state of endless fluctuation. The sounds of the violin along with the harsh sounds of rocks interfere with their audio feedback to create a collage of sonic relentlessness.

PERFORMANCE SET-UP

The suggested set-up for the speakers is as follows:
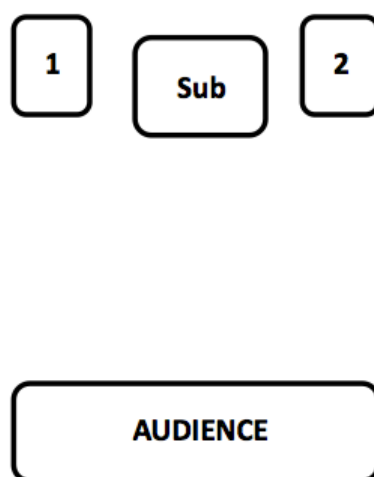
Figure 17 – *Strings on the Rocks*: speaker set-up

SYNOPSIS

Strings on the Rocks is a stereo acousmatic piece composed entirely in the studio. It embodies material previously recorded in the studio and in live

performances using software I created for manipulating sounds through gestures and body movements mentioned above as *VSTloader*, *Pandora Software*, and *Awakening Software*. Although these software output has multi-channel surround sound this composition, as well as the *7 Doors* are composed for only two speakers. The reason is not only that I did not have access to a multi-channel set-up at the time of composing, but also that I found it very useful to include stereophonic pieces in this portfolio for the practicality of performance[25]. Over the course of three years various people from different backgrounds have been testing the software and thus creating sounds, which I recorded in real time. Some examples include one-to-one introduction to the software, an installation of *Alilepidrasi* (LiveART festival), live performances and rehearsals of *Alilepidrasi*, *Pandora*, and *Awakening*. Therefore, I consider this composition to be a collective piece of art.

COMPOSING AND STRUCTURE

My intention when composing this piece was to try and use as many audio samples as possible from the substantial number of recordings I collected over my three-year studies as a PhD student. The initial material was more than 40Gb of data from which I had to carefully select the very few that would create this composition. This approach was new to me as I normally begin composing a new piece by having as little material as possible and start building on it.

The sonic result of *Strings On The Rocks* is a state of endless flux that is built in the samples I chose to work with. This property is the result of the way I am using the GRM plug-ins within the software I mentioned above. The mapping that takes place in the software is a key element as it provides the user with an interface that makes it easier to tweak many parameters with a single hand gesture. An equivalent to this result would be to create numerous automations in a DAW software and repeat this process over and over again. I believe that

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[25] A stereo piece can also be performed via popular web-sites such as "soundcloud.com" and in every conventional concert set-up.

this alternative is not only time consuming but also less intuitive as I prefer to listen to the manipulated sound in real time.

This composition is a collage of violin sounds, sounds of rocks on a metal case, and marbles in a metal plate. These sounds have been manipulated in such a way that they generate a digital feedback[26], from which interesting and unpredicted sonic results arise. This feedback has been carefully edited in order to accompany or contradict the more natural sounding material mentioned above.

Since the feedback is a derivative of these three categories of sounds, it keeps a close relationship to their original timbre and structure. In addition, the pitch qualities are always based on the higher in amplitude harmonics found in the original sounds, gliding from one to another in a rather fluid and unexpected manner.

The piece is composed in one movement, and emphasizes different sonorities as the piece progresses. At the beginning the violin is accompanied and imitated by the feedback generated from violin sounds as well as metallic sounds, in order to present all the available material that will be further developed later in the piece. The violin sound gradually fades out, giving the main role to the purely electronic sound produced by the more "industrial" sonorities. This harsh sound contradicts the more atmospheric sonorities of the manipulated feedback, which prepares the ground for the violin to penetrate once more. The violin gradually enters the soundscape with a more virtuosic attitude accompanied mainly by its own feedback. The "industrial" sound suddenly switches the timbre of the piece and the violin moves to the background in order to accompany and "guide" the electronic sound to its climax and eventually its termination. The piece finishes with the violin producing a bed of sonorities on which the rest of the sounds come to ease.

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[26] The feedback of sound is being created in a loop inside a circuit, which incorporates GRM Shuffling.

SOFTWARE

As mentioned previously, the software used for the sound production is *VSTloader*, *Pandora Software*, and *Awakening Software*. In addition, various other Max-MSP patches were created to granulate sound with the LEAP Motion[27] interface. The piece was finally edited in Logic Pro.

CONCLUSION

This composition shows another way of using the software I created for live performances. A composer can focus on the intuitive way of controlling audio effects with gestures through a prefixed mapping of data purely in the studio, as a compositional tool. The sonic result is significantly easier to produce than conventional studio editing techniques, but rather inflexible as the user cannot edit its internal structure once recorded. A solution to this problem can be found with a different approach where the composer uses software such as Ableton-Live or Logic-Pro to record the data as automations instead of recording the overall sound, an experiment that I undertook during the *Pandora* project. The result was promising as all the automation creating the sonic structure can be edited and adjusted afterwards in the studio, but rather inflexible for my intentions and aesthetics. Although Max for Live[28] enhances Ableton's potential, I found Max-MSP a more adaptable environment when it comes to experimental music.

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[27] LEAP Motion is a controller that lets the user control the computer with hand gestures.
[28] Max for Live is a library that enables users to create patches to be used inside Ableton Live.

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7 DOORS

Year of composition: 2014

Format: stereo fixed media

Duration: 12:00

Acousmatic

CONCERT PROGRAMME NOTES

7 Doors is a stereo acousmatic piece composed in 2014. Doors open to sonic environments consisting of sounds we hear in our daily lives. The piece embodies an artistic view of a journey from Hastings to London, from the intensity of the city traffic to the tranquillity of water drops in a bathtub.

PERFORMANCE SET-UP

The suggested set-up for the speakers is as follows:
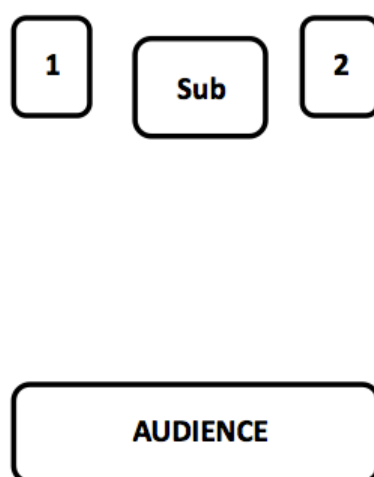
Figure 18 – *7 Doors*: speaker set-up

SYNOPSIS

7 Doors is a stereo acousmatic composition consisting of sounds found in our everyday environment, such as traffic noise, doors, people speaking etc.. This composition is a musical tribute to our auditory perception and the way our ears collect and send sounds to our brain without us consciously realising the effect they may have on our psychological state. Nevertheless, these sounds can be altered in such a way that they produce a harmonious and sometimes melodic character.

COMPOSING AND STRUCTURE

The structure of *7 Doors* is based on a continuous recording during a trip from Hastings to London, attending the ceremony of a baptism, right through until a dinner that took place later the same evening. The initial recording helped me realise the structure as well as the title of the piece, which corresponds to the seven more interesting, distinct, and beautiful sounds or "sonic-environments" apparent to me during the editing. These sounds formed a virtual journey where they alternate spontaneously with little or no regard to the actual timeline of events. Each door opens to a new "environment", or an altered version of one already presented, and may last for a minute or just a few milliseconds.

These seven "environments" in their original recorded order are:

- Bathroom
- Road Traffic
- Train Station
- Church
- Dinner Table
- Children ("Hello" and more: recorded in English)
- Love ("Agapi" and more: recorded in Greek)

My initial aim was to create an electroacoustic piece without any electronically manipulated sound. Although this plan was not fully implemented as intended, I found the idea of a more sparing way of composing intriguing; leaving

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sounds in their original state with little or no clearly audible manipulation, or altering a small fragment, grain, and/or band of frequencies instead of each sound as a whole. This resulted in sounds that can be easily traced back to the originals, but which are presented as more artistic and carefully edited artefacts. A distinct example of this technique can be found at the end of the third minute (02:45) where the traffic noise has been slightly augmented by applying a low frequency Filter Bank that emphasises the corresponding frequencies.

This technique is not the only one used in the piece: there are moments where sounds are augmented to more extreme transformations, but they always conclude to simplicity.

SOFTWARE

The software I used for this piece is AudioSculpt and Max-MSP libraries that can be found on IRCAM's website including but not limited to: SuperVP, and MuBu. In addition there was some use of Michael Norris' Sound Magic[29] Spectral plug-ins and extensive editing in Logic Pro.

CONCLUSION

This composition served as a catalyst for me to realise that regardless of the time a composer spends listening to and analysing sounds, it is very difficult to always be conscious of the sonic beauty that surrounds us. There are many different ways one can perceive a sound. Despite the fact that our emotional state, and memories play a vital role during this possess, there is always a sound with characteristics that can be considered universal and applies to anyone at any time, and affects us all in a similar manner.

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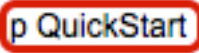
[29] SoundMagic Spectral is a FREEWARE suite of 24 Audio Unit plug-ins that implement real-time spectral processing of sound (http://www.michaelnorris.info/software/soundmagic spectral).

APPENDIX 1: SOFTWARE

Please **NOTE**: in order for the patches to work in Max6 the user must place the folder "Max_library_InvitationToListen" inside the Max search path.

VSTLoader

VSTLoader software is written in Max-MSP as a performance platform for *Alilepidrasi with live electronics for Violin and 2 iPhones.* The following picture shows the user interface.

Please **NOTE**: to get started please turn on the Audio and open the iPhoneSimulator sub-patch, or double click the p QuickStart sub-patch and follow the instructions.
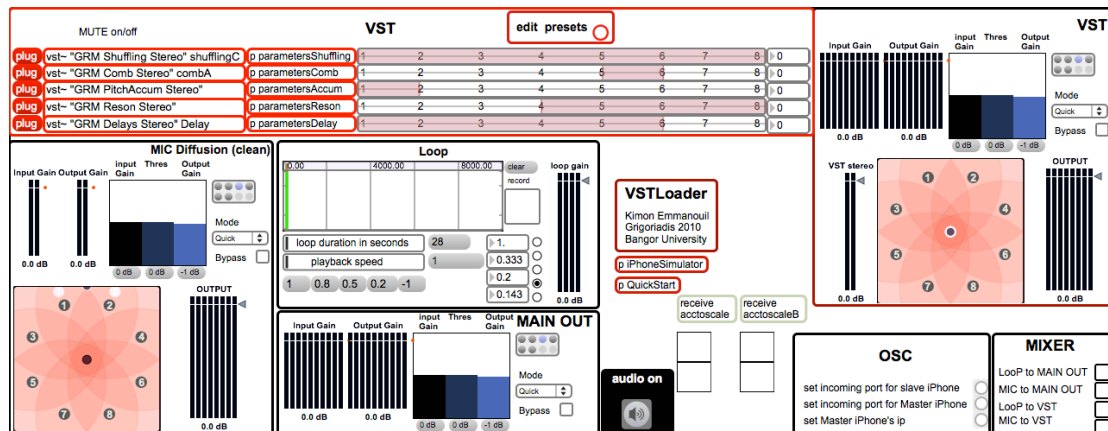
Figure 19 – *VSTLoader*: main window

VSTLoader - basic set-up

VSTLoader can function as studio tool as well as a platform to control VST plug-ins in live performances. The following picture shows the basic set-up for a live performance. The accelerometer data and the sound from the microphone are sent to the software, which will manipulate, diffuse, and output the sound as an eight-channel surround sound

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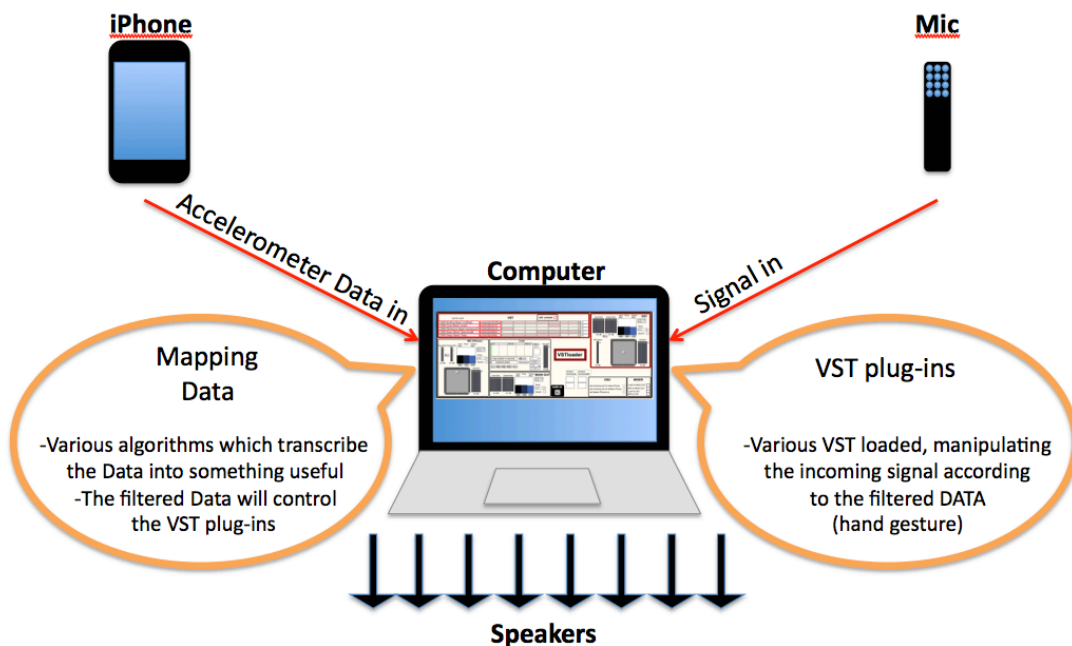
Figure 20 – *Alilepidrasi*: set-up

The iPhone Simulator
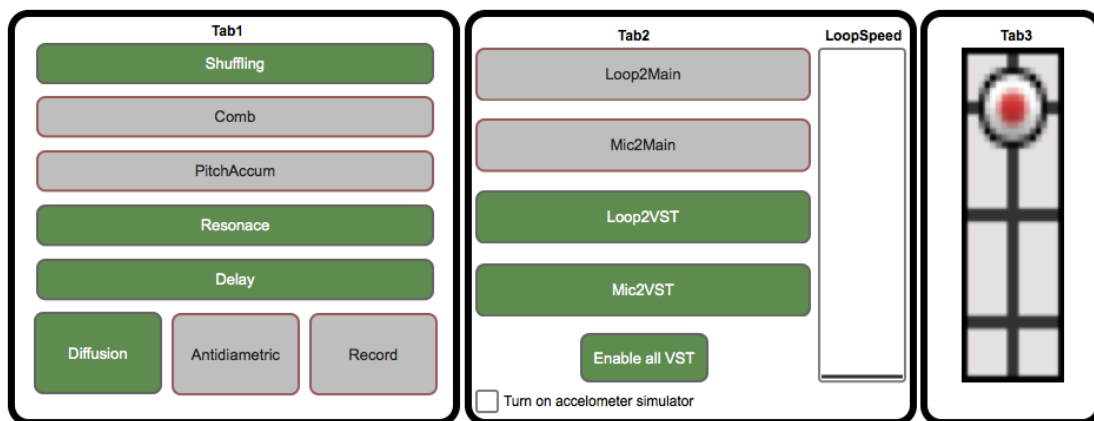
Figure 21 – *VSTLoader*: iPhone simulator

For the user who does not have access to a device with an accelerometer the *iPhone Simulator* provides a quick way to evaluate the software. This simulator is similar to the TouchOSC template mentioned below and provides similar functions. The user can hover above any button to enable it temporarily, or click on it to sustain it. Please refer to the "TouchOSC

Template for *Alilepidrasi*" section below for more information. In order to turn on the accelerometer simulator that uses the state of the mouse (or touchpad on a laptop) the user must click on the corresponding toggle.

The VST edit: (analyzed from left to right)

Figure 22 – *VSTLoader*: VST edit

- By clicking the plug box the user can choose a VST plug-in.
- By double clicking the VST column the user can access the original interface, the selected VST, and edit the parameters manually, save or load VST presets.
- By double clicking the parameters box the user is able to select different modes of manipulating accelerometer data within the popup window:
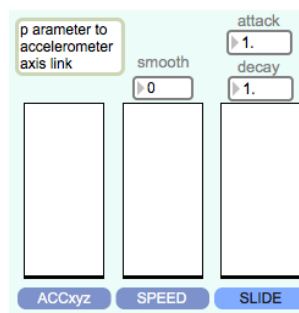
Figure 23 – *VSTLoader*: Parameters sub-patch

i. **Accxyz** will pass the raw accelerometer data to the VST plug-ins.

ii. **Speed** will transcribe the accelerometer data to the current speed at any given moment. By adjusting the smooth value the user can have a smoother response, which is sometimes beneficial for musical purposes.

iii. **Slide** creates a ramp with different smoothing values for the attack (ascending values) and the decay (descending values).

iv. By double clicking the parameter box on the left side corner the user can even assign each individual axis to a different parameter of each individual VST plug-in. The maximum number of parameters is 15.
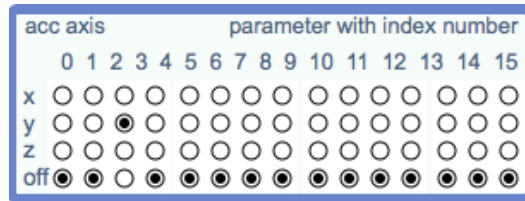
Figure 24 – *VSTLoader*: Parameters to accelerometer axis link sub-patch

- By changing the values of the horizontal sliders the user can set the range to which the incoming values will be scaled. This is very useful in the desired effect is to switch from one VST preset to another.

- By clicking the EDIT presets button the user can change the Global Presets. Please note that these presets are not the same as the VST presets. The VST presets are responsible only for the VST parameters. The Global presets as indicated by the name, control all the parameters of the software. This is very useful if a more defined structure is desired. The user can access and edit these presets as shown in the picture below. Scale refers to the range of the horizontal slider. The actual range when editing is from 1 to 20. Mode refers to the Accxyz, Speed, and Slide modes previously discussed. The mode values are the following: 0 for Accxyz, 1 for Speed, and 2 for Slide.
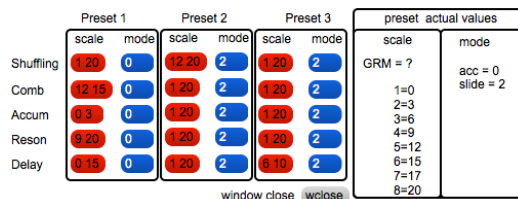
Figure 25 – *VSTLoader*: Edit presets sub-patch

The VST output

The next part of the software interface as we move to the right is the VST output. This section controls the input gain to the VST plug-ins (stereo version of the microphone input to each of the five plug-ins), and the output gain from the compressor (stereo version of each of the five plug-ins) to the surround panner. Additionally, there is a stereo input level, which is the sum of all the plug-ins, and the octaphonic output, which shows the levels for the resulting sound. Having multiple volume indicators allows the user to have a better idea of the signal flow within the patch.
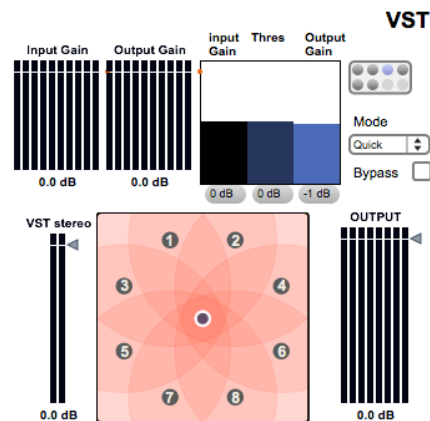
Figure 26 – *VSTLoader*: VST output section

The MIC diffusion

This section diffuses the sound of the microphone similarly to the VST output section.
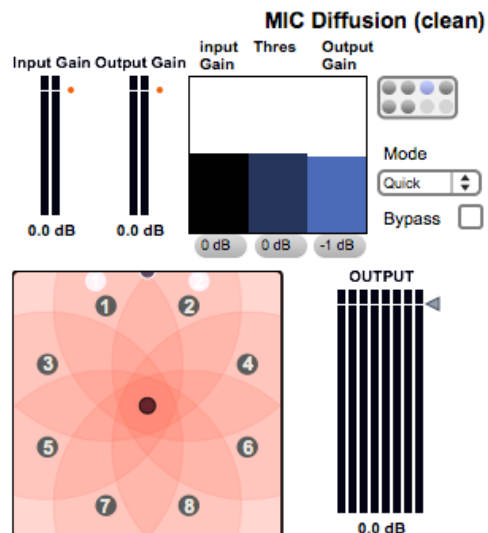
Figure 27 – *VSTLoader*: MIC section

The Loop

This section receives the resulting sound from the microphone and the VST plug-ins, records it into at most four buffers, for playback. The user can choose to have the same playback speed to all four players or assign individual speeds for each one[30]. There is a loop duration slider, which controls the length of the loop in seconds, and an overall speed slider which will affect every player at once.
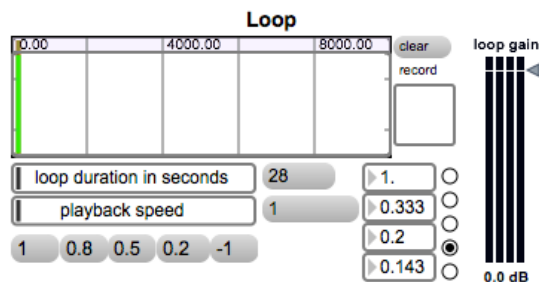
Figure 28 – *VSTLoader*: Loop section

OSC and MIXER

This section allows you to set the incoming port for one or two iPhones (named Master and Slave), and the IP address for the Master iPhone. This allows the software to communicate with the Master iPhone and update the iPhone screen when needed.
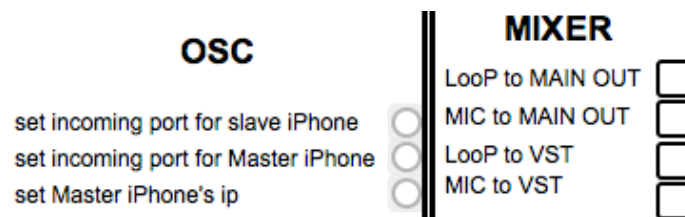
Figure 29 – *VSTLoader*: OSC and MIXER section

The Mixer allows the user to route the signal from the "Loop" and/or the "Mic" to the VST section for manipulation, and also to send a direct out from the "Loop" and/or the "Mic" to the "Main Out".

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[30] Please note that this is not a spectral manipulation and that the speed and pitch are linked to each other.

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The Main Out

The Main out section compresses the resulting octaphonic sound before it reaches the speakers.
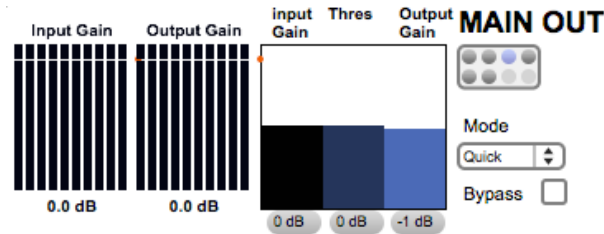
Figure 30 – *VSTLoader*: MAIN OUT section

Please note that this software is designed to be controllable by an iPhone. A template of the TouchOSC app designed by the composer can send data to every parameter of the software. Nevertheless, it can be also controlled from the computer itself if this is the desirable set-up.

TouchOSC
Template for *Alilepidrasi*

TouchOSC for iPhone is an application that sends OSC data via network. The template used for *Alilepidrasi* is created with TouchOSC-Editor by the composer and is a remote control for VSTLoader.

Tab 1

This section enables the GRM VST plug-ins used for *Alilepidrasi*. In addition, it enables the octaphonic diffusion of the overall signal. By selecting "antidiametric" the user can set the dry and wet signals in 180 degrees out of phase. This is used in cases the distinction of the clean signal is important. The record button will record the overall signal to a buffer for as long as it is hold down. This buffer can be accessed through the Loop section.
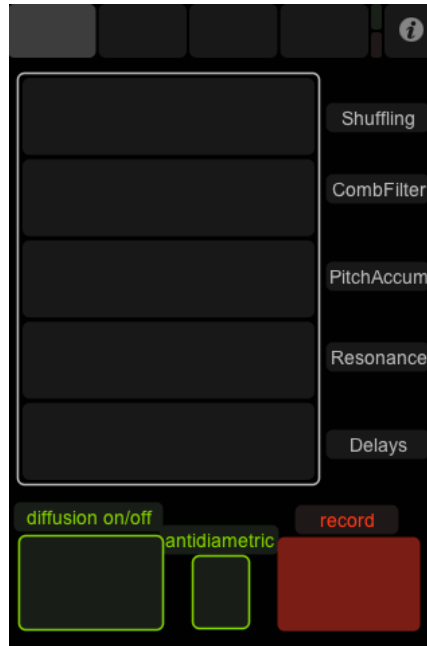
Figure 31 – *TouchOSC*: Tab 1

Tab 2

This section lets the user control the diffusion with a 2D slider. In addition, it enables the octaphonic diffusion of the overall signal similarly to the **Tab 1.**
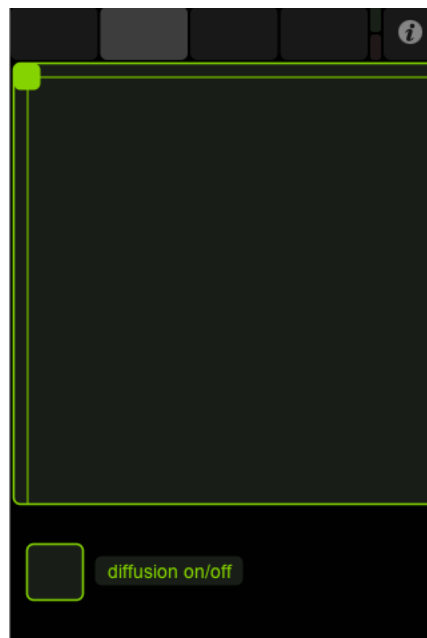
Figure 32 – *TouchOSC*: Tab 2

Tab 3

This section controls the "Mixer" of *VSTLoader*, the Loop playback speed, and it enables all with the "enable rest VST" toggle[31].
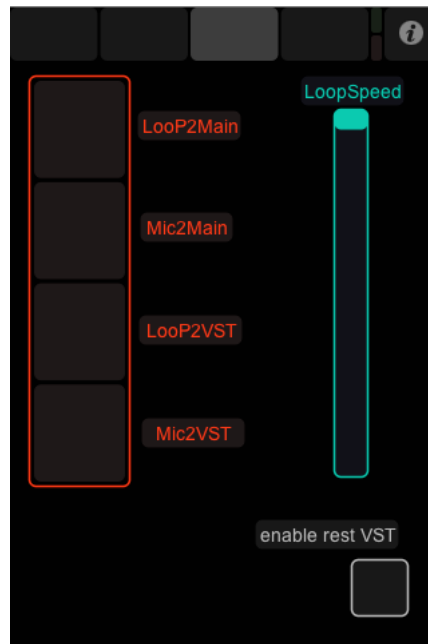
Figure 33 – TouchOSC: Tab 3

Tab 4

This section consists of the five presets that form the structure of *Alilepidrasi* (see "Global presets" page 65).
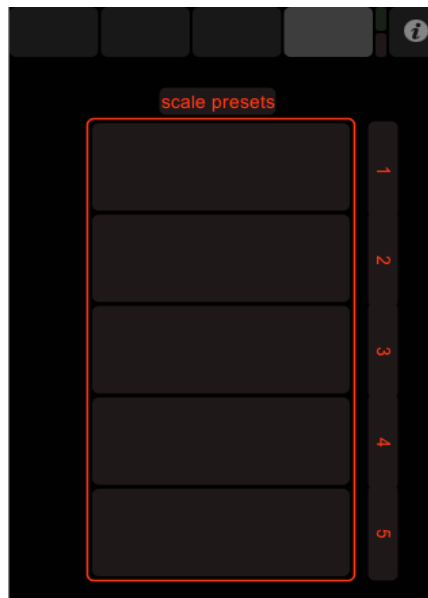
Figure 34 – *TouchOSC*: Tab 4

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[31] By default *VSTLoader* will enable only the three VST plug-ins that are used from both users.

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PANDORA - SOFTWARE

Pandora Software is written in Max-MSP as a performance platform for *Pandora composition for solo dancer and live electronics.* It works in conjunction with Microsoft Kinect camera, and the Synapse software from which it receives OSC messages. The following picture shows the user interface. The page arrangement and presentation are based on the composition's structure.

Please **NOTE***: to get started please turn on the Audio or open the* **p QuickStart** *sub-patch and follow the instructions.*
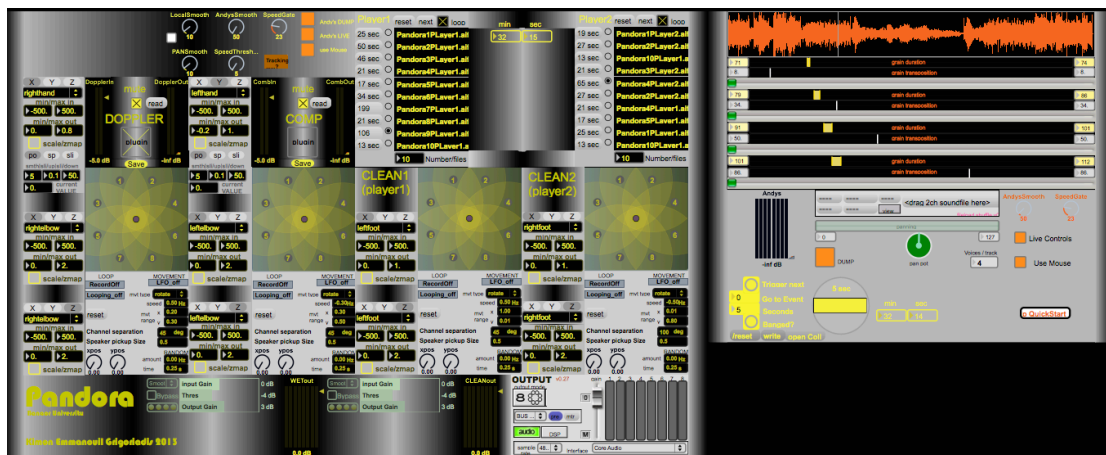
Figure 35 – *Pandora*: Main Window

Pandora set-up

The following picture shows the set-up used for Pandora's performance. There are two computers; the main computer runs *Pandora Software* and is responsible for all audio manipulation, and the secondary one, which is placed on stage, is used for capturing and sending the data from the Kinect to the main computer. In addition, the on stage computer runs the *Pandora Score* which updates critical information for the performer.
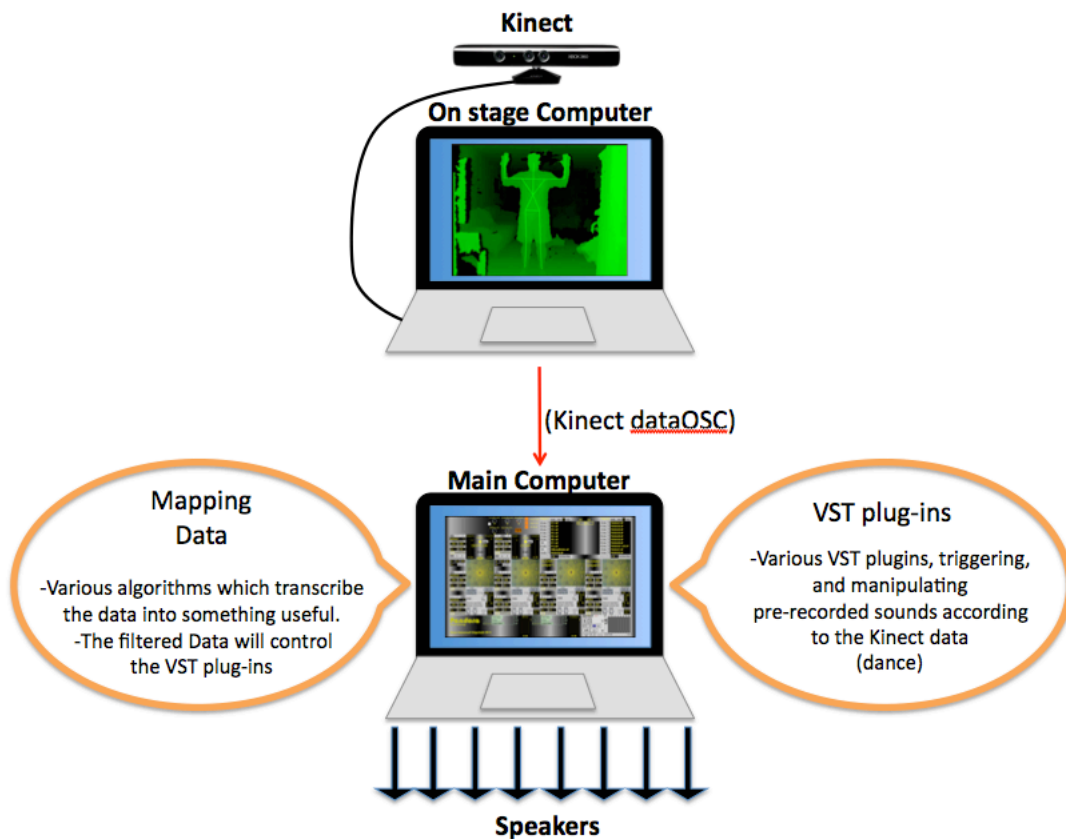
Figure 36 – *Pandora*: set-up

Tab 1: Main Interface (analysed from left to right)

There are four instruments on Tab 1 as shown below. The first two are based on the GRM plug-ins Doppler and Comb filter respectively. On the left side of each instrument the user can choose which part of the body controls the VST parameter from the pop up menu. The user can also define which axis should be used (x, y, z), the scaling values, and the "Data Effect" (position, speed, slide similarly to *VSTLoader*). Below the VST plug-in settings are the diffusion settings (octaphonic panning BEAST tools) consisting of a pair of inputs (ex. right-elbow X and right-elbow Z), which control the X and Y-axis of the 2D slider for panning.
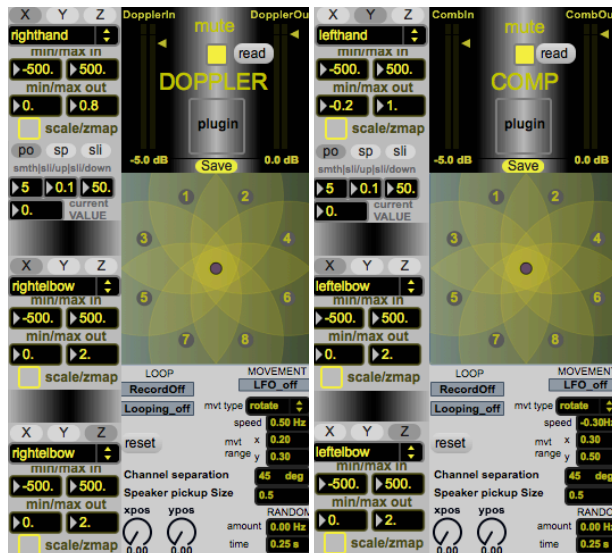
Figure 37 – *Pandora*: Doppler and Comb filter section

The second pair of instruments named "Clean1" and "Clean2" is based on a player loaded with pre-recorded sound files. This player is created in such a way that can playback multiple sound files[32] simultaneously using the poly~ object. The sound files can be loaded by drag and dropping the files to the empty slots. Once again the user can set the parameters for the diffusion on the lower left side.
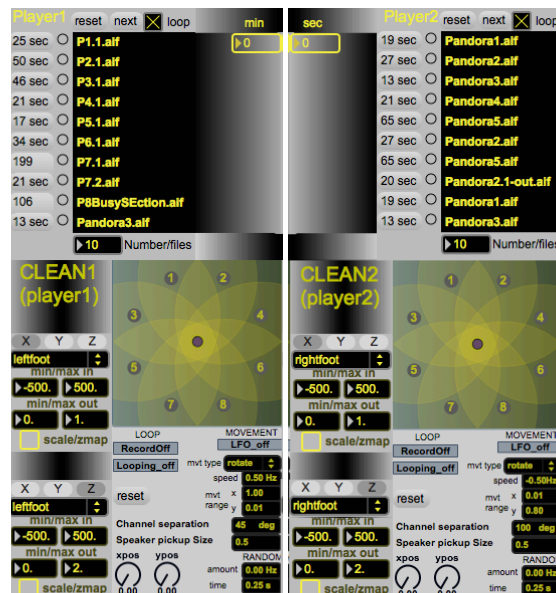
Figure 38 – *Pandora*: Player 1 and 2 (Clean 1 and 2) section

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[32] The user is required to drag and drop each sound file in the corresponding slot

The upper left side of Page1 gives access to Page2 basic parameters so the user does not need to change pages regularly.
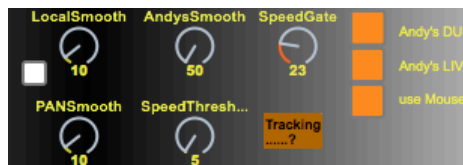
Figure 39 – *Pandora*: *Andys* control section

At the bottom of the page there are two compressors one for the wet signal coming out of the GRM plug-ins and the other one for the Clean1-2 players respectively. In addition, there is also the "Main Output" octaphonic control created by Prof. Andrew Lewis.
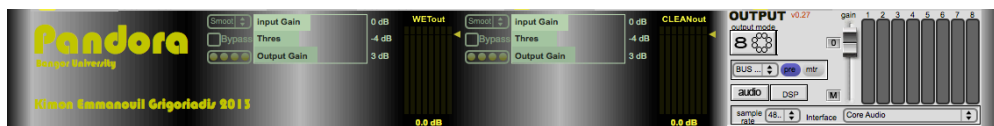
Figure 40 – *Pandora*: Limiters and Main Output section

Tab 2: Andys instrument

(Please NOTE the *Andys* instrument is also included in the *Main* window for practical reasons).

This tab shows the pre-recorded sound file loaded into *Andys* instrument. There are four cursors shown below, representing the position of the hands and legs, their transposition and grain duration values released when an event is triggered. There are some extra controls that can change the sound to a great extent such as the *DUMP* toggle, which if turned on, will mute the grains when the performer is not moving. Furthermore, turning the *Live controls* toggle on lets the user control the grain transposition and duration with the hands and legs in real time, regardless the values stored in the coll object, or by using the mouse position on the screen (*Use mouse* toggle).

There are also two nodes named AndysSmooth and SpeedGate that change the cursors' response and the speed threshold for changing their positioning respectively. Next to the Volume control there is a window showing the basic

information about the sound file being used, and the panning range. The user can also choose how many voices per track are being used at any given moment (each cursor controls a track with 4 voices). Since there are four cursors the voices are multiplied by four, meaning that the user may choose to use up to 64 voices (16 for each track) depending on the computer's CPU power.

Figure 41 – *Pandora*: *Andys* window

The bottom part of the page shows information regarding the coll object such as the current even, the time window duration, and the overall duration of the performance. Also, the user can manually trigger an event (an option very useful during rehearsals) as well as open the text file that includes the event information and/or make changes.
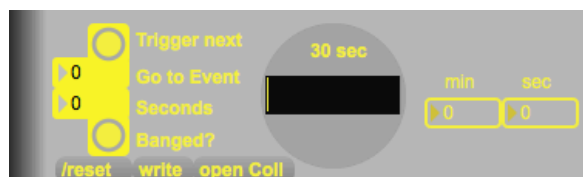
Figure 42 – *Pandora*: timeline and coll max-object control section

Tab 3: BandPass filter

This tab shows the parameters for the GRM BandPass filter. Similarly to tab1 the user can set the input parameters for both hands.
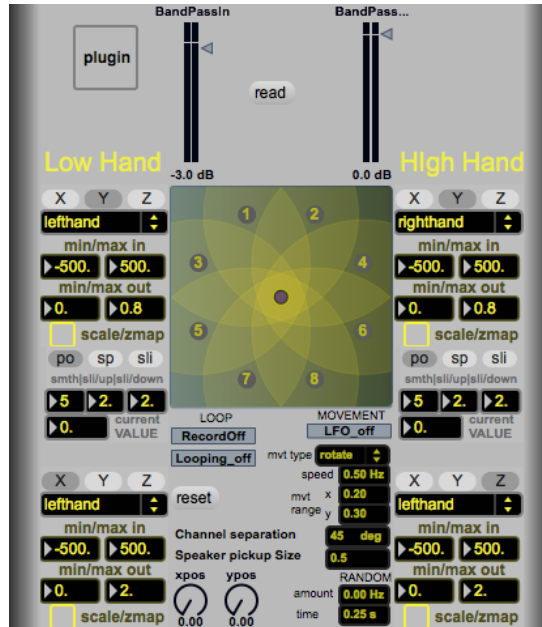
Figure 43 – *Pandora*: BandPass window

Tab 4: Synapse router interface

Please refer to http://synapsekinect.tumblr.com for further information.

Tab 5: Connect to route

This patch shows when the Kinect is tracking and sending data to the software.

Figure 44 – *Pandora*: Connect to route window

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PANDORA – SCORE
The "Coll" max-object (code)

The following code is the essence of the *Pandora* composition and it forms its structure. This code consists of seventeen "events" marked numerically at the beginning of each event and must be placed inside the coll max-object. Please note that every single part of this code is vital for the software to perform *Pandora* smoothly and accurately, thus the user should copy and paste it as it is!

0, "/dsp 1, /player2 /stop 0, /player1 /stop 0,/andys /dump 0, /levels /wetout 0 10,/andys /levels -70. 20, /doppler /levels -70 20, /comp /levels -70 20,/levels /cleanout 0,/bandpass /levels -70 20,/bp_state 0,/comp_state 0, /sec 5";

1, "/andys /duration /1 71 74,/andys /duration /2 79 86,/andys /duration /3 91 101,/andys /duration /4 101 112,/andys /transposition /1 8 8,/andys /transposition /2 34 34,/andys /transposition /3 50 50,/andys /transposition /4 86 86,/andys /levels 0 800, /sec 60";

2, "/comp_state 1,/comp /levels 0 20,/clean1 /panjointx /joint 8,/clean1 /panjointy /joint 8,/sec 37";

3, "/player1 /soundfile 1,/sec 15";

4, "/doppler /levels 0 500,/levels /wetout 0 10,/andys /levels 0 800,/clean1 /panjointx /joint 4,/clean1 /panjointy /joint 4,/sec 10";

5, "/comp /levels -10 1000,/doppler /levels -8 1500,/andys /duration /1 43 55,/andys /duration /2 79 86,/andys /duration /3 92 137,/andys /duration /4 101 112,/andys /transposition /1 12 12,/andys /transposition /2 87 93,/andys /transposition /3 118 125,/andys /transposition /4 68 68,/player1 /soundfile 2, /sec 30";

6, "/comp_state 0,/comp /levels -69 15000,/doppler /levels -69 15000,/player1 /soundfile 3,/sec 20";

7, "/doppler /levels -70 10,/comp /levels -70 10,/player1 /soundfile 4,/sec 15";

8, "/bp_state 1,/bandpass /levels 0 1300,/player2 /soundfile 2,/player2 /soundfile 4,/player2 /soundfile 5,/levels /cleanout -70 2000,/levels /wetout -70 2000,/sec 30";

9, "/levels /cleanout 0 50,/levels /wetout -5 20,/bp_state 0,/bandpass /levels -70 2300,/player1 /soundfile 5,/sec 20";

10, "/comp_state 1,/comp /levels 0 1000,/doppler /levels 0 1500,/andys /levels 0 100,/andys /duration /1 33 55,/andys /duration /2 49 86,/andys /duration /3 22 137,/andys /duration /4 11 112,/andys /transposition /1 12 12,/andys /transposition /2 87 93,/andys /transposition /3 18 125,/andys /transposition /4 28 68,/player1 /soundfile 9, /sec 15";

11, "/levels /cleanout -70 2000,/levels /wetout -70 2000,/comp_state 0,/bp_state 1,/bandpass /levels 0 300,/sec 20";

12, "/levels /cleanout 0 200,/levels /wetout 0 20,/bandpass /levels -70 1300,/sec 5";

13, "/levels /cleanout -70 2000,/levels /wetout -70 100,/bandpass /levels 0 200,/bp_state 1,/sec 30";

14, "/levels /cleanout 0 200,/levels /wetout 0 100,/bandpass /levels -70 1300, /bp_state 0,/andys /transposition /1 12 12,/andys /transposition /2 80 80,/andys /transposition /3 44 44,/andys /transposition /4 20 20,/sec 20";

15, "/andys /dump 1,/sec 15";

16, "/andys /dump 0,/bandpass /levels 0 100,/bp_state 1,/sec 10";

17, "/andys /dump 1,/sec 10";

AWAKENING – SOFTWARE

Awakening Software is written in Max-MSP as a performance platform for *Awakening composition for Violin, Dancer, and Live Electronics.* It works in conjunction with Microsoft Kinect camera, and Simple Kinect Software (OpenNI), from which it receives OSC messages.

Please **NOTE***: to get started please turn on the Audio or open the* **p QuickStart** *sub-patch and follow the instructions.*
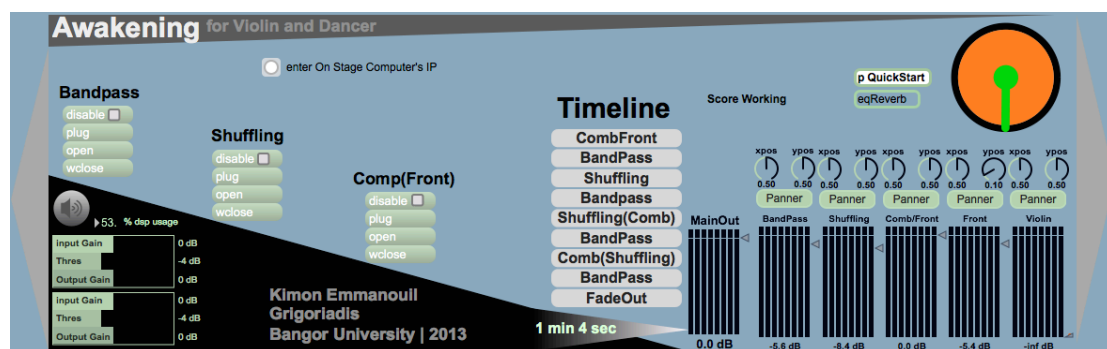
Figure 45 – *Awakening*: Main window

Awakening set-up

The following figure shows the set-up used for *Awakening's* performance. There are two computers; the main computer runs *Awakening Software* and is responsible for all audio manipulation, and the secondary one, which is placed on stage, is used for capturing and sending the data from the Kinect to the main computer. In addition, the on-stage computer runs the *Awakening Score*, which updates critical information for the performer. Finally there is a third computer that runs the score for the violin performer and is independent from the rest of the set-up.
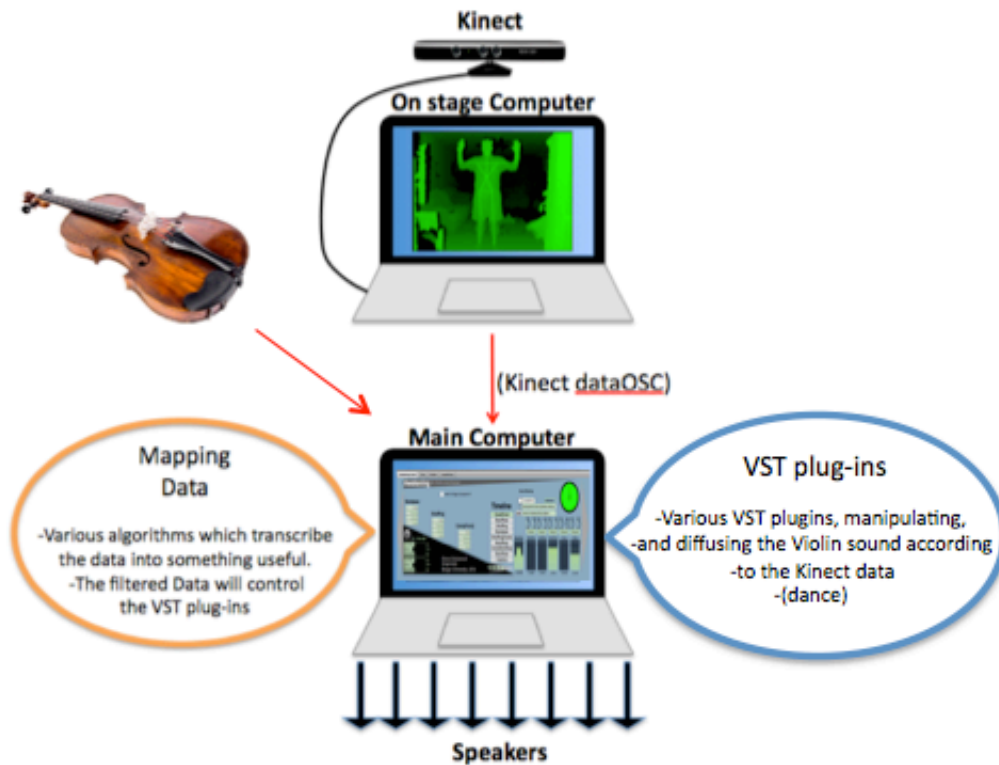
Figure 46 – *Awakening*: set-up

Tab 1: Main Interface (analysed from left to right)

There are three VST plug-ins on Tab 1: the GRM Bandpass, the GRM Shuffling, and the GRM comp. The user can disable each plug-in by selecting the toggle box underneath each label. Furthermore, the user can load another plug-in by clicking on the "plug" message box; open the plug-in's interface by clicking on the "open message" box and close the interface window by clicking on the "wclose" message box. At the bottom left corner there are two compressors; the one on top is for the wet signal coming out of the GRM plug-ins and the one at the bottom is for the Main Out. Above the compressors there is a button for turning on the DSP and a CPU meter. The user can change the IP address for the on-stage computer by clicking on the designated button above the Plug-in area.

78
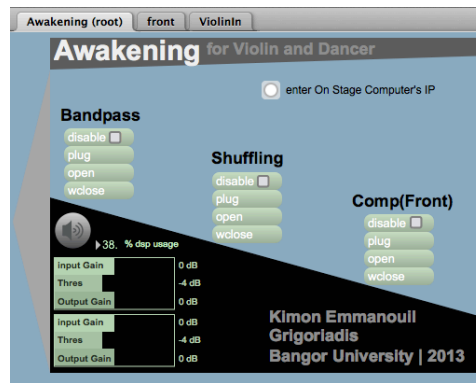
Figure 47 – *Awakening*: VST and Limiter section

As we move further to the right there is the Timeline displaying the nine movements of the piece, which are triggered manually by the composer, starting with the top one. Below the timeline there is a global timer that shows the duration of the performance. It will reset every time the first movement button is clicked (CombFront).
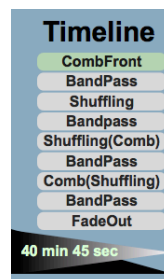
Figure 48 – *Awakening*: Timeline section

The right side of the software consists of the octaphonic individual sliders for every plug-in as well as the surround panners placed above each fader. The MainOut fader will show the overall signal coming out of the computer. At the top right corner there is a circular timer, which indicates the predefined duration for each of the nine movements. It will change colour from orange to green when the next trigger ought to take place. At the left side of the timer there is an indicator that reassures the user that the score on the on-stage computer is functioning by displaying "Score Working" followed by 1 to 3 smiles. Finally there is an EQ-Reverb sub-patch for the user to tweak the sound and add some reverb if needed.
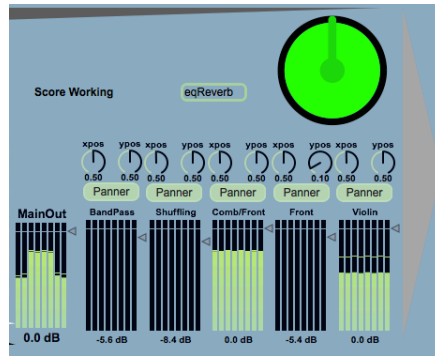
Figure 49 – *Awakening*: mixer section

Tab 2: Front

Front stands for "front wall" which is a virtual wall that plays back a granulated bell like sound, when touched by the dancer. The midi keyboard is linked to the y-axis value of the hand that touches the front wall, therefore the higher the value, the higher the pitch. The user is able to tweak various parameters of the *Front* instrument, which is based on "grainstretch"[33] max-object.
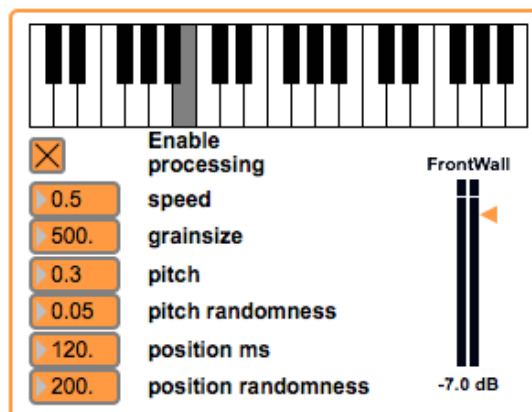
Figure 50 – *Awakening*: Front (Wall) window

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[33] Created by Timo Rozendal (http://www.timorozendal.nl/?p=456).

Tab 3: Violin In

This tab shows the Violin input signal after the reverb is applied. Please note that the Violin signal sent to the plug-ins is always dry and is not indicated in this Tab.
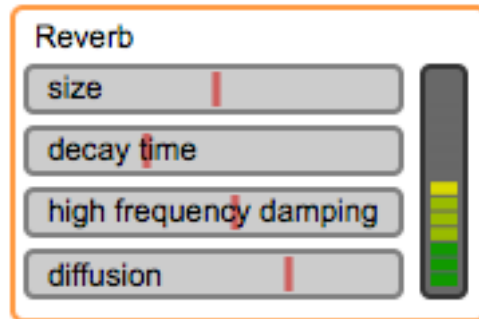
Figure 51 – *Awakening*: Violin In window

APPENDIX 2: SCORE

ICE – FULL SCORE

(Page Intentionally left blank)

(The score has independent page numbering

The initial numbering resumes on page 98)

Kimon Emmanouil Grigoriadis

Ice

for
String Quartet and Clarinet in B♭

SYMBOLS

Tremolo with both hands: When the following notation appears, the performer should play a bowed tremolo always as fast as possible in addition to a tremolo between the indicated notes at the indicated duration. Also, syncronisation between the two hands is not preferable at any time. The performer should have in mind that the aim of this technique is to generate irregular timbre.

Scratch tone: a very raspy, coarse tone by pressing down into the string, and drawing with a continuing downward pressure. Dynamics for these sections are to be followed regardless whether the scratch tone will sustain or not.
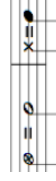
Harmonic glissando on open E string
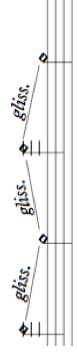
The desired effect is to let the bow bounce naturally as the bow is moving downwards. Depending on the dynamics indicated the performer may need to force the first stroke. This will produce a rather scratchy tone at the first stroke and irregular bouncing.

Crescendo – diminuendo to / from "as soft as possible" depending on the circumstances.

ST = sul tasto
SP = sul pont
PN = position normale
(Not to be confused with the "nat." which is used to reset the vibrato in the string section)

The arrow indicates gradual change between the symbols on each side
(ex. Gradually slide from sul tasto to sul pont position).
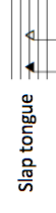
Hypervibrato (hypervib): is an extraordinarily wide vibrato of at least half a tone on each side of the indicate pitch. Its speed should always be considered as slow. Nevertheless, the performer is welcome to vary the speed in the form of (accelerando – ritenuto).
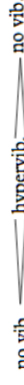
Ice

score written in C

Kimon Emmanouil Grigoriadis

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Shepard R. N. (December 1964) **Circularity in Judgments of Relative Pitch**. Journal of the Acoustical Society of America, 36:12: pp. 2346–53.

MAX MSP EXTERNALS

Acknowledgements

The software accompanying this portfolio uses the following external libraries. Here I acknowledge each individual library according to the guidelines provided on each website. Please note that these libraries have been updated since this software was created. Their updates have not been tested.

BAT toolkit

BAT (Bangor Audio Toolkit) is licensed under the terms of the GNU General Public License (http://www.gnu.org/licenses). You may only make use of it if you agree to abide by the terms of the license.

http://www.bangor.ac.uk/music/studios/BAT

The software accompanying this portfolio makes use of several parts and patches of this toolkit augmented to fit the needs of the composer.

BEASTtools v1.0

BEASTtools v1.0 is licensed under the terms of the GNU General Public License (http://www.gnu.org/licenses). You may only make use of it if you agree to abide by the terms of the license.

http://beast.bio.ed.ac.uk/downloads

The software accompanying this portfolio makes use of several parts and patches of this toolkit augmented to fit the needs of the composer.

grainstretch~

This object is made by Timo Rozendal (timorozendal.nl) and partly funded by SmadSteck (smadsteck.nl).

Uses the algorithm of the granular timestretching max patch by Mattijs Kneppers (arttech.nl)

Internal pitch detection for beating prevention is based on fiddle~ Copyright (c) 1997-1999 Miller Puckette and Ted Apel.

http://www.timorozendal.nl/?p=456

CNMAT library

This work makes use of software developed at the Center for New Music and Audio Technologies (CNMAT) at the University of California, Berkeley.

http://cnmat.berkeley.edu/downloads

DoT Digital Orchestra Toolbox

DoT is licensed under the terms of the GNU General Public License (http://www.gnu.org/licenses). You may only make use of it if you agree to abide by the terms of the license.

http://idmil.org/software/digital_orchestra_toolbox

Kinect Via Synapse

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http://synapsekinect.tumblr.com

sadamlib

As the external sadam.lzo is using the LZO Library, version 2.03 (April 30, 2008, Copyright © 1996–2008 Markus F. X. J. Oberhumer), which is licensed under GPLv2, this external is released under GPLv2. You will find a copy of

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http://www.sadam.hu/en/software

Externals used in *VSTLoader*

BEASTtools: BEASTpanner.maxpat

DoT: dot.smooth.maxpat

BEASTtools: wiggly.kr.maxpat

CNMAT: OSC-route.mxo

Externals used in *Pandora Software*

BAT: FileloadShuffle

BAT: delaymsg

BAT: fchoose

BAT: grainvoice8ch.maxpat

BAT: mapAL

BAT: output.maxpat

BAT: pan_1_to_8.pat

BAT: spkrcntl

BAT: spkrpan

Kinect-Via-Synapse: Kinect-Via-Synapse.maxpat

Kinect-Via-Synapse : bp_daVinciSingle.maxpat

Kinect-Via-Synapse : bp_joints.maxpat

BEASTtools: BEASTpanner.maxpat
BEASTtools: rchoose.maxpat
BEASTtools: wiggly.kr.maxpat
DoT: dot.smooth.maxpat
CNMAT: OSC-route.mxo

Externals used in *Awakening Software*

BEASTtools: BEASTpanner.maxpat
CNMAT: OSC-route.mxo
grainstretch: grainstretch~.mxo
BEASTtools: wiggly.kr.maxpat

Installation

In order for the software accompanying this portfolio to run properly you must place the folder *2-Max_library_InvitationToListen* in the Max6 path. Alternatively you can create a new path under Options -> File preferences -> + button search for the *2-Max_library_InvitationToListen* folder.

Please note that in order to perform some of the pieces in this portfolio more than one computer is needed (ex. In order to perform *Alilepidrasi* the user needs *VSTLoader* and *Alilepidrasi Score* software. These must run on different computers.)

System requirements

The software accompanying this portfolio has been tested on a Macintosh computer with the following technical specifications:

Processor 2.53 GHz Intel Core 2 Duo
Memory 4 GB 1067 MHz DDR3
Graphics NVIDIA GeForce 9400M 256 MB
Software OS X 10.9.5
Max-MSP version 6.1.6 (32bit)

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