

De Monfort University

Fusional Notes

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INTRODUCTION

This documentation is going to explain and to contextualise the work *Fusional Notes*. First of all, this will explain my main ideas and research questions I have tried to solve with this piece. Then, this is going to explain the structure and the ways I have used to compose this piece trying to solve the research questions. At the same time, this will show my influences I had and where I have carried out the techniques used. Finally, this is going to expose some problems I faced during the work in progress.

CHAPITRE 1

RESEARCH QUESTIONS

The piece *Fusional Notes* has been composed in response to some research questions which have guided me along the process. First of all, after having made a few video-music works, I wondered, “Why do not we adapt this genre to mixed music¹?”. Effectively, we see electro-acoustic artists becoming increasingly interested in video-music and on the other hand, we have seen a lot of instrumental works including live performance in front of a screen like a pianist playing in front of silent movie or Glass ensemble playing in front of Qatsi trilogy². But, I have never seen any video work with mixed music. Then, this was the main research point of the work : composing a video-mixed-music piece. I wanted to compose a video-music with performance for the same reason Philip Glass performed Qatsi’s Trilogy with his Glass ensemble : “What happens when you do live music, it’s that the possible re-interpretation reappears [. . .] and that, I’m convinced, this is the basis on which this experience has taken on a different dimension³”

Keeping this research point in mind, other questions came to me. Can we find some relations between the sound and the image which help to blend both in a common shape ? How can we express the image with a musical instrument and vice versa ?

To respond to these questions, I have based my research on another piece of research made by myself in 2006 on the relations between the sound and the image in the film *Koyaanisqatsi*. From this latter research, I have carried out some important points that I have tried to put into practice in *Fusional Notes* :

- Luminosity versus pitch and tempo.
- Repetition in the image versus repetition in the music.

¹Mixed Music : Literal translation from French. This is a music genre blending electro-acoustic music and instrumental music. This genre must be performed at least partly live.

²Qatsi’s Trilogy : Series of three films produced by Godfrey Reggio scored by Philip Glass including *Koyaanisqatsi* (1983), *Powaqqatsi* (1988) and *Nakoyqatsi* (2002).

³Philip Glass interviewed by Julia Wolfe on 14th July 2001, MASS MoCA Theatre

- Speed and density in the image versus tempo and density in the music (busyness).
- Image tonality versus music timbre.

I have added some other points of mine to these points :

- Consonant levels in the music versus image saturation for diatonic music.
- Low level of image saturation versus chromatic music.

The relationships found from *Kayaanisqatsi* worked very well and moreover have been performed and toured by the Glass ensemble. So, those were a good starting point for my research. For the relationships of mine above, they are more relevant to this specific work and maybe more subjective because they come from the perception I get from the image and the sound. This concept will be explained more deeply later in the section video.

CHAPITRE 2

WAYS TO ACHIEVE IT

Because this work represented a huge amount of work due to the multiple tasks involved, it was important to organise these tasks along the year to maintain control on the whole process. Effectively, this project had five main tasks divided into sub-tasks :

1. Piano score

- (a) Program Max
- (b) Find the modes
- (c) Find the rhythmic patterns
- (d) Experiment with extended techniques
- (e) Find the “transition passage”
- (f) Format the score

2. Video

- (a) Capture footage
- (b) Generate material
- (c) Synchronize the video with the music until section 4
- (d) Find the best way to synchronize the video and the music in section 4-outro
- (e) Render

3. Audio

- (a) Program Max/Msp
- (b) Sequence the processing
- (c) Optimize and prepare the patch for the performance

4. Performance

- (a) Learn the score

(b) Practice with the real-time processing and the video

Even before starting to work on these tasks, I needed to establish the general shape of the whole piece to serve as a guideline when working on a specific task even before having started the other tasks. This general shape consists of four parts, an introduction and a conclusion. Each section has its own shape, colour, ambience, length and technique as follows :

Introduction :

- Establishing of the tempo for the whole piece using 6 different beats : each beat is three measures long and is repeated twice before changing to another one
- Inharmonics only (extended technique)
- two minutes

Part 1 :

- A beat from the introduction keeps the tempo
- Gradually introducing a consonant simple motif (normal play)
- Once the first mode reached, changing modes every six measures using a chromatic transition of three measures for a total of 10 pandiatonic¹ modes
- The more we advance in this part, the more the modes are dissonant.
- Each time a change of mode occurs, the beat changes to another one recorded in the introduction
- five minutes

Part 2 :

- The pitches of the modes used in this part are based on a 12 pitches chords system instead of pandiatonic system ; this makes part two more dissonant and tensed.
- The rhythmic pattern in the piano score (not the beat keeping the tempo since the introduction) changes for the first time.
- This part is divided in three sections which are identical in the piano score but different in the real-time processing and in the video ; each of these sub-sections

¹Pandiatonism : Pandiatonic chords and successions are those formed freely from all degrees of a diatonic scale without regard for their diatonic function, sometimes to the extent of no single pitch being felt as a tonic.

has three different chords (from the same 12 fixed pitches system) played for three measures each

- An element from the introduction is added in the beat every three measures ; this makes part two becoming increasingly denser as we advance in this part.
- Measured delays on the piano slowly start in the second section and become very dense until the end of the third section ; at the end, we should be able to hear what is almost one chord repeated every 16th note
- four minutes

Part 3 :

- The acceleration of the pianist still playing the last motif of the previous part makes the delays become desynchronized and become a complex texture ; steady tempo is now lost
- The texture is recorded and repeated by the computer freeing the pianist for two minutes.
- A piano motif brings a transition to the next part with high and loud trills followed by an accentuated note on the lowest pitch of the piano
- The whole part is a big crescendo until the climax of the piece with the last low note
- three minutes

Part 4 :

- Starts in the resonance of the low accentuated note from the transition.
- Contrasts with the previous part with a very smooth, soft and peaceful ambience.
- Use of fishing lines extended technique² to produce a smoother and more sustained sound than hammers play
- Use of diatonic consonant modes
- four minutes

Conclusion :

- Uses the same composition process as in the part 1 with the difference of, instead

²Fishing lines extended technique consists to bow a fishing line tied to a piano cord between his fingers.

of changing all the notes from a pitch pattern to an other, changing only the pulse notes (which will be explained later) and not doing chromatic transitions between each mode

- Starts with the last mode used in the previous part to smooth the transition between fishing lines and normal play
- Finishes the piece with a very consonant pattern focusing on B \flat .
- two minutes

2.1 Piano score

The piano score has been made with many different composition techniques and involves a few extended techniques throughout the piece.

First of all, the introduction is nearly a quote of the introduction of *Piano mécanique* of mine but longer and more elaborated. Effectively, I use inharmonics³ in the same way (isolated notes) with filtered delays : which result in a complete beat coming from the isolated inharmonics. This time, instead of always feeding the same beat resulting from the filtered delays (processed by Ableton Live by the time), I change the beat every six measures feeding each beat twice (every three measures) for a total of six different beats kept in memory for later use in the parts 1-2-3. This extended technique comes partly from the prepared piano pieces from John Cage with the difference of not preparing the piano ; the contact on the cord which makes a harmonic resonate is provided by a finger instead of a screw or any metal object in the piano. The finger has the advantage of leaving the sound to resonate louder and longer allowing me to produce dissonant sounds which are difficult to hear and are too short when produced with a fixed object. So, this introduction provides a tempo and a background accompaniment for the next sections and fit well with the general aesthetic of the piece : the repetition.

For Part one, my first goal was to create a succession of ambiances becoming increasingly dissonant staying in a diatonic system. The idea of succession of ambiances

³Inharmonic is an extended technique which consists to put his finger on a cord trying to avoid a knot corresponding to a consonant harmonic while playing the same pitch with the hammer. This results in a inharmonic sound sounding as a bell.

comes from *music for 18 musicians* from Steve Reich in which the modes are constant for a while before changing to another one. Because the possibilities are more limited in a solo piece, I keep the modes for only about 17 seconds (six measures) instead of 5 or 10 minutes.

I used a composition technique which I started to develop for *Isolution* in 2006. This technique is derived from isorhythm⁴ developed by Guillaume De Machaut who has composed integrated isorhythmic pieces like *Qui es promesses-Ha! Fortune-Et non est qui adjuvet*. Unfortunately, integrated isorhythmic technique, like used in this latter piece, is too restrictive in controlling almost everything in the composition process ; even the main structure of the piece is controlled by this type of technique. That is why I used only the main idea of isorhythm which consists in a rhythmic pattern (talea) and a pitch pattern (color) which are not the same length. I applied a different isorhythm for each hand.

Also, to follow the aesthetic of repetitive music, I used two pulses, one for each hand, which keep a constant repetition for the section 1-2-3 and in the conclusion. This idea is from *music for 18 musicians* by Steve Reich but in this latter piece, the pulse was single. I decided to complexify a bit the concept in using two pulses with different length : the high one is 8th and half long, and the low one is 4th long. It means the pulses come together every 1.5 measures. In introducing the pulses in the isorhythms, that complexifies the process a lot and that results in a constant change. That change became a problem when I tried to read the score on the piano. Because the rhythm changed all the time, the learning process was very long and awkward. Then I decided to restrict the rhythm pattern to a loop of 3 measures including the pulses. Much easier to learn, I think the loop is not too obvious and we still hear isorhythms instead of loops.

For the pitches (the color), they are based on pandiatonism which provides the freedom of deciding the order of my chords arbitrarily, this technique not following any rules for the progression of the chords, in thinking only about the level of consonance. For the beginning, where I wanted something very consonant, I took my inspiration from the

⁴Isorhythm : (iso or same) consists of an order of durations or rhythms, talea ("cutting", plural taleae), which is repeated within a tenor melody whose pitch content or series, color (repetition), varied in the number of members from the talea.

general aesthetic of Philip Glass and more particularly from his piece *Opening*. To follow the idea of ambiances changing smoothly from one to another like in *music for 18 musicians*, I created transitions of three measures between each chord. These transitions are inspired by the piece *Coros tejiendo, voces alternando* from Josée Évangélista where the piece starts from a chord and moves to another one passing by a multiple of intermediate chords. Instead of using multiple intermediate chords, I linearly and chromatically move each note of the previous color to the corresponding note in the next color (see in the example). Then, because we hear each note of the color sometimes less often than the number of chromatic notes between the starting and the ending note, we do not hear the whole chromatic transition all the time. As we can see in the example below, the 1st note of the left hand color (lowest note) transits from B \flat to C one octave below passing by only A \flat , F, and E \flat .

The image displays two systems of musical notation. The first system shows a piano accompaniment with a right-hand chord and a single left-hand note. The second system, starting at measure 97, illustrates a chromatic transition. The left hand moves from B \flat to C one octave below through intermediate notes (A \flat , F, E \flat) over three measures (97-99). The right hand chord changes in parallel with the left hand's movement.

For Part two, to increase the tension until the climax, I changed the pitch system to the 12 pitches chord system, which has a very uniform colour because each pitch class appears always at the same register and has the same importance amongst the others. I use three different 12 pitches chords in this section and I change chord every 9 measures without transition because the complexity of this section is already high and adding chromatic transitions would blur the musical intention. I decided to keep each chord for such a long time to help the listener to assimilate the chord which is more dense and more awkward to assimilate than the pandiatonic chords of the previous part and because

the real-time processing and the video become very dense too. Furthermore, that helps to create a kind of hypnotic ambiance. Also, to contrast a bit more with the previous part, I changed the rhythmic pattern (talea) for the first time since the beginning. In this part, the piano is less on the first layer than in the previous sections then, the real-time processing becomes the main element to carry the musical idea sharing its place with the video.

In Part three, the sensation of tempo is totally lost giving to this part a textural and hypnotic ambiance rather than a rhythmic ambiance. The piano score leaves its place to the real-time processing and to the video to come back later to amplify the climax of the piece and to make a transition to the next section. This passage here is highly influenced and, I would say, nearly quoted from *I leap through the sky with stars* from Alexina Louie. Effectively, this kind of writing style fits perfectly for my musical idea which is a whole gesture to very high pitches of the piano increasing in intensity with a last note in the lowest range of the piano to achieve the climax. The transition to the next part is made through the resonance of this low accented note which sounds pretty much to the first sound of the next part made with fishing line on a low note with the sustain pedal.

For the whole of Part four, I use an extended technique using fishing lines and I use also another extended technique using cotton wool balls watered with alcohol. I have heard this first one very efficient technique in a piece from Jean-François Laporte destined to a choreography named *Play it again*. This technique allows to the piece a radical change in the sound and the ambiance. It becomes very smooth and soft contrasting with the very tense and dense part three. The second technique I have heard from a piece called *Nutrisco et Exstinguo* for piano and real-time processing performed and composed by Julien Leblond and Éric Andrade. This latter has been used to add some colour and high sound to this part which is, without that, a bit too dark. Here, I decided to use improvisation because the real-time processing fills the accompaniment randomly and I think it is the only way to interact with this accompaniment. Furthermore, it is useless in this situation to write every note because the improvisation will produce exactly the same effect and even more. In this part, the idea of sustained ambiances is subtler because the change between each chord is more progressive and the real-time processing leaves the

previous chords sounding. Even if it is subtle and the extended technique makes this part very contrasted ; still sustained ambiances can easily be heard and this blends with the others sections.

The conclusion leaves one chord resonating for two minutes using the same isorhythm technique as in part one. But here, only the pulses change, always keeping the same chord present. The pulses finish the piece in solving it on B \flat in a nearly classical way. We could find an influence here from the classical symphonies that finish in a long coda repeating a perfect cadence.

2.2 Video

My main inspiration for the video has been *Koyaanisqatsi* because this latter transposes the minimalist and repetitive music in the video. Effectively, in a few scenes from this film the sound and the image follow a repetitive pattern and that makes the image and the sound blend together very efficiently. In *Koyaanisqatsi*, the images have a certain meaning and, because of that, we need to recognise the subject of them. I used almost all the concepts carried out from this film but in a more abstract way following the aesthetic developed by recent composers making video-music works. In this genre, the image is manipulated in the same way we manipulated the sound in an electroacoustic piece, and the subjects from the image are often not recognisable. My main influence from this genre is Jean Piché who made abstract works apparently without narrative based on the three main video parameters : colour, movement and shape.

As in *Koyaanisqatsi*, I match together repetition in the sound with repetition in the image. In my piece, the sound is mainly based on isorhythm which uses always the same pitches and the same rhythm inside the same pattern without any exact repetition. To transpose it in image, I needed footage using a constant movement composed by elements changing all the time. Then, I captured footage of about three minutes long in a park which is a long travelling on a path with trees on both sides. I restrained myself to use only this footage keeping a consistence for the introduction, and parts 1-2-3 to go with the isorhythm from the piano score. The more the isorhythm is heard clearly, the

more the original footage from the image is recognisable as in part 1 where we still can recognise the footage behind all the transformations along the section.

Another association found from *Koyaanisqatsi* applied in my work is the luminosity in the image associated with pitch and tempo in the music. The introduction shows low-pitched sounds from the inharmonics and the luminosity is very low too. These levels increase to reach a constant level for the whole next part where the average of pitch is quite constant and the tempo very steady. When the pitch becomes a bit higher in part two, the luminosity increases one-step too and when the pitch reaches its most high level during the climax, the luminosity follows ending at the maximum level : a white screen. The more obvious relationship between luminosity, pitch and tempo appears in part four where the fishing lines leave long low-pitched notes resonating, the tempo is very slow and the video darker. The conclusion follows the same idea increasing the luminosity a bit with pitch and tempo.

In addition, the image tonality goes with music timbre most of the time like, again, in *Koyaanisqatsi*. In general, the image tonality tends to be warmer in parts 1-2 and becomes colder in part 3 through the end as the music timbre, which is a little bit limited compared with the possibilities of the orchestra in *Koyaanisqatsi* and is associated with the pitch in parts 1-2-3, is soft and warm (hammers play) in parts 1-2. It becomes more strident in the transition in the high range where a blue tone appears in the image for the first time since the beginning. Part four stays in blue tone because of the fishing lines' sound that is granulated and colder than the hammers play. For the conclusion, I do not follow this rule anymore to keep a continuation with the previous part and this part is not long enough to justify a change, quite obvious if made, of image tonality.

The busyness of the image versus the busyness of the sound is also an important relationship found in *Koyaanisqatsi*. This latter one is quite obvious and I tend to use it nearly unconsciously. This relationship has been applied in my whole work reaching its highest level in part three where the busyness in the sound is at its maximum with the real-time processing randomly playing back the third 12 pitches chord of the previous part and with the background accompaniment coming from the introduction now sounding as a big mass including a lot of noisiness.

As explained before, I have associated the level of consonance in the music with the saturation of the image and this latter association is my own idea. I tried to associate the similar perceptions from image and sound with parameters influencing these perceptions. In other words, when I watch an image with a low level of saturation (with a certain amount of colour perception, not grey scale), I feel more comfortable and peaceful than when I watch an image with a high level of saturation. In parallel, when I listen to consonant diatonic music, I feel more comfortable and peaceful than when I listen to dissonant diatonic music. That is why I tried to associate these two parameters. For the atonal music, like the use of 12 pitches chords, I feel the music differently because the level of consonance between all the notes does not follow any rules coming from the tonal and modal music. I perceive the atonal music without any fluctuation in the level of consonance and that is why I decided to associate the atonal music (I will call it chromatic music to differentiate it from the atonal music which has very specific rules which have not been followed in this work) with a very low level of contrast approaching the grey scale to remove the fluctuation carried by a higher level of contrast.

2.3 Real-Time processing

The real-time processing is another main part of my work because that is as important as the piano performance and the video. This part brings a complete background and, from an accompaniment, it becomes the first layer in part three where the pianist stops to play leaving the real-time processing carries the musical idea for two minutes. The idea of Glass saying that live music makes a re-interpretation of the piece possible each time it is performed is not really complete if we use only a fixed tape as the electronic part because this latter can not react to the performer or vary. That is mainly why I use real-time processing in my piece. And furthermore, I introduce some random parameters in the programming of the audio-processing which make the processing becoming a “performer” because it changes each time the piece is played. For example, the order of the succeeding beats in part 1 is randomly determined and it is possible that, for a given performance, one or more beats are not played at all in part one. For another example,

in part two, an element from one beat is added every three measures and it is randomly chosen again like in part three where the processing introduces noisy variations in the multiple loops playing and it is also completely random. In these previous examples, the result is almost the same each time like a performer would play a musical piece almost the same each time. But, in part four, the result is unpredictable because the processing plays 8 audio sounds randomly picked from the last two minutes recorded from the performer. That can change totally the harmonic result and moreover, that influences the performer who is improvising in this part.

Also, I use real-time processing to extend the possibilities of the instrument. Coupled with the real-time processing, the musical instrument finds others possibilities which are impossible to achieve with a single performer ; if it can be achieved without the real-time processing, I consider the real-time processing, in this case, useless. In *Fusional notes*, I extend the possibility of the piano in part two and three when I feed measured delays with the piano. Then, the performer is multiplied by four by the four delays used and, if the performer is tight enough, the result will be a eight notes chord repeated every 16th note which is impossible to achieve considering the range covered by the chords and the speed of repetition.

CHAPITRE 3

OTHERS PROBLEMS MET DURING THE WORK IN PROGRESS

The first problem coming to me was to find the best way to synchronize the video with the sound. Effectively, the sound was partly improvised and part three involved variations in the length due to its lack of tempo. Obviously, it was quite easy to program a Jitter patch reacting to the same switch pedal already installed for the audio patch and to request two computers for the performance. But, I was quite worried about the tour ability of my piece. I think that is a great quality we should take care if we are able to. That is why I decided to use a dvd-video. Anyway, the first half of the piece from the beginning until part three was really easy to synchronize because of the steady tempo.

The first try was to program a dvd-video using dvd scripts. However, even the possibilities of these scripts are interesting ; the only way to interact with a standard dvd-player is to use a remote control and each time you push a button on a remote control, the image lags for a few frames and that is undesirable if we want a fluid video. So, there was no possibility to interact at the middle of the piece to synchronize the climax, which is the only important precise point-of-synchronism. Anyway, the Glass ensemble did it nicely when it toured *Koyaaniqatsi*, *Powaqqatsi* and *Naqoyqatsi*. The director knew the video very well and was able to smoothly accelerate the ensemble in advance to synchronize a point-of-synchronism. There was here a choice between flexibility of the performer versus tour ability of the piece and I did it. Then, I resolve myself to ask the performer to learn the video well enough to be able to synchronize the climax in following the video. But still, there was a problem for the end because, even though the transition to the conclusion is long and blurred, I needed to end the video smoothly without cut and part 4 does not allow calculating exactly when the whole piece is going to finish due to its improvisation.

The first idea to solve this latter problem was to use a few video streams using the angle option available on most of the standard dvd-players. The other problems involved in it were that I needed a dvd-player operator because it needed a few interactions with

the remote control, which is still doable, and the bandwidth of each video streams was too reduced to get a fair quality. So, this idea was not good too.

The second idea to solve the problem of the end was to create a fixed single video stream which has a few ends. Then, I created a video where there are periodically black screens during the last 1 minute and half. The dvd-player operator just needs to pause the video in any black screen after the last notes of the piece.

Another problem came to me when I tried to perform the piece the first time with the real-time processing. It was humanly impossible to be tight enough during the whole introduction to avoid any problem of tempo precision in parts 1-2-3. This is why : when you play the inharmonics, you base your tempo on the last note played and looped by the real-time processing ; then the tempo will imperatively move a bit, even if it is a tiny bit, from one note to another and will add together until the last beat ; in the next part, if the system chooses, for example, the first beat to follow the last beat, there will be a problem of precision in the tempo. That is why I resort to a click track playing in monitoring earphones. That is a good thing also for part three as well where it is awkward to be extremely tight with the tempo despite the noisy background to be able to synchronize the delays together to get the idea of the repeated chords.

CONCLUSION

Finally, I think the idea of creating a piece where the video, the performance and the audio processing are blended and matched well together has been quite well achieved. This has been accomplished in solving the question about relations between image and sound, which has been quite effectively applied along the piece. Also, the question about expressing the image with a musical instrument and vice versa has been solved through all the relationships between image and sound carried out in the project. In conclusion, the idea of re-interpretation of the piece at each performance has been achieved in the piano and the real-time processing including random parameters and interaction with the performer but, unfortunately not in the video, which does not react or change at every performance because of its fixed support.

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