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An Introduction to ATINER's Conference Paper Series

ATINER started to publish this conference papers series in 2012. It includes only the papers submitted for publication after they were presented at one of the conferences organized by our Institute every year. The papers published in the series have not been refereed and are published as they were submitted by the author. The series serves two purposes. First, we want to disseminate the information as fast as possible. Second, by doing so, the authors can receive comments useful to revise their papers before they are considered for publication in one of ATINER's books, following our standard procedures of a blind review.

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The Breadth of the Source-Code Becomes the Brush of the Artist

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Abstract

Traditionally, the artist's use of a brush has defined an infinite number of visual possibilities. But, increasingly, the artist is now breaking through the canvas to reach completely new territories. It is these areas of expression that I am exploring with reference to a few of my videos.

I demonstrate that the artist is no longer concerned in laboriously laying one set of brush strokes over another until the right end result is achieved but, instead, by using code, he can choose from many available options which particular image best matches his or her initial vision. Hence, **the breadth of the source-code becomes the brush of the artist.**

It is the language of Processing that enables the artist to act as an ultimate decision maker rather than as a mere artisan. I illustrate these new powers of expression with reference to *Metamorphosis* – a video that reveals how a simple program can create behaviour of infinite complexity. To further illustrate how New Media has literally burst into the studio, I discuss how new computational tools can assist the artist in meeting the challenge of picturing the world as we really see it.

The use of advanced source-code in artistic practice encourages a merging of traditional art forms and opens up new and unexpected avenues of opportunity. To emphasise this point at the Conference, I called on my skills as a clarinettist to demonstrate the way a theme and variations could be interpreted both aurally and visually to create a piece of Performance Art.

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I am indebted to Sinan Ascioglu[1], Open Processing architect, for my title. It conveys the radical changes that are taking place in both the practice of art and the role of the artist in society. Traditionally, the artist's use of his brush has defined an infinite number of visual possibilities. But, increasingly, the artist is now breaking through the canvas to reach completely new territories. It is these areas of expression that I want to explore with reference to a few of my videos.

What do I mean by my title?

In *Allegro Amabile* (Figure 1. Allegro Amabile), I used code to produce a series of computerised brush strokes. Then, to create my final artwork (Figure 1. Selected sweep of the brush), I selected the one sweep of the brush that appeared, to me, to be the most visually satisfying. This is a hands-off approach to creating art that, to my mind, neither diminishes or inhibits the role of the artist but, instead, it offers a method of 'mastering the canvas' which differs radically from the traditional approach.

The artist is no longer concerned in laboriously laying one set of brush strokes over another until the right end result is achieved but, instead, he can see at a glance from a potentially infinite number of options, which end result might best match his vision. This is why I say that *the breadth of the source-code becomes the brush of the artist.*

At this point I need to define my terms. In using the term *brush* my intention is to embrace all the tools traditionally associated with the production of art – not only the brush but also pen, ink and paper etc. *Source-code* denotes the future: the idea that second generation computation offers a new power of creativity and expression for artists. For me, this realisation was reinforced by the V&A's Decode exhibition[2], in 2010, which brought together a wide range of digital outputs where, more often than not, the language of Processing was the catalyst for creativity. Inevitably, therefore, Processing has become my preferred method of discovery and endeavour. The opportunities and avenues of exploration it offers appear to be endless.

Processing is all about the creation of image sequences conveying movement and animation. These sequences can be long – say, 2000 to 3000 separate images. The artist can opt to select a single frame, if and when it matches his guiding vision or, alternatively, he can choose to amalgamate a set of separate images into a final artwork (Figure 1. The language of Processing). Whatever he decides to do, it is this process of selection that signifies a new emerging role for the artist by providing him with the freedom to act as an ultimate decision maker rather than as a mere artisan; it gives him greater

[1]In an online interview, Sinan Ascioglu commented that *sharing source-code results in the creation of better things. It's for the greater good. The breadth of the source-code becomes the brush of the artist. How you use that brush defines the visual output.* www.rhizome.org/editorial/2010/feb/26/interview-with-sinan-ascioglu/

[2]Decode: Digital Design Sensations was held at the Victoria and Albert Museum, London, 8 December 2009 – 11 April 2010

powers of expression and also, potentially, more influence over the technological tools at his disposal.

To illustrate how artists can now articulate and approach problems in a new way, I can draw on my own experience.

Metamorphosis

Metamorphosis represents three variations on a theme. I was aiming to generate the complex patterns seen in nature from just a few ingredients. Echoing the work of D'Arcy Thompson[1] in the last century, I wanted to create a video that revealed how growth and form need not be mysterious; how patterns can be discerned emerging from simple rules; how nature has themes and preferences for the images it creates (Figure 2. Theme, First variation, Second variation, Third variation). I am indebted to Philip Ball, in his book 'Shapes'[2], for instilling these thoughts in my mind.

The theme of Metamorphosis is a 'toolbox' of pattern forming elements – a series of shapes reminiscent of Autumn Leaves in rainbow colours. Through Processing these shapes are subjected to a process of 3D movement.

In the first variation, 3D movement is again applied to create an array of images as a continuous trail. This process renders the original shapes as a series of scroll waves, which appear to mimic nature as pattern forming elements are 'excited' by clashing and merging with one another. It is by making small adjustments in the Processing source-code that the artist has countless opportunities for mimicry. He can apply a delicate interplay of forces which result in spontaneous patterns expressing the themes and preferences of natural growth.

The second variation performs a similar process of movement in two dimensions with markedly different results. The shapes of the original toolbox are still discernible but in a distorted form. This results is a system of continuous oscillation – analogous to a chemical system running out of control – which changes from a steady state to oscillations of increasing complexity and eventually to chaos. This is a common form of pattern forming behaviour which the artist can use to discover a '*game of intricate enchantment and deception*'[3].

By contrast, the third variation shows spontaneous order emerging from complexity as recognisable structures with shape and depth begin to be evident. Together, my four manifestations of metamorphosis reveal how a simple program can create behaviour of infinite complexity.

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[1]Thompson, D'Arcy Wentworth. (1961). *On Growth and Form – Abridged ed./ Edited by Bonner, John Tyler.* Cambridge University Press.

[2]Ball, Philip. (2009). *Shapes: Nature's Patterns, A Tapestry in Three Parts.* Oxford University Press.

[3]Quote from Butterflies, page 86. Nabokov, Vladimir (2000). *Unpublished and Uncollected Writings.* Beacon Press, Massachusetts.

The dynamism of Processing

Processing has a gift for breaking down light and colour into moving shapes that can be energetic and dynamic. I can imagine the unbounded joy of artists like Giacomo Balla (Figure 3. Futurism) if Processing (and computing) had existed early in the last century. In fact, the Futurists had only the most pedestrian of tools (based on Cubism) for depicting their vision of the technological triumph of humanity over nature.

In my opinion, there's no comparison between the computational opportunities on offer to artists today and the limited range of expression available to Futurism (and the other 'isms'). New Media has literally burst into the studio (Figure 3. New Media) enabling the artist to not only dispense with the brush but, also, to cast aside other traditional aspects of his or her craft.

I'll examine artists' use of perspective as a prime example:

The world as we see it

The discovery of perspective came remarkably late in the history of Western Art – about 2000 years after Thucydides (or should I say Praxiteles). It is a well known fact that artists have to make adjustments to limit the ambiguity of perspective; without these, objects in the distance appear to be too far away (Figure 4. Artists' perspective of the world). But even with these adjustments to 'constancy scaling' the construct of perspective succeeds only in representing the artist's retinal image, which is not what we really see. This is why observers from other parts of the world – Japan, for instance (Figure 4. Artists' perspective of the world) – find the distortions of perspective unconvincing; they have their own way of seeing the world which allows them greater freedom of expression although, for our part, we might find the results somewhat strange.

The challenge of representing the world as we really see it has always fascinated me. As an architect, I have always been concerned in conveying the experience of buildings, both built and un-built. Does a framed photograph really do the job? I think we know the answer. A photograph depicts an idealised view available to the single eye (or lens). To obtain any sense of reality we must glean information from a set of photographs taken from different viewpoints as, for instance, in the case of a Hindu temple – a complex building I visited recently in India. (Figure 4. Photographs of Veera Narayana). Then, with this array of images in front of us, we can begin to put together, in our mind's eye, the full depth and form of a building or scene. What these photos don't convey are the binocular cues received by our eyes when, in moving through the temple, we glance quickly in many directions at once to gain an 'all round' perception of where we are.

Scientists working in this area of eye/brain perception[1] have coined the phrase 'motion parallax' to describe what is missing in single-eye images.

[1]I am referring, in particular, to the work of Gregory, R.L. (1990). *Eye and Brain: The Psychology of Seeing, Fourth edition.* Oxford University Press.

This term can be defined as *'the displacement, or difference in the apparent position, of an object caused by the actual change of position of the point of observation'*. It is through the application of motion parallax that we form a true picture of our surroundings. The photograph can't do this for us. Nor can the artist applying the rules of perspective.

From my own experience, I believe that the utilisation of source code can literally throw some light on the conundrum of picturing the world as we really see it. Of course, it remains a construct just as perspective is a construct, but it offers a way of harnessing, in real time and space, the effects of motion parallax. The preferable way of demonstrating what I mean is through a video *www.trickettapplets.com/Balavadi1.mov* My illustration (Figure 4. A more real experience of 'seeing') shows just one frame from the full sequence of 2,500

The video demonstrates a convergence of visual information – a simultaneous unwinding of images at differing scales – which conveys, to my mind, a truer picture of reality than a conventional series of shots (moving or still) captured through the 'single eye' of a camera. It's also possible to select a single frame from the video, from the long sequence available, which still succeeds in recreating an experience in four dimensions – ie the normal three dimensions plus time (Figure 4. A picture in four dimensions). Wasn't this, long ago, the declared aim of Cubism?

I realise, of course, that my example is not a complete answer to the challenge posed by motion parallax; it introduces its own set of distortions that observers may or may not find acceptable. It is an 'artifice' just as Cubism is an artifice and, for this reason, I must leave others to decide on the merits of my process of bringing source-code to the aid of art. But, for me, the opportunities provided by Processing facilitate the reliving of a delightful experience. Surely, this is what artists generally want to achieve – the communication of their own vision and experience of a place for the benefit of others.

And now for sound

So far, I've mentioned various dimensions of art – space, time, movement – but made no mention of sound. This omission cannot be allowed to continue because often, for me, music comes first, not last, in my order of priorities.

I have to admit that the results of combining the creative worlds of imagery and music are often disappointing but, as a child, I was enthralled by Disney's *Fantasia* and, recently, equally enraptured by *In Seven Days (Concerto for Piano and Moving Image)* by Thomas Ades and his partner Tal Rosner[1]. For once, the visual images, produced through Processing, stood alongside the composer's work as an equally imaginative participant.

So those are the high points. But now, I'll refer back to my own work; I created *Allegro Amabile* to capture the mood of Brahms's sonata for clarinet

[1]Thomas Adès, *music*, Tal Rosner *visuals.* (2008). CD+DVD. *In Seven Days for piano and orchestra with moving image.* Signum Classics

and piano, Opus 120, no.2. The music is kaleidoscopic in its range of colour and emotion and demonstrates mercurial shifts of texture and harmony. My computerised brush strokes (as shown above) aim to reflect the character of the piece in visual terms by providing a fluid pattern of constantly merging colour in Autumnal hues as can be seen in an excerpt from the first movement www.trickettapplets.com/AllegroAmabile.mov

Not everyone will agree with my interpretation, of course; the perceived relationship between art and music is both tenuous and subjective.

To conclude, I'm returning to *Metamorphosis* – a theme with three variations, as I explained earlier, which together reflect, visually, the way complex patterns of nature emerge from the application of a few simple rules. Germaine Taillferre's sonata for clarinet solo similarly subjects a simple series of notes to continuous variation. She might have been surprised, I think, that I chose to perform her piece, at the 3rd Annual International Conference on Visual and Performing Arts, held in Athens in 2012, as a live demonstration of how visual and aural patterns can be woven together to produce Performance Art. However, as the only female member of *Les Six*[1], I hope she would have approved. A video of *Metamorphosis* with sound track can be seen at www.trickettapplets.com/Metamorphosis-complete.mov

It's been my aim, in this paper, to show how the artist can potentially become a more powerful force for change and innovation. By casting aside the brush in favour of computational tools, he or she will be entering a world which is as much conceptual and cultural as it is technological. As the use of advanced source-code in artistic practices becomes more established we can anticipate that, increasingly, various traditional art forms will tend to merge and new unexpected avenues of opportunity will emerge.

An exciting prospect!

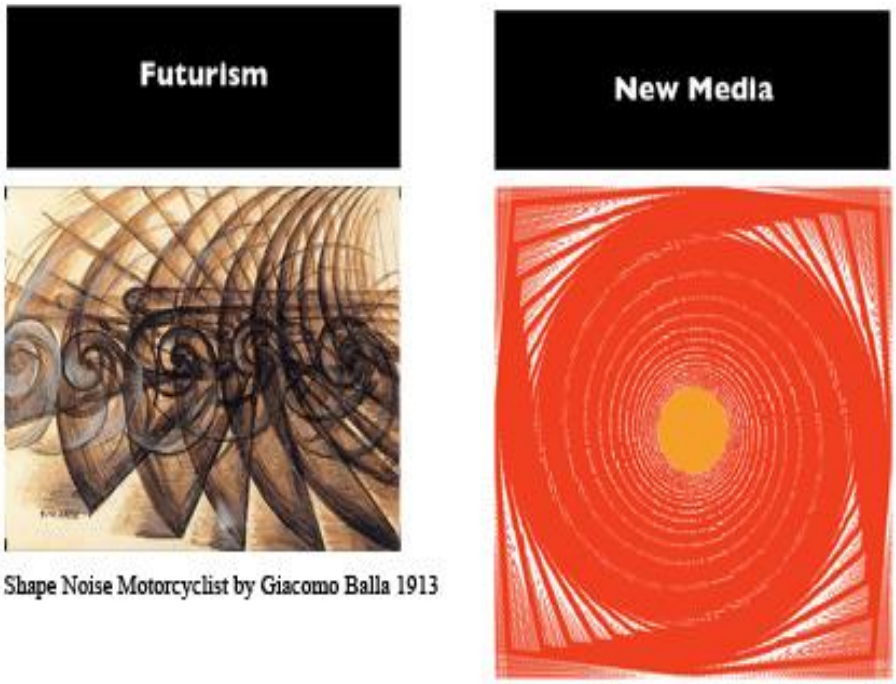
[1] Launched in 1920 by the Parisian music critic, Henri Collet, *Les Six* were George Auric, Louis Durey, Arthur Honegger, Darius Milhaud, Francis Poulenc and Germaine Tailleferre (1892-1963).

Figure 1. What do I mean by my title?

Figure 2. Metamorphosis

www.trickettapplets.com/Metamorphosis-complete.mov

Figure 3. The dynamism of Processing



Shape Noise Motorcyclist by Giacomo Balla 1913

Figure 4. The world as we see it