

# A Systems-theoretic Analysis of the Artwork 'I See You'

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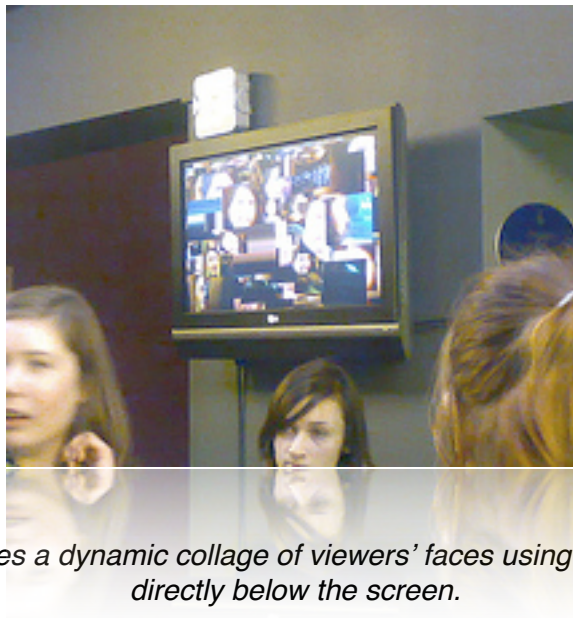
## Abstract

'I See You' is a digital artwork by Sean Clark. It starts with images of the artist being used to draw a viewer towards a video screen. As the viewer approaches, these images are replaced with images of the viewer's face. This process then continues with the new images being used to attract the next viewer and so on. The artwork was deliberately created to behave as a simple dynamic system that would be structurally coupled to its immediate environment. This paper presents a systems-theoretic analysis of the artwork with a particular focus on whether or not it exhibits the property of 'autopoiesis'.

## Introduction

The digital artwork 'I See You' was first exhibited by Sean Clark at the *Trampoline 10 Year Anniversary* event at the Broadway in Nottingham on the 29th November 2007 (Trampoline 2007). The piece took the form of a video screen showing a dynamic collage of faces captured live via a video camera.

'I See You' starts with images of the artist being shown on the screen. These are used to attract the first viewer. As the viewer approaches the images of the artist are replaced with images of the viewer's face. These images are then used to attract the next viewer, and so on, with this cycle continuing for the duration of the exhibition.



*Fig 1. 'I See You' creates a dynamic collage of viewers' faces using a video camera situated directly below the screen.*

The digital artwork was created in response to the 'Surveillance City' theme of the Trampoline exhibition. However, this paper does not attempt to examine the artistic meaning, or value, of the work in any great detail. Instead, it presents an analysis of 'I See You' from a systems-theoretic perspective. In particular, it focuses on whether or not the artwork exhibits the property of 'autopoiesis'.

## The Construction of The Piece

For this exhibition the piece was constructed on an Apple Macintosh computer using the Max/MSP/Jitter programming environment with the cv.jit computer vision extensions. An Apple iSight video camera was used to feed a live video image to the Max/MSP/Jitter 'patch' for processing and a 42" LCD screen was used to display the resulting image.

The live video feed from the camera is constantly scanned by the Max/MSP/Jitter patch for patterns that appear to be human faces. If a face is found then it is grabbed from the video feed and added to the video screen in a random location and size. Over time the video screen begins to display a collage of viewers' faces - with the most recent viewers appearing on the 'top'. This is illustrated in Figure 2.



*Fig 2. A still taken from a video recording of 'I See You' in action.*

If a viewer stays in range of the video camera then images of their face are added to the image at the rate of three images per second. Various configurations of the artwork were experimented with in the studio, including a version where each viewer was only added to the image once in a visit, and another where the latest viewer was shown full screen. However, it was felt that the configuration selected offered more interesting interactive possibilities.

## 'I See You' as an Open System

'I See You' was deliberately designed to operate as a simple 'open system'. Such a system is defined in *Principa Cybernetica* as "a system with input, an entity that changes its behaviour in response to conditions outside its boundaries" (*Principa Cybernetica*, 2007). By aiming for this in the construction of the artwork it was hoped that the piece would lend itself to being analysed from a 'systems-theoretic' perspective.

Systems theory is a well-established field of science that seeks to understand the world through the analysis of interactions *between* elements rather than through analysis of its elements in *isolation*. It is seen by 'systems thinkers', such as the physicist Fritjof Capra, as part of a new world-view that favours non-linear, non-hierarchical and ecological thinking in preference to the linear, reductionist approaches that have been dominant in western thinking for the past 400 years. This is expanded upon in detail in Capra's book *The Hidden Connections* (2004) and earlier works such as *The Tao of Physics* (1975) and *The Web of Life* (1997).

Before attempting to analyse 'I See You' from a systems-theoretic perspective it is important to clarify elements of terminology and context.

Firstly, there are possible confusions relating to the terminology used in system theory and their application to this artwork - especially one constructed using computer technology. So, to clarify. The 'system' in question should not be confused with the Apple Macintosh 'computer system'. The computer is certainly part of the wider system, but they are not synonymous. Similarly, 'input and output' refer to the system as a whole and, again, should not be seen as synonymous with the computer's input and output capabilities.

Secondly, system theory has been applied to an arts context by other artists and authors. Specifically, in *Art as a Social System* (2000) Niklas Luhmann uses systems theory as the basis a detailed analysis of the perceptual and social aspects of art and aesthetics. Additionally, 'systems art' itself - that is, artwork composed according to aesthetic rules or processes - is not a new concept. However, whilst both of these areas are undoubtedly relevant to this work, they will not be brought in to this analysis.

### **A systems-theoretic Analysis of 'I See You'**

When looking at any system the first task is to identify the elements the system is composed of. This is not necessarily as clear-cut and objective as it may first seem. In *The Tree of Knowledge*, Maturana and Varela (1987, p40) identify that in order to do this one must first enter into an act of 'distinction' in which what has been identified is seen as separate from its background. The result of this is the identification of a 'unity'.

Given the multi-dimensional nature of systems thinking, what has been identified as a unity at one dimension may in fact be considered a system itself, perhaps composed of further unities upon deeper analysis, or what appears to be a system composed of many interacting unities at one level may become a single unity itself at a higher level.

At the highest level of this analysis, two unities can be distinguished - the 'viewer' and the 'artwork'. These unities exist within a medium of interaction that can be called the 'gallery'. 'I See You' can therefore be seen as a process of interaction between the viewer and the artwork that takes place in the gallery. For the duration of the interaction both the viewer and the artwork maintain their independent organisation. However, they do cause each other to change. The artwork incorporates an image of the viewer in the collage being displayed and the viewer reacts to the artwork through a cognitive or physical response. In Varela and Maturana's terminology the unities become 'structurally coupled' (*ibid.*, p75).

If we now shift our attention to the artwork alone, this can also be analysed from a systems perspective in its own right. As mentioned earlier, it was intended that the artwork be an

'open system' in that it could change in response to its environment. The mechanism by which the artwork is able to be 'aware' of its environment is the video camera and the change in the structure of the work is represented on the video screen. The artwork certainly appears to satisfy the criteria defined by *Principa Cybernetica* (2007). This view is supported by private correspondence with Dr Francis Halsall, Lecturer in Modern and Contemporary Art History, National College of Art and Design, Dublin, Ireland, who writes:

"A system is generally understood as a set of elements integrated with one another to such an extent that they form a recognisable and coherent whole. In addition, this recognisable and coherent whole performs some type of recognisable function. Thus, in general a system is a collection of components that by virtue of its organisation and function, becomes meaningful in its own right. This seems to apply very interestingly to your work." (Halsall, 20th November 2007)

Looking deeper at the artwork, other systemic elements can be identified. The work has a 'boundary', which is defined physically by the extend of the computer and size of the video screen. It is in a state of 'dynamic equilibrium', in that once the artwork has filled the video screen with images the broad appearance of the screen remains the same, yet it is in constant change so long as viewers interact with it.

### **Is 'I See You' Autopoietic?**

As well as creating an artwork that behaves as an open system, one of the goals in creating 'I See You' was to experiment with the idea of creating an artwork that exhibited the property of 'autopoiesis'.

The term 'autopoiesis' is defined by Wiktionary as a "self-maintaining system, organisation, or organism: a process whereby a system, organisation, or organism produces and replaces its own components and distinguishes itself from its environment" (Wiktionary, 2007). It was first coined by biologists Humberto Maturana and Francisco Varela as a way of describing the operation of living cells and they fully define it as:

"An autopoietic machine is a machine organized (defined as a unity) as a network of processes of production (transformation and destruction) of components which: (i) through their interactions and transformations continuously regenerate and realize the network of processes (relations) that produced them; and (ii) constitute it (the machine) as a concrete unity in space in which they (the components) exist by specifying the topological domain of its realization as such a network." (Maturana, Varela, 1980, p. 78)

So does 'I See You' exhibit autopoiesis? Key to answering this is identifying whether or not it is constructed in a way which allows the artwork to be truly self-generating and self-organising. The use of material selected from its surroundings (the viewers' faces) in constructing its form (the video screen) is strongly suggestive of autopoiesis. Similarly, the key systemic relationship between the viewer and the artwork - i.e. artwork attracts viewer, viewer is incorporated into artwork, artwork attracts new viewer etc. - is reminiscent of other autopoietic systems, such as the way living organisms attract food. However, even through the external form of the artwork may constantly change in response to the environment, the underlying 'processes' - as embodied in the Max/MSP/Jitter patch - do not self-generate. They remain unaltered by the external world and hence it would appear 'I See You' falls short of being autopoietic in at least this respect.

## Conclusion

Intentionally creating an artwork to operate as an open system has proven to be a very interesting exercise. Even more so has been the attempt to analyse it from a systems-theoretic perspective and to look for autopoietic behaviour. While 'I See You' can not be said to be fully autopoietic, it does share some properties with autopoietic systems and can be said to be a first step towards the goal of defining and creating truly autopoietic digital art works.

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