Computer Art in the New Millennium

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In 1995 I interviewed Masao Komura, founder of the Computer Technique Group (CTG) in Tokyo, Japan. He, along with others in the group, produced sensitive, innovative, political artworks that were featured in the first important computer art show, Cybernetic Serendipity, in London, 1968. When I asked what he thought would be the future of the technology, Komura stated, "It would become our third skin," the first being our skin, the second our clothes, and the third whatever devices we choose to develop. (See his Web page at http://www.ntticc.or.jp/special/babel/profile_e.html.)

The concept of art in the twentieth century differs drastically from that of earlier periods. What began as picture storytelling in caves has evolved into elaborate conceptual art experiences. Computer technologies and graphic techniques have made this development possible. The early 1960s experiments in graphical picture making and interactivity matured into a total art experience involving viewers in the process, as well as using all of their senses. The technology has been assimilated into current artistic production to the extent that the technological aspects of the work range from invisible to bells and whistles.

Artmaking with technology will continue to expand our ability to experience ideas. I see the movement as an informed approach to artistic appreciation. The complexity of the involvement with the technology is only one factor in the art of the future. A hundred years from now, the art-historical contributions from computer art to a broader aesthetic experience will include algorithmic and heuristic processes, interaction, and telemetric art (art at a distance). The media for these future experiences will change with the times, as always.

Many pioneer artists began using the computer to explore algorithmic visualization. Vera Molnar cofounded GRAV (*Group de Recherche d'Art Visuel*) in Paris in 1960, which was dedicated to understanding mathematical simulation and aesthetics. In a letter dated 20 July 1998 she wrote me, "After 10 years of "Machine Imaginaire" (1959-68) I started to work with real computers in 1968."

One of the aspects of Molnar's visual research has been the exploration of heuristic, problem-solving techniques. The most appropriate solution of several is selected at successive stages of discovery for use in the next step. She states that she works in a "series of small probing steps," and that each step is followed by an evaluation. She tries to vary only one parameter at each step, and "by comparing the successive picture...," she has "control over the stages of development."[1] Molnar was fascinated by the process of going back to former versions of her work. The computer's ability to save various stages of work means that artists need never fear change again.

Paul Brown (http://www.paul-brown.com) is one of many artists who use the mathematical properties of the technology to create images. The visual research that involves algorithms is a natural outcome of the technology and very important to the future of art. See Figure 1. This is a content source unique to the computer.

In a letter to me dated 20 July 1998 Brown wrote,

> Most of my work concerns cellular automata — simple procedural games that generate often complex or surprising behaviors that can't be predicted by their rules. This field now known as Artificial Life or A-Life has been a dominant focus of my career. In 2000, as the recipient of an Australia Council Fellowship, I will be based at the Centre for Computational Neuroscience and Robotics at the University of Sussex in England where I hope to develop my knowledge of this field and, in particular, learn about evolutionary programming and genetic algorithms.

Although much algorithmic art is realized as 2D prints, many artists combine it with multimedia and virtual reality projects. The incorporation of scientific research into art is increasing; algorithmic techniques will continue to aid this process.

Artists have invented their own environments and sensory devices using the technology to respond to specific challenges. The interactive experience divides into four categories: active (each viewer is offered the same experience), interactive (viewers may have different experiences depending upon the intervening choices made), reactive (the presence of the viewer changes the artwork), and immersive (through various devices, the viewer enters another environment.)[2]

Artist Paras Kaul, a neuro-art researcher (see http://

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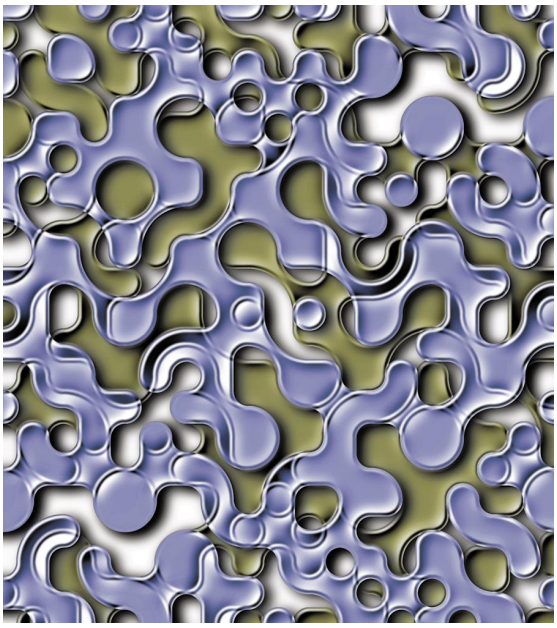

©1998 Paul Brown

1 "My Gasket" by Paul Brown. Iris print. 69 by 62 cm.

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2 Paras Kaul seated at her computer system, wearing the Brainwave apparatus. As part of her performance, "That Brainwave Chick," Paras concentrates to allow her alpha state to be experienced. The brainwave activity triggers both visual imagery and audio music.

www.paraswest.com) and collaborator Mark Applebaum create performance events such as "That Brainwave Chick" (Figure 2).

Paras has also produced a CD with neural audio imaging and sound. Using IBVA software and a headband with three electrode sensors, the participant's brain controls images that are displayed on a screen as well as music that is interpreted through a MIDI synthesizer. In a 15 September 1999 letter Paras wrote,

> When beginning the neural imaging process in real time, the brainwave activity is random and changes rapidly. A viewer is likely to be involved in a settling process whereby neural activity is transitioning to a calm, focused state of mind. During this time, images and sound may appear chaotic, so related audio tracks reflect this unsettled brain activity. As a viewer begins to relax and focus his or her attention, the audio and visuals will begin to flow more naturally, and the effect of the multimedia experience will become calming. A goal of the neural imaging experience is to increase awareness of the fact that we have the ability to relax and exist in stress free states of mind ….

This work is an example of the reactive and interactive experience that is a developing aspect of the technology.

Telemetric art and Web art will continue to be realized in the new millennium. One example is by Victoria Vesna and collaborators Robert Nideffer, Nathanial Freitas, Kenneth Fields, Jason Schlerfer, and others. The work is titled "Bodies© INCorporated" (Figure 3). The interactive installation is located at http://www.bodiesinc/ucla.edu.

Vesna said,

> …soon the same issues that seem to be somehow relevant only for "cyberspace" will be equally important in the physical realm…. What may move this process forward is the work being done with "intelligent software agents on the Web."[3]

©1999 Victoria Vesna

2 "Bodies© INCorporated, Head" from Victoria Vesna. Interactive.

Her current work centers on networked environments and the exploration of "the social psychology of group dynamics."

Art made with computers began in the 1960s and, unlike many other twentieth-century art movements, has taken decades to be recognized by the conventional art community. At that, it is only just beginning to be appreciated. Ironically, as Frieder Nake commented in an interview (Pasadena, Calif., Feb. 1988), the first artists and scientists to use the technology truly believed that the technology would lead to democratization of art and of the art world. They saw computer printouts as an unending source for multiple originals. For the past twenty years artists have exclaimed, as Joan Kirsch said in her 1980s article of the same name, "When will computer art be taken seriously?" In an art market based on rarity and scarcity, it will be interesting to see how the market for new art develops with unlimited multiple originals and cyber artworks. I wonder how we will market our "third skin?" ■

References

1. V. Molnar, "Toward Aesthetic Guidelines for Paintings with the Aid of a Computer," *Leonardo,* Vol. 8, 1975, p. 185.
2. P.D. Prince, "Interacting with Machine Culture,'" *IEEE CG&A*, Sep./Oct., Vol. 13, No. 5, 1993, pp. 4-8.
3. V. Vesna, "Marketplace: From Agents and Avatars to the Information Personae," http://arts.ucsb.edu/~vesna/publications, 1997, p. 2.

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