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LEONARDO THINKS

Opinion: In Collaboration with Machines

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Art is I; Science is we.
-Claude Bernard (1813-1878)

We enlist the simulated intelligence of technology in the making of art. It is a natural collaboration to most of us, we who share a world with digital doppelgangers, autonomous agents and robots. It may be natural, but there is a leap here from the use of technology to carry out the express intention of the artist to technology that collaborates with that intention. Prior to digital (computer) technology, the implements of art may have constrained creation, but they did not decide it. That is, printing presses, ink, chisel and marble, the range and tone of musical instruments—all these determined a universe of possibilities for the artist, but did not choose among the possibilities.

Computers can and do choose—within the constraints imposed by humans. The roles are reversed.

I do not mean to exaggerate: humans often reserve the right to throw away the computers' product, and so impose their aesthetic judgment. If the artist does not impose that judgment, then producers, publishers and curators will. But the fact remains: software produces luscious music and poetry. Brian Eno has software perform for him as he "writes" his own music—and he told an audience last year that the computer's music can be as good as his "own." The simplest use of a computer to make pictures implicates the collaboration of the machines. The apparent serendipity of line, color and texture, the sight of multiple layers of transparent and opaque colors, are provided by the computer; software can even create a work in the style of Matisse, Monet or van Gogh.

Computers, machines and automation are the metal heart of much performance art, embodied so to speak in the exquisite exhibitions of

Survival Research Laboratories (SRL). SRL makes enormous machines from the flotsam and jetsam of a machine world: V2 engines, trucks, flame throwers, wheels, buzz saws and farm equipment are smelted together to form enormous,



apparently autonomous robots that move and attack to the literally deafening screams of explosions and machine noise and the incineration of flame and gasoline. The machines move with inchoate menace, threatening the humans who stand by in awe, shredding the theater and eventually each other. It is a joke, of course-it is theater, after all. Humans dressed in discreet black have some control via radio signals, but it can get out of hand, and SRL's founder lost part of his body to one of the machines. It is the best kind of joke, the kind that sometimes is not. SRL's work is a puissant metaphor for the autonomous machine. But both those machines and their software cousins reach back through their media-through the software and pieces of erstwhile metal-to collaborate with makers from the past. Someone (probably many people) wrote the software; someone operated it; someone decided to use it; someone combined it with other programs.

These software collages may now be ordinary, but they are bar sinister in the eyes of the law. Copyright law needs an author, a maker, a creator, an utterly human being who can own things, make money, hire lawyers and sue people. The ideal here is the embodied genius of one person-the poet with pen, the painter with brush. Reward the author with rights, the theory is, and more art will be made. Without an artist to own the work, copyright law flounders. To be sure, there is the notion of a 'joint work," but that requires the deliberate contributions of multiple human authors toward an intended joint work. Can a program intend? Can the author of a program intend the unpredictable output of the software to be a contribution to a future work with other unknown humans? Not likely. But at least in these current scenarios humans, only, are critically involved in the collage of creation. They can, if necessary, be left to the dubious pleasures of litigation to sort out their legal rights. And if that sounds unappetizing, the humans can make contracts to state their rights.

Others have remarked the evisceration of authorship, the confusion of maker and audience in the digital realm and the advent of art as an electronic spasm. But now, with the birth of truly autonomous intelligent software agents, the collaboration is moving away from a plain link to humans. We are moving toward creation of machine art, or direct collaboration with machines, in which software makes aesthetic judgments. The Internet is a place where we spend an increasing amount of our time, both socially and for business, and art erupts there too. For example, the San Francisco Museum of Modern Art has three web sites in its permanent collection [1]. Why should not art be made by the new crop of portable, machine-independent software agents made with Java or ActiveX [2]? Already we note the juvenile forms: applets spin and dance on our screens, using the two basic sensory vehicles of sight and sound. Today these applets work directly as programmed. But specifically intelligent applets are designed to work with other agents; who can predict the results of their combined efforts?

And who will own their products? With whom-or with what-do we negotiate for the rights to use or copy works of communities of intelligent agents? Who sues when an unauthorized copy is made? How do we handle compensation? There are no obvious responses. Copyright law may abdicate the field; or programs may be deemed legal fictions, like corporations, that can sue and "sign" contracts-through their human agents. Or perhaps we will make the products of art free and pay humans for such effort as they make toward the product, unlinked to the value of the result. There are many responses to this argument



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between copyright's search for an author and the technology's refusal to provide it. It is up to us to map these out and to push toward the solutions that encourage creativity. We say it is up to us, but our machine collaborators may differ.



Endnotes

[1] See, for example, <<http://www.atlasmagazine.com>>.

[2] Sun Microsystems' Java and Microsoft's ActiveX are programming languages, descendants of C++, that can be used to create small applications, or "applets." Applets can be transmitted via the Internet and are generally platform and operating system independent. These are commonly found embedded in Web pages, activated by the remote user's mouse-click. Applets are now being produced to interact with other applets: these so-called intelligent agents "on their own" investigate the processing environment and determine how best to interact with other unfamiliar applets. "Software agents" are applets that, if written to interact with other agents and to operate with only the most general direction from the human user, may qualify as "intelligent."

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