AUTHENTICITY AND COMPUTER ART*%

Margaret A. Boden

University of Sussex

Abstract:

Computer art is often seen as inauthentic, even strictly impossible, because it lacks certain essential features of genuine art. For instance, it's said that computers don't have emotions; that any work of art is a human communication rooted in human experience; that computer art isn't unique, because a program could churn out its products indefinitely; and that programs can't generate fundamental creative changes. This attitude prevents people from engaging seriously with the products of computer art. In addition, it threatens to devalue the artistry of the human being behind the computer, and to undermine their status as an artist.

I: Introduction

One of the meanings of "authentic" listed in my dictionary is "entitled to acceptance". This sits

alongside other meanings such as "genuine", "trustworthy", "authoritative", and "of established credibility". That's hardly surprising: if something is indeed genuine, trustworthy, authoritative, and of established credibility then, for sure, it's entitled to acceptance.

But if not, not--and there's the rub. A very common reaction to computer art is to withhold acceptance in principle, to refuse to regard it as authoritative under any circumstances because, inevitably, it lacks authenticity. This paper considers some of the reasons given for that attitude--which so annoyed one computer artist, as we'll see, that he has recently taken extreme action in an attempt to counter it.

As is usual for dictionary definitions, the terms listed together are closely linked. The concept of authenticity implies some originating agent, whose honesty (compare "genuineness"), and perhaps whose competence (compare "authoritative"), can be "trusted"--and to trust someone is to "accept" what they say or do. Nevertheless, the listed terms aren't exact synonyms. In particular, "entitled to acceptance" doesn't mean the same--no more, and no less--as "authentic". Lack of authenticity is only one possible ground for non-acceptability (see Section II). However, it's the one that's in focus here.

At this point, three terminological warnings are in order. First, I sometimes use the expression "computer artist" to denote the computer itself, and sometimes to denote the human being who programmed it. The context should make clear which meaning is intended in each case. As we'll see, both senses are philosophically problematic.

Second, my phrase (above) "the human being who programmed it" should more strictly have been "the human being who programmed it or inspired it". For the person who actually did the programming is not always the person whose artistic vision is embodied in the system. One well-

known example of this is the evolutionary artwork of Stephen Todd and William Latham (1992), where the IBM computer scientist Todd wrote the code (and doubtless offered some aesthetic insights along the way) but Latham, an RCA-trained sculptor, provided the artistic inspiration and guidance. Except for a brief reminder in Section V, I'll ignore such complications. I'll write as though the inspirer/artist is always the same person as the programmer. (With the spread of IT among young people, this is increasingly true.)

Third, and most important, I'll mention "computer art" and "artworks" throughout the text. This is a shorthand way of denoting specific visual, auditory, or literary compositions in whose origin a computer had a hand. Like the word "hand" in that sentence, my terms "art" and "artwork" don't carry a heavy load of philosophical baggage. I'm not prejudging the question of whether it's possible for a computer to generate anything that's properly called a work of art. The answer to that question, as we'll see, depends partly on what role authenticity plays in aesthetics.

II: Irrelevant unacceptability

Sometimes, people who refuse to accept computer art do so--or anyway, claim that they are doing so--purely on the grounds of its intrinsic qualities. They look at a particular computer-generated image, listen to some computer-generated music, or read a computer-generated story or poem, and announce that it's uninteresting and/or faulty in various ways.

An unusual example of this type of reaction was directed at the products of the "Emmy" program discussed in Sections III and IV. Emmy writes music in familiar styles, to be played by human musicians on the usual range of instruments. Some of these performances were recorded, and Emmy's programmer offered the tape-recording to a commercial CD company specializing

in computer music. To his amazement, they refused to take it on because, in their view, it wasn't authentic: as they put it, "it didn't sound like computer music" (Cope 2006: 352). For them, "computer music" didn't mean 'music composed (and possibly also performed) by a computer', but 'music (whether composed by human or computer) that uses computer-synthesized sounds instead of, or as well as, traditional musical instruments'. (Happily, after many more rejections, another CD company was eventually found which was willing to publish Emmy's music. Unhappily, as we'll see, the music then met a number of very different criticisms.)

If a critic of computer art really is responding only to the intrinsic properties of a particular artwork (as this CD company was doing), their arguments aren't relevant here. After all, fully-human works presented as art are often criticized too. Not everything produced by a self-styled artist, or even by a publicly recognized 'name', is entitled to acceptance. Indeed, even human beings can be accused of in various ways of a lack of authenticity (hypocrisy, for instance) that undermines their work's acceptability.

To be sure, the "entitlement to acceptance" is a matter of aesthetic judgment, not a matter of fact. In that sense, it's as problematic as any other such judgment. But these are judgments that we're accustomed to making, and which can even achieve a high degree of consensus.

A judgment of this type, when directed to a computer artwork, may be generalizable up to a point. Suppose that the observed aesthetic flaw is a lack of balance in a computer's drawing, or a lack of expression in its musical performance. It may be that the particular technology and/or programming style that was used is inherently incapable of providing the balance or expressiveness required. If so, that technology or style is as aesthetically constraining for the computer artist (in either sense) as a drunken haze, a muscular cramp, or a bad habit acquired

during training, would be for a traditional painter or pianist. In such cases, the critic can justifiably argue that no computer art generated in that particular way will be entitled to acceptance. But "that particular way" must, of course, be specified.

It must be specified because it's always possible that some other approach might avoid the aesthetic flaw in question. For example, the music program discussed in Sections III and IV had no way of representing musical expression: it laid down what notes to play, not how to play them. You may feel that that's no surprise: surely, you may be muttering, no computer could model musical expressiveness. You'd be wrong. That seemingly unanswerable challenge has been met with remarkable success, dealing with familiar compositions by 'Romantic' composers such as Chopin (Longuet-Higgins 1994).

These generalized criticisms, too, are irrelevant for our purposes--unless they can be generalized still further. The critic would need to show (at least) that any computer art that's feasible in the foreseeable future would have the same shortcoming, or (more strongly) that any conceivable computer art would necessarily have it too. In other words, they'd need to show that computer art isn't just unsatisfactory here and there but, as the caterpillar said of Alice's recital of 'You Are Old, Father William', "wrong from beginning to end".

III: Emotional authenticity

The arguments most germane to our discussion, then, are those which suggest a principled reason why no computer could possibly produce an authentic work of art. I'll mention two examples in this section, taken from two very different writers. But they're highly similar in spirit, as we'll see.

The first example comes from Douglas Hofstadter. He's a cognitive scientist, who for many years has been developing computer models of creativity--specifically, creative analogies of various kinds, including typographical fonts (Hofstadter and FARG 1995; Hofstadter 2002). In addition, he has commented at length on other such work, in literary, visual, and musical domains. But he hasn't attempted to model the art that's closest to his heart: music. And that's no accident. For his view is that music involves emotions (in both creator and listener), which computers cannot have.

Presumably, he'd allow that a programmer might deliberately set out to model emotions, and then use this model in enabling a computer to compose music. And he'd certainly admit that a programmer might set out merely to generate compositions having one of several distinct emotional tones. Indeed, that has been done by several people, including another Douglas--Douglas Riecken (1989, 1994, 2002). But for Hofstadter, no matter how successful the result (in inducing sadness, or joy, or ... in the listener), there would be no genuine emotion in the music. For the composing computer isn't an emotional agent. In other words, the program's compositions wouldn't be authentic--just a clever fraud.

How extraordinary it would be, then, if a programmer who wasn't even trying to make his composing-machine express, or suggest, emotion managed to do so regardless. And how embarrassing (for Hofstadter), if the computer music concerned were to engage the emotions of musically sensitive listeners--even a highly sceptical listener, such as himself--in the same sort of way that human-originated music does.

Well, such a program already exists: the Emmy system, whose music was spurned by the specialist CD company mentioned in Section II. It was written by David Cope, a professor of

music at the University of California (Santa Cruz) and a recognized composer in his own right. The program has been developed and improved over the last twenty-five years (Cope 1991, 2000, 2001, 2006). Its first name was EMI (the acronym for Experiments in Musical Intelligence), but it soon became known as Emmy. This system is briefly described in Section V. Here, let's just note that it composes music in the style of X (where X may be anyone from Monteverdi to Joplin, and including non-European music too)--and that it does so with remarkable success.

Hofstadter has the honesty to admit this. As a fine amateur musician, he found even the early version of Emmy impressive despite--or rather, because of--his initial confidence that "little of interest could come of [its classical AI] architecture". Indeed, Emmy was so impressive that the experience shocked him to the core:

> I noticed in [the pages of Cope's 1991 book] an Emmy mazurka supposedly in the Chopin style, and this really drew my attention because, having revered Chopin my whole life long, I felt certain that no one could pull the wool over my eyes in this department. Moreover, I knew all fifty or sixty of the Chopin mazurkas very well, having played them dozens of times on the piano and heard them even more often on recordings. So I went straight to my own piano and sight-read through the Emmy mazurka--once, twice, three times, and more--each time with mounting

confusion and surprise. Though I felt there were a few little glitches here and there, I was impressed, for the piece seemed to *express* something .... [It] did not seem in any way plagiarized. It was *new,* it was unmistakably *Chopin-like* in spirit, and it was *not emotionally empty.* I was truly shaken. How could emotional music be coming out of a program that had never heard a note, never lived a moment of life, never had any emotions whatsoever?

[.... Emmy was threatening] my oldest and most deeply cherished beliefs about ... music being the ultimate inner sanctum of the human spirit, the last thing that would tumble in AI's headlong rush toward thought, insight, and creativity (Hofstadter 2001a: 38f.; italics in original).

One could argue that Hofstadter was allowing himself to be over-impressed, here. For what psychologists call the "effort after meaning" (Bartlett 1932) imbues our perception of music as well as of visual patterns and words. The human performer naturally projects emotion into the score-defined notes, much as human readers naturally project meaning into computer-generated haikus (Boden 2004: 170ff.). So, given that Chopin-like scores had been produced, it wasn't

surprising that Hofstadter interpreted them expressively. What was surprising was the fact that Chopin's composing style had been captured so well in the first place.

However, the important point here is that Hofstadter--like many others--regards the very essence of music as the expression and communication of human emotions. A similar position has been taken about art in general by the philosopher Anthony O'Hear (1995).

O'Hear sees art, by definition, as involving communication between one human being and another. This often goes beyond the communication of relatively unfocussed emotions, as happens in music, for it may express positive or negative concerns about specific aspects of the world. Think of the many 'Annunications' and 'Madonnas', for example, or of Pablo Picasso's 'Guernica'. But for any communication whatever to be possible, O'Hear insists, both artist and audience must share human experience.

Computers are therefore excluded. O'Hear refuses to refer to computer-generated products as "art", no matter how superficially beautiful or seemingly interesting they may be. He grants that music, pictures, and poems produced in this way may sometimes (as in Hofstadter's recollection) appear to satisfy some of our psychological and/or aesthetic needs. But were we to discover that they'd come from computers, he says, the satisfaction would evaporate. For we'd have been deceived: tricked (thanks to the ubiquitous effort after meaning) into responding to an item as though it were an artwork, whether good or mediocre, when really it was nothing of the kind.

Insofar as this is an empirical claim about people's psychological responses, there's some evidence for it. I myself have seen this sudden switch-of-attitude on several ocasions, the people concerned being adamant that their initial, spontaneous, reactions had been inappropriate. On the other hand, Hofstadter wrestled gamely to make his satisfaction evaporate--but couldn't do

so.

However, O'Hear is offering us prescription rather than description. He's talking about an item's entitlement to appreciation as an art object. And since he grounds the status of "art object" in human authenticity (of artist and observer), he sees talk of art-making by computers as philosophically confused, not to say absurd.

O'Hear doesn't bother to argue for his claim that computers can't have experiences--whether of emotions, or colours, or anything else. Like Hofstadter, he regards this as obvious. If asked about the few programs that specifically model emotions, he'd insist that they can't actually experience them. And he'd have many allies besides Hofstadter. For this opinion, or intuition, is shared by the vast majority of people--including visitors to art galleries.

Some tough-minded computationalists insist that they're mistaken (Dennett 1991; Sloman 2000). In a nutshell, these philosophers see conscious experience (alias qualia) as a matter of subtle discriminatory and action-oriented functions, occurring in a hugely complex, and self-reflexive, mental architecture. Emotions, on this view, are much more than feelings. At heart, they are essential scheduling mechanisms in a multi-motive intelligence. Conscious emotional feelings are only the tip of the functional iceberg (and, as such, they themselves are functional too).

If these computationalists are right, then Hofstadter's attack on the authenticity of any conceivable computer art must fail (although today's computer art certainly isn't produced by programs having the requisite complexity). O'Hear's challenge must fail too, unless one puts more weight on the word "human" than on the word "experience" (which would also rule out chimpanzee art or Martian art, even though chimps do, and intelligent Martians would, have

emotions of some kind).

Carefully considered, the functionalist analysis of qualia isn't as crazy as it seems at first sight (Boden 2006: 14.xi.b-d). But whether it's correct or not, this position is a minority taste even among philosophers of cognitive science. For sure, it's not widespread in the general public, still less in the art world. Computer artists, then, can expect to encounter the 'orthodox' opinion, which is that computers don't, and can't, have emotions in any sense.

Critics of computer art who agree with Hofstadter and O'Hear are demanding authenticity in two senses. On the one hand, they're saying that an artwork must involve some genuinely human communication, springing from genuinely human experience. On the other hand, the communication must be honest--which is why, as suggested above, the charge of hypocrisy undermines an artist's entitlement to acceptance. However, it's not clear that human-ness and honesty are enough. For "acceptance" is ambiguous as between aesthetic and moral acceptance, and the relation between these is notoriously problematic. Perhaps artistic authenticity also involves a moral dimension?

Suppose that the experiences being communicated by a human being are hatred, cruelty, and rage, directed onto an intentional object with respect to which such emotions are morally repulsive. Think of a Nazi film or newspaper cartoon depicting Jews, for example, or the cruelty-soaked writings of the Marquis de Sade. One may have to allow that these items are skilful, even hugely powerful in their emotional effect. But whether one should ascribe aesthetic value to them is a highly controversial matter.

In relation to our present discussion, the stories written by a 'sadistic' computer might arouse strong feelings in its readers, much as Emmy's music did in Hofstadter. But O'Hear, and perhaps

Hofstadter too, would say that we should not be repelled by it, because there's no real (authentic) cruelty there.

IV: Why do computer art?

If computer art is apparently so problematic, why do people do it in the first place? There are three main reasons.

The first is to overcome the technical challenges involved in programming a plausible computer composer, painter, or poet. This sometimes includes exploring the potential of some relatively new technology: evolutionary programming, for example. In that case, the programmers concerned may think of themselves primarily as artists (see Whitelaw 2004), or they may not (e.g. Sims 1991). The second reason for doing computer art is to explore the psychological processes involved when human artists go into action. And the third is simply to produce works of art.

These are very different motivations. It's possible for one and same person to be driven by all three. Often, however, one of them is paramount. When the prime reason is the third, namely to produce works of art, there's usually a further aim: to exhibit those artworks to the public, thereby gaining--or consolidating--one's reputation as an artist.

In such cases, how the public in fact responds will be important to the aspiring artist. If, like Hofstadter and O'Hear, most people--and influential art critics--see computers (for whatever reason) as essentially incapable of producing art, then the third aim will be frustrated. At best, the originator will be recognized as someone who could have produced good art, if only they'd left their computer in its box. (Hence my warning, in Section I, that both senses of "computer

artist" are problematic.) In short: no computer art, no computer artists.

That unappreciative public reaction has often been directed at Cope, the originator of the Emmy program. In one case, there wasn't even any pretence on the part of the critic that he had identified specific aesthetic flaws in the computer-composed music. For his review was published fully two weeks before the performance that he was 'reviewing': Emmy's first public concert, given in 1989 (Cope 2006: 345). Moreover, when phoned by Cope to invite him to attend the occasion, he refused.

His main objection to the music wasn't that it didn't spring from emotion. Nor did he complain that the concert pieces were musically crude, perhaps even faulty--how could he, if he hadn't heard them? Rather, he poured scorn on the very idea of a concert devoted to what he termed "computer forgeries".

In the art world, a forgery is the epitome of inauthenticity or bad faith. (And of bad luck too, if you pay a fortune to buy it.) To present the public with a work notionally by a long-dead artist when in fact it was made only yesterday is a betrayal of trust. Whether, and how, the devaluation of forgeries can be justified on strictly aesthetic grounds is controversial (see e.g. Stalnaker 2005; Davies 2004: 13ff., 200-205). But if--like O'Hear, for instance--one sees art as a form of human communication then forgery must be condemned, because it's deceitful. This suggests that the reviewer's deliberately insulting reference to "computer forgeries" shouldn't be taken literally. For Cope hadn't attempted to deceive anyone. To the contrary, the interest of Emmy's music lay largely in the fact that it clearly hadn't been composed by any famous names of the past.

The charge of forgery was compounded, in this reviewer's eyes, by the risk of contaminating the listener's musical knowledge, or expectations. Given that too few people, he said, know the

music of C. P. E. Bach (one of the composers mentioned in the advance programme), it was "unforgivable to dilute the repertoire" with Emmy's versions of it. He was complaining not only of the lack of authenticity in any music composed by computers, but also of the inauthenticity involved in aping (riding on the back of?) specific--and sometimes sadly under-appreciated--human musicians.

Cope was especially chagrined by this criticism because he'd had no intention of "diluting" the repertoire. To the contrary, he'd already decided that he'd never release more examples of a given genre than the original human composer had done. So, for instance, he has officially published only 371 Bach-style chorales (although he confesses that 5,000 were put on his web-site for downloading in 2005, alongside 1,000 Chopin nocturnes). The reason was precisely to avoid risking the originals' being "lost amid greater numbers of new compositions in the same style and form" (2006: 364).

Indeed, he'd started out with no intention to imitate other composers, still less dishonestly to produce "forgeries". His original aim had been to write a program to produce music in his own style. However, he soon realized that he was "too close to [his] own music to define its style in meaningful ways", so he switched to the well-studied classical composers instead (2001: 93). By "well-studied", he meant not merely familiar, but musicologically documented. Dozens of musicians and scholars had already started to identify the stylistic patterns found in classical music. Those patterns could be applied not only in assembling Emmy's data-base, but also in designing the procedures used to generate new compositions.

He was annoyed, too, at the reviewer's tacit downplaying of his own musical skills, and his near-invisibility qua artist. For he, not the computer, was the true composer of Emmy's music.

Indeed, he still feels it necessary to insist that Emmy's music is, in truth, "my own" (2006: 346). (Notice that if we take this seriously, then O'Hear's and Hofstadter's criticisms fail. For the music must now be regarded as an artwork of human origin, communicating human experience--including emotion--to other human beings.)

The fact that he wrote the program-code isn't the main point here: as remarked in Section I, someone else might have done that. (As it happens, Cope was technically highly adept; for instance, he invented a way of describing music formally, before the MIDI format was available.) The point lies, rather, in his musical skills--which were crucial in two main ways.

On the one hand, he identified the items to be used in the data-base for each human composer being studied, and chose the musicological principles guiding the program's composition. On the other hand, and less obviously, he decided just which instances of Emmy's output would be put before the public--in concerts, for example. He was determined to release only the best. These would be "the tip of the iceberg", with respect to the entire mass of Emmy's production. (The now-complete list of "the best" comprises about 1,000 items, recalling 35 composers--2006: 385-389.) Deciding which items were the best required subtle musical judgments. For instance, Cope usually rejected Emmy-compositions that he judged to be "vague paraphrases" of entries in the data-base. Occasionally, however, he accepted them because the composer in question, e.g. Mahler, "seemed so fond of self-referencing" (2006: 346).

However, such self-defence fell on deaf ears. If the reluctant concert-goer's vitriolic review was the first public attack that Cope had to endure, there were plenty more where that came from. And they hurt. They didn't injure only his personal pride, but also his perceived status as an artist.

Eventually, they elicited an unexpected response. He has recently destroyed much of a quarter-century's work--not in a fit of petulance or pique, but specifically in order to highlight the artistic authenticity of his oeuvre. This dramatic incident, as we'll now see, sharpens the question of why an artist would even want to do computer art.

V: A case-history

To understand this story, one needs to know a little about how Cope coaxed his computer to compose music "in the style of X".

Emmy's basic method has been described by Cope as "recombinatory", and was summarized by Hofstadter (2001a: 44) as "(1) chop up; (2) reassemble". Both these descriptions underplay what the program was doing, for--taken at face value--they suggest that Emmy works by random generation. In fact, the program's "recombinations" were highly constrained, in musically acceptable ways. For Emmy explored generative structures, as well as recombining motifs. It showed both combinational and exploratory creativity--but not, as Hofstadter (2001b) was quick to point out, transformational creativity (Boden 2004). A 'new' style could appear only as a result of mixing two or more existing styles, such as Bach/Joplin or Thai/jazz.

The program's data-base was a set of 'signatures' (note patterns of up to 10 melodic notes) exemplifying melody, harmony, metre, and ornament. These had all been selected by Cope himself, as being characteristic of the composer concerned. Emmy would start applying statistical techniques to identify the core features of these snippets. Then, guided by general musicological principles, she/it would use them to generate new structures.

(Some results worked less well than others. Cope has described some of these unsatisfactory

results, saying just what he thinks is wrong with them--e.g. 2001: 182f., 385-390. In other words, he himself criticizes Emmy's compositions in specific ways, as considered in Section II. When choosing "the best" pieces for public exhibition, however, he tries to avoid faulty examples.)

The early versions of Emmy were exercises in traditional, symbolic, AI. That's largely why Hofstadter, already a long-time critic of GOFAI, was so amazed at their emotional power. From 1990 on, a connectionist network was added, giving Emmy increased flexibility (Cope says it had become "truly creative"). Today, its successor program uses a fully integrated associative network; even so, it still employs the core principles that inspired Emmy.

Emmy soon became famous, even to people who had no interest in computers. Part of its notoriety was spread by scandalized gossip: "There doesn't seem to be a single group of people that the program doesn't annoy in some way" (Cope 2001: 92). But as well as relying on newspaper features and word of mouth, people could read about it, and examine some Emmy scores, in Cope's books. Enthusiasts could even try it out for themselves, following his technical advice, by using one of the cut-down versions ("ALICE" and "SARA") provided on CDs packaged inside his books.

They could listen to Emmy's compositions, too. Some stand-alone CDs were released in the late 1990s, and several live concerts of Emmy's music were staged to public audiences. (These featured human instrumentalists playing Emmy's scores, because the program didn't represent expressive performance. As remarked in Section II, it laid down what notes to play, not how to play them.)

However, the concerts were mostly arranged by Cope's friends. The musical establishment was as loath to support them as was the anticipatory reviewer mentioned in Section IV. Cope now

recalls: "Since 1980, I have made extraordinary attempts to have [Emmy's] works performed. Unfortunately, my successes have been few. Performers rarely consider these works seriously" (2006: 362). For someone aspiring to be accepted as an artist, that dismissive attitude was very hard to take. (I say "aspiring", even though he was already accepted as an artist in respect of his 'normal' music, because he wanted his computer music to be regarded as art too.)

The problem, as he sees it, was that the dismissive performers (like most people) regarded Emmy's music as computer "output", whereas he had always thought of it rather as music. Naturally, he wanted listeners to approach it as music. But many were unable, or anyway unwilling, to do that. The fact that it was computer-generated swamped the fact that its human originator was looking for an innocent aesthetic response on their part. As suggested in Section II, their putatively aesthetic criticism was largely "rhetoric [that is] simply a subterfuge engineered to avoid confronting the music directly" (2006: 351).

A large part of the difficulty was that the term "output", besides suggesting inhuman tin cans, implies infinite extensibility. This, Cope found, makes people devalue music considered as output. The fact that human artists die, he remarked, is part of what makes us value their work. Rarity is important for our unsullied aesthetic response, not only in the grubby context of the auction-room: "Part of what's involved in experiencing any work of art is knowing that while it may be imitated, it is unique" (2006: 363). Put another way, an artwork's authenticity is grounded in its being a specific communication that a specific individual has chosen to make--where the number of such choices is always finite.

This is why, just over a year ago, Cope took the drastic decision to destroy Emmy's historical data-base (2006: 364). There will be no more new Bach-style fugues from the program. The old ones still exist, however, both on CDs and in printed scores (and on Cope's website). As Cope

puts it, they constitute a "completed oeuvre", which can be studied by musicians just as any other composer's work can be. He even feels that the uniqueness of this collection will render the individual pieces "musically more valuable than they seemed when each new day brought the possibility of many new creations", (2006: 363). As a result, he hopes, they will be performed by others besides his close friends and colleagues.

(It must be said that Cope's sensitivities about uniqueness aren't shared by all computer artists. Harold Cohen, for instance, welcomes the prospect of indefinitely many novel examples of his (sic) art continuing to appear after his death: Cohen 2002. This difference in attitude may reflect the fact that Cohen, unlike Cope, has never aimed to make his program produce art in someone else's style.)

Emmy has gone out with a bang, not a whimper. The program's "farewell gift" to the historical-music world was a 52-page score for a new symphonic movement in the style of Beethoven. This required "several months of data gathering and development as well as several generations of corrections and flawed output" (Cope 2006: 366, 399-451). From now on, Emmy--or rather, Emmy's much-improved successor--will be composing in Cope's own personal style, as "Emily Howell" (372ff. and Pt. III passim). (Emily's data-base will be drawn largely from Emmy's music, so this new, unique, creative entity--Cope's words--will be reminiscent of its moth-balled predecessor.)

This tale can be read as a dire warning to people motivated by the third aim listed at the outset of Section IV. It wouldn't be surprising if some still-struggling computer composers were so discouraged by Emmy's poor reception--from professional instrumentalists and other musicians, as well as the general public--that they renounced computer art entirely. An artist who has

already invested years of effort in computer art will be less ready to abandon it. Cope himself, for instance, hasn't done this: Emily Howell is proof of that. But ambitious youngsters, hearing about Cope's difficulties in getting his works "considered seriously", might decide not to enter the field in the first place.

If you're persuaded that virtually no-one is going to credit you with producing authentic works of art, why bother? At best, your work will be confined to a niche market.

VI: Conclusion

Whether Cope's future listeners will, as he hopes, be willing to regard Emily's output as authentic music remains to be seen. They may or may not like it, but that's not the issue. (Someone who doesn't appreciate atonal music may accept Schoenberg as a real artist, and his oeuvre as an authentic body of art.) As we've seen, most members of the art-audience approach putative artworks with certain philosophical assumptions in mind, which prevent them from taking computer art seriously.

These assumptions have nothing to do with the intrinsic qualities of specific examples of computer art. Rather, they concern the authenticity--or, as most people would have it, the inauthenticity--of computer art in general. They include the following: (1) art must spring from human agency; (2) art must be grounded in emotion; (3) art must involve the communication of human experience; (4) art must be honest, and/or produced in good faith; (5) art must be unique/rare; and (6) art must be transformational.

The first four assumptions could be satisfied if one were prepared to ascribe the human concepts concerned to computers too. As we saw in Section III, a few philosophers are in

principle willing to do that. But even they have to admit that current and foreseeable computers don't/won't have the necessary complexity, so this isn't promising as a way of saving the authenticity of computer art. Alternatively, one might seek to neutralize the first four assumptions by identifying the human computer artist as the true originator of the artwork (compare Cope: Emmy's music is "my own"). However, problems then arise due to the indirectness of the (often) highly complex computational processes that actually generate the works.

(One might even quibble about the word "human" in assumptions (1) and (3), not only to allow computer art but also to admit chimpanzee art and Martian art. With respect to the latter two genres, constraint no. (2) would be satisfied, since--as noted in Section III--both chimps and suitably intelligent Martians have, or would have, emotions. However, assumption (4) would exclude the chimps, if not the Martians. Having a relatively primitive Theory of Mind, chimps can't lie--so they can't be honest, either: cf. Tomasello et al. 2003.)

The fifth assumption can be countered by deliberately limiting the productive capacity of a given program, as Cope did with respect to Emmy. But 'killing' a program for this reason is arbitrary, even inauthentic--unlike the all-too-authentic phenomenon of a human artist's death.

The sixth assumption could be countered in two ways. First, one could point out that not all of the art that's heard in concert halls, read in books, or seen on gallery-walls, is transformational. Much of it springs from combinational or exploratory creativity, which are available to computers in principle--and, up to a point, in practice (Boden 2004). Cope's work is an excellent example, wherein exploratory and combinational creativity are combined. However, it's true that much of the art that we value most highly is transformational, so to that extent the assumption must be granted.

Second, one could argue that evolutionary programming enables computers to engage in transformational creativity too. Indeed, this technique can sometimes generate results that are not only unpredictable but bear no recognizable relation to their 'ancestors' (Sims 1991; Boden 2004: 318-320). However, whether purely programmed (as opposed to embodied and/or world-linked) systems can generate transformations that are truly fundamental, such that the system surpasses the limits initially inherent in it, is a difficult and controversial question (Boden 2006: 15.vi.d).

In sum, none of these six assumptions about the nature of art can be confidently rejected (although the last must be qualified), and none can be unequivocally satisfied by computers. If they remain in play in people's minds, the status of computer artists as recognized artists will remain problematic.

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