

Can Machines Create Art?

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Abstract As machines take over more tasks previously done by humans, artistic creation is also considered as a candidate to be automated. But, can machines create art? This paper offers a conceptual framework for a philosophical discussion of this question regarding the status of machine art and machine creativity. It breaks the main question down in three sub-questions, and then analyses each question in order to arrive at more precise problems with regard to machine art and machine creativity: What is art *creation*? What do we mean by *art*? And, what do we mean by *machines* create art? This then provides criteria we can use to discuss the main question in relation to particular cases. In the course of the analysis, the paper engages with theory in aesthetics, refers to literature on computational creativity, and contributes to the philosophy of technology and philosophical anthropology by reflecting on the role of technology in art creation. It is shown that the distinctions between process versus outcome criteria and subjective versus objective criteria of creativity are unstable. It is also argued that we should consider non-human forms of creativity, and not only cases where either humans or machines create art but also collaborations between humans and machines, which makes us reflect on human-technology relations. Finally, the paper questions the very approach that seeks criteria and suggests that the artistic status of machines may be shown and revealed in the human/non-human encounter before any theorizing or agreement takes place; an experience which then is presupposed when we theorize. This hints at a more general model of what happens in artistic perception and engagement as a hybrid human-technological and emergent or even poetic process, a model which leaves more room for letting ourselves be surprised by creativity—human and perhaps non-human.

Keywords Machine art · Algorithmic art · Art · Creativity · Computational creativity · Aesthetics · Philosophy of technology · Heidegger · *poiesis*

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1 Introduction

As more tasks are delegated to machines, the question arises if this can also be done for artistic creation. For some, art is one of the last domains that have not been taken from us yet, a domain we like to claim exclusively for us, humans. Others do not have a problem admitting that machines can create art. And, perhaps for most of us, things are not that clear at all. We are not sure. Is it really art, and if so, is it different from human art? What exactly is the status of these works and these creative acts?

The problem is not a merely abstract one: people have tried to make machines that create art, and many works created by machines are already presented as art.¹ But if a computer is said to compose music, is the machine really “creative”? And, *is* the product really art? What should we think of claims that, for instance, a neural network has created a Van Gogh² or a robot is able to draw portraits of people?³ We can see the outcome and performance, and perhaps, we see something that looks like art. But, is it art? Is for instance the robot really drawing? Is the *process* really creative? There is uncertainty about the status of these works of art and creative processes.

Interestingly, it does not suffice to answer these questions by saying that the results of these artistic and scientific experiments are merely “programmed”. It is more complicated than that. They are programmed in the sense that the algorithm, the code, is programmed, but the end product—what is claimed to be the work of art—is not *directly* made by a human being. The algorithm, not the human, is the “artistic” agent. The human is the creator of the code, not of the work of art. The non-human creator is created by human creators, but the work created by the non-human agent is not directly created by the humans (compare this to the idea that human beings are created but then in turn themselves become creators, become themselves a demiurge—a mortal one, but a creator nevertheless). It seems that the creativity is no longer entirely in the programmer but has migrated to the technology. This is especially the case when the machine has the capacity to learn or when, in other ways, the process cannot simply be reduced to the execution of a code written by humans (the promise of artificial intelligence and artificial creativity). Thus, machines seem to enter the sphere that was previously reserved for humans. But, in what sense does the machine ‘create’ the work, is what goes on here really creativity and is the result really a work of art?

These questions are not only interesting from the point of view of determining the status of machine art and machine creativity, they also make us reflect on the nature of human art and human creativity. They are interesting for researchers in cognitive science and artificial intelligence who want to explain human creativity (see below), but also for philosophers thinking about art, about the human and about the ways humans may relate to technology. Thinking about machine art forces us to re-examine our classic definitions of art and creativity. What exactly do we mean when we say that someone is creative? What is art creation and what is art? Similarly, these questions make us think about what “humanness” means as opposed to the “machine” character

¹ By art, I mean not only the visual arts but also the auditory and performing arts such as music and contemporary dance.

² Recently, it has been reported that a neural algorithm can imitate the style of Van Gogh (<http://www.wired.co.uk/news/archive/2015-09/01/art-algorithm-recreates-paintings>).

³ Artist Patrick Tresset has created a robot that can draw faces (<http://www.wired.co.uk/news/archive/2011-06/17/sketching-robots>).

of things and activities. What exactly is so special about us compared to machines? What do we mean when we say that humans can create ‘original’ art?

Finally, this exercise of questioning machine art and machine creation is also important for the philosophy of technology, since as I will show, it raises the question concerning the relation between art and technology. What exactly is the role of technology in art? Are there similarities between artistic creation and technology? What do we mean by technology anyway? Moreover, as the beginning of this introduction suggested, the discussion about the artistic status of machine “art” seems also part of a broader discourse and anxieties/enthusiasm concerning the question if machines will take over, if they will make humans obsolete in a lot, if not all, domains of previously exclusively human activities. Consider for instance the discussion about robots in healthcare or the discussion about automation and employment: will robots replace nurses and perhaps replace all kinds of jobs previous done by humans? Will they even take over more intelligent and indeed more *creative* jobs? But, what do we mean by creative?

In response to these problems, this paper offers a framework of concepts and questions that can be used to discuss the main question in a more precise way when faced with particular cases and claims about machine art and machine creativity.

First, the paper breaks the main question down in three sub-questions, and then analyses each question in order to arrive at more precise problems with regard to machine art and machine creativity: What is art *creation*? What do we mean by *art*? And, what do we mean by *machines* create art? This analysis then provides criteria we can use to discuss the main question in relation to particular cases. In the course of the analysis, the paper engages with theory in aesthetics and literature on computational creativity and contributes to the philosophy of technology and philosophical anthropology by reflecting on the role of technology in (all human) art creation. Although this discussion is in no way exhaustive of all the relevant theories that may be found in these fields, the emphasis is on the articulation of some of the main positions and criteria.

Then, starting from these questions, the paper contributes its own argument about the status of machine art, which does not only respond to the subject-object discussion but also enables a questioning of the question regarding criteria. Articulating and criticizing some unexamined assumptions in the previous discussion, it is first argued that the distinctions between process versus outcome criteria and subjective versus objective criteria of creativity are unstable, that we should consider non-human forms of creativity and that we should not only consider cases where either humans or machines create art but also collaborations between humans and machines—a thought which invites us to further reflect on human-technology relations. Finally, the paper questions the very approach that seeks criteria. It is suggested that the artistic status of machines may be shown and revealed in the human/non-human encounter before any theorizing or agreement takes place, and that this epistemology of machine creativity hints at a more general model of what happens in artistic perception and engagement as a hybrid human-technological and emergent process. It is a hope of the author that this model leaves more room for letting ourselves be surprised by creativity—human and perhaps non-human.

2 Can machines *create art*?

A first way to break down the large question “can machines create art?” into smaller parts is to distinguish between process and outcome. We can focus either on the creative process or on the work of art. One could add more elements⁴ and later on in the paper, I will question this distinction, but it is a good way to start the analysis.

It is also a distinction that can be found in discussions about ‘computational creativity’ in artificial intelligence, cognitive science and related areas. Whereas some researchers focus on creating *art works* with their machine, on the ‘external’ outcome, others focus more on the ‘internal’ workings of the machine, on the process by which the art work is created. An example of the first approach is the so-called Turing test for art works: people are asked to say which work of art is created by a human and which one is created by a computer. A machine work of art passes this Turing test if people are unable to make this distinction, that is, if they think it might as well be created by a human. For instance, Boden defines the criterion as follows: for a program to pass the Turing Test ‘would be for it to produce artwork which was (1) indistinguishable from one produced by a human being and/or (2) was seen as having as much aesthetic value as one produced by a human being’ (Boden 2010, p. 409). But, if a machine passes this test—and many people in the field claim machines have *already* done so—then is this machine *really* creative? This leads many researchers in computational creativity (including Boden) to take the second approach, which tries to define creativity in a non-behavioural way. An example of the second approach is discussions about what creativity is and what capacities are needed for creativity. For instance, one may argue that what is needed is a system that ‘legitimately instantiates mechanisms with some similar properties to those that result in the appearance of mental states in cognitive agents’ (McGregor et al. 2014). Or, one may argue that creativity requires imagination and/or that embodiment is necessary for creativity. One may also ask if the capacity to create presupposes the capacity to *evaluate* and appreciate art. These discussions have an overlap with discussions in the philosophy of the mind (see for instance McGregor et al. 2014) and of course artificial intelligence in general. For instance, the attempt to create a machine that has a genuine creative process and capacities (rather than merely *imitating* this process and these capacities) has been termed ‘strong computational creativity’ as opposed to its ‘weak’ counterpart which only tries to mimic the creative process, in analogy with ‘strong AI’ versus ‘weak AI’ (Al-Rifaie and Bishop 2015).

Let me begin with the creative process. Can machines engage in a genuinely creative process? For instance, is drawing done by an algorithm really drawing or is it “just movements”? What is creativity anyway?

There is already plenty of literature on creativity and art in the areas of philosophy of creativity, aesthetics and psychology, ranging from Socrates’ idea that creativity is about divine inspiration (in the *Ion* and *Phaedrus* dialogues) and Kant’s romantic ideas about originality and genius to psychological accounts such as Guildford’s (1950) and more recently authors such as Kaufman, Cropley, Moran and Sawyer (see for instance Kaufman and Sternberg 2010). Today, a popular approach is one in which philosophy

⁴ One can also focus on the character of the person or on the context. Here, I will limit my analysis to process and product (see also Rhodes 1961).

meets empirical psychology in an effort to explain creativity (see for example Paul and Kaufman 2014).

With regard to machines, in the field of artificial intelligence, computing and robotics, there is a considerable amount of work on computational creativity, which seeks to model and replicate human creativity in a computer. Again, explaining creativity is the goal. Boden argues in her influential book *The Creative Mind* that romanticism does not have an understanding of creativity (Boden 2004, p. 15); instead, she wants to explain creativity, turning the mystery into a puzzle that can be solved by science. According to her, creativity depends on ordinary mental abilities. One could say that she is engaged in the work of disenchantment: science should do away with magic; creativity is not magic but can be explained by reducing it to mental abilities, which might be simulated by a machine. This attitude towards creativity and romanticism is common among scientists; as Boden says elsewhere, ‘people of a scientific cast of mind’ are often ‘anxious to avoid romanticism’ (Boden 1994, p. 75) (I will say more about romanticism below.) Moreover, Boden is mainly interested in how *human* creativity is possible: what she calls the fourth Lovelace question⁵—whether computers themselves could ever *really* be creative as opposed to producing the appearance of creativity—is for her not a scientific but ‘a philosophical worry about “meaning”’ (Boden 1994, p. 85).

In any case, in explaining creativity, Boden stresses mental abilities. Others question the psychological emphasis on (individual) mental processes and propose to pay more attention to embodiment when thinking about creativity (e.g. Saunders et al. 2010; Lucznik 2015) or put more emphasis on behaviour. Cardoso and Wiggins (2007), for instance, define computational creativity as ‘the study and simulation, by computer means, of behaviour, natural and artificial, which would, if observed in humans, be deemed creative.’ Similarly, Colton and Wiggins define computational creative research as the philosophy, science and engineering of computational systems that ‘exhibit behaviours that unbiased observers would deem to be creative’ (Colton and Wiggins 2012). These behaviourist definitions are interesting, since they put the criterion on the side of human observation. It seems that what matters here is not whether a computer *is* creative but whether it can *appear* to be creative. Here, the emphasis is on the observer, listener, etc. who gives meaning to what the machine does and makes (I will return to this point when discussing objective versus subjective criteria).

For the sake of the present analysis, I will mainly draw on philosophical *aesthetics*, although I will also refer to the literature on computational creativity when relevant for sketching the main positions and raising the questions. Let me distinguish between two long-standing opposing views on what it means to artistically create (of course there are many more views but this selection suffices for the present purpose).

One is modern and expressivist. The idea is that when you create, there is something you express. This ‘something’ is something from yourself, something inner, like an emotion or your authentic self. Moreover, there is an origin (whatever that is and means), and a work of art is original if it is connected to that origin. This view has been developed by the romantic tradition and has become a key ingredient of modern(ist) thinking about art. Collingwood, for instance, echoes the romantic, expressivist idea

⁵ Inspired by Lovelace, Boden outlines the following questions: (1) Can computers help us to understand how *human* creativity is possible? (2) Could computers ever do things which *appear* to be creative? (3) Could computers *recognize* creativity? (4) Could computers ever *actually* be creative? (Boden 2004)

when he defined art as self-expression. ‘By creating for ourselves an imaginary experience or activity, we express our emotions and this is what we call art’ (Collingwood 1938, p. 151). And today, many art lovers still use the language of originality when they approve of a work of art. Sometimes, the romantic term ‘genius’ is also used to refer to a very creative individual—in art and elsewhere. According to this view, creativity relates to something ‘in’ the person. Art and creativity is about creative artists.

According to a different, pre-modern view, what art is doing and should be doing is *mimesis*, imitation.⁶ Here, the point is not to express something of yourself but to imitate as well as possible what you see in your environment: the natural environment, perhaps also people, buildings and so on. Traditionally, the focus was on imitating nature. In ancient Greece, the artist’s challenge was to imitate nature as much as possible. For Plato, this meant that art was further away from truth (see the *Republic*). Aristotle’s *Poetics* deals specifically with *mimesis*. He argues that we are imitative beings, who are born with the instinct to imitate. In the beginning of the *Poetics*, Aristotle says that poetry—what we would now call theatre, poetry, music—is *mimesis* (1447a13–16). Tragedy and its benefit of *catharsis* only work if there is distance. Art is not the same as reality; it is not even a mere copy. Coleridge, a romantic writer who nevertheless was attracted to the concept of *mimesis*, already stressed that imitation goes through a different medium. There is a mix of sameness and difference: ‘imitation, as opposed to copying, consists either in the interfusion of the same throughout the radically different or of the different throughout a base radically the same’ (Coleridge 1817, p. 355). But, tragedy also needs imitation as sameness; we should feel that what happens on the stage could also happen to us; we should be able to identify with the characters.

There are of course more views on artistic process, but let me limit the discussion here to these two criteria and explore what they may imply for the main question concerning machine art.

First, if we assume an expressivist view, then it seems not possible for machines to engage in true artistic creation, since this presupposes some ‘inner’ state or inner self, and as far as we know, machines do not have such an inner state: they lack consciousness (this argument from consciousness is also well known in the computational creativity literature; researchers in the process tradition often try to counter this objection with the view that consciousness is not necessary, that some (other) capacities that do not depend on consciousness are sufficient for creativity). Moreover, what is lacking, according to the romantic-expressivist view, is a true origin. As Lovelace already remarked about Babbage’s analytical engine, it has ‘no pretensions whatever to *originate* anything’ (Lovelace quoted in Boden 2004, p. 16). Humans, by contrast, can be original, authentic and so on, and in works of art, they can express this originality and authenticity.

And indeed, Collingwood explicitly excludes the ‘technical’ when he explains the term ‘creating’ in his definition of art: “‘Creating’ refers to productive activity which is not technical in character” (Collingwood 1938, p. 152). For Collingwood, something does not need to be materialized or sensuous for it to be art, and partly for that reason

⁶ I side with the view that ‘mimesis’ should be translated, if at all, as imitation and not as representation, since representation can be done by anything (a symbol for example) whereas Aristotle probably meant that the artists should imitate nature, rather than representing it through whatever sign one can imagine.

(we may assume), he is also keen to distinguish between art and craft. What matters in art is imagination and expression. The work of art can exist in someone's head, for instance, a piece of music that remains inaudible for others (p. 151). Clearly, what matters for Collingwood is the process, and in particular expression and imagination. But machines, it seems, can do neither of these. They have no 'self' that can be expressed and they lack imagination.

Second, if we assume a mimesis conception of artistic process, however, the machine has at least a chance to be included in the domain of artistic work, since the only thing that matters is imitation. Unless one can come up with a different definition of mimesis, it seems that this is simply what mimesis means. Hence, if a machine is capable of imitating whatever it 'sees', then according to this criterion, it seems that what it does qualifies as artistic creation. For example, if on the basis of the information given by its sensors and by means of an algorithm a machine is able to draw a portrait of a person that *looks like* the person, then that machine has succeeded in meeting the criterion. And, if on the stage the machine imitates a human being, then this can, in principle, be art—again, if we understand art as mimesis and if we understand mimesis as imitation. What matters is what happens in the performance, that is, what matters is how well the machine imitates nature. If the work of art looks like the original, then according to this view, the machine has created art (it remains unclear, however, if a machine can meet Collingwood's more sophisticated mimesis criterion: does the machine merely copy or can it also *interfuse the same through the radically different*? What kind of 'difference', exactly, is needed for any kind of creativity as mimesis?)

In the *mimesis* view, however, the distinction between process and outcome breaks down, since the process is judged by the outcome. The criterion for deciding the nature of the process is the product: we only know if the process is one of imitation if we look at the product: does the work of art imitate the original?—which is usually interpreted simply as does it look like, sound like, etc. as the original? Whether or not there is mimesis is judged by the outcome of the mimetic process (and perhaps the same is true even of the expressivist view, since whether or not expression of something inner is going on can only be judged on the basis of outer appearance. I will return to that later). Therefore, let us now look at some outcome criteria.

3 Can machines create *art*?

A different way to understand the question regarding machines and art is to focus on the outcome and ask, is what the machine creates, the artistic product, the work of art, really a work of 'art'? Is machine art really art?

Again there are various theories in aesthetics about the definition of art (for an overview, see for instance Adajian 2012). Some try to define art in terms of specific features, such as 'aesthetic' features—which shifts the problem to what aesthetic means—or expressive properties (see again the romantic-expressivist view). For instance, Beardsley defines art in terms of the aesthetic experience it affords (Beardsley 1982): this shifts the problem to what aesthetic experiences are. A traditional view equates art and the aesthetic with beauty—a view which has been questioned since Ruskin and Gothic: art can also be sublime; for instance, it does not have to be beautiful or pleasing. One can point to aesthetic features by using terms such as elegant, nice and grotesque and so on or

one can turn to more formal, ‘objective’ features such as harmony and unity. In all these cases, what counts for the creative and artistic status of the work of art are its properties.

Others reject the criteria that have to do with the aesthetic features of the work of art. They might hold a conventionalist view: art is an artefact created by (someone who is recognized as) an artist and presented in an art context such as an art museum or an art gallery. For example, Dickie has proposed an institutional definition of art, according to which the status of art depends on whether it receives appreciation by the art world (Dickie 1974). To others, this definition is unacceptable since it seems to render everything a (potential) work of art.⁷ A good counter objection to this is that this is not true since process matters: not everything makes it through the hands of (who is considered to be an) artist to the museum or art gallery (notice again that the process-outcome distinction breaks down: here, the process of art institutionalization becomes important).

This is of course only a very brief representation of the discussion about what counts as art, which leaves out many other relevant definitions and debates in aesthetics. For the purpose of the present paper, let me (re)frame the debate about the definition of art by distinguishing between ‘objective’ versus ‘subjective’ views, which can be seen as two extremes of a continuum. According to one view, there are objective criteria for deciding whether or not something is art. For instance, in ancient times someone holding a mimesis view may think that to draw a human body, there are certain rules one must follow, based on the (ideal) proportions of a human body. The result of the art work, the work of art, is then judged based on these rules. Or, a modern formalist may give very precise definitions of what aesthetic means. According to a very different view, however, there are no such objective criteria. Art is what we call art, what we decide art is, what we agree to call art. Art is subjective, depending on the individual, or it is a matter of collective agreement and institutionalization. It is individually or socially constructed.

If what counts as art is a matter of objective criteria, it seems that machines may have a good chance to qualify as genuinely creative and as producing, especially if these criteria can be formalized. If there are objective criteria, we can try to program machines in such a way that they make things that meet the criteria. We can make code, based on the rules. Someone who evaluates whether machine art is really art, then, will ascribe art status to the product when it is clear in the product that the rules have been followed (note again that the distinction breaks down: unless one has access to the code of the machine, the product is evaluated by process). For instance, if a drawing is made according to the rules of good portrait drawing, and if one assumes that there are such rules and that they can be formalized, then there is no barrier to calling that drawing a work of art.

In practice, it may be very difficult for a machine to create something that meets certain objective criteria. But the point is that in principle, it is possible for a machine to do it. In contrast to the expressivist definition of art, these kinds of definitions do not exclude machines a priori.

⁷ Typical controversial twentieth century cases here are Marcel Duchamp’s ready-mades (found objects that are then exhibited in an art context) and John Cage’s composition 4’33”, usually perceived as 4 min and 33 s of silence.

On the other hand, if there are only subjective criteria, it seems that the machine gets an even better chance to be seen as an artist having created a work of art. If the only thing that counts is subjective decision or social agreement, then if these are in place, this is all the machine needs. If what constitutes art is open, then it may also be open as to whether machines could join the community of artists. For instance, if a neural network creates something we (humans) call art, then it is art—end of the matter; the artistic status of the product is clear.

Some computational creativity researchers take into account this subjective criterion, for instance, when they refer to the art ‘consumer’ and take the evaluation of that consumer—or indeed even the *buying* of that consumer—as a reference point for developing creative machines.⁸ Colton argues that once we consider how creativity in human artists is assessed, we arrive at a model in which a consumer projects creativity onto the artist (Colton 2008).

Again, this does *not* mean that it is necessarily and always easy for a machine to create art. There is still the challenge of producing objects that produce an art experience or that become institutionalized as art. But, the machine is not excluded a priori and ‘competes’ with the human on an equal footing with regard to getting its product accepted as a work of art. The machine faces the same challenge as the human artist: the challenge of creating a product that qualifies as art. Here, it does not matter whether the human or non-human artist is ‘original’ or ‘expresses’ something, or whether it is good in terms of mimesis (since here, process does not matter). And in the conventionalist and subjectivist case, it does not even matter whether the work of art is good according to the objective criteria; the challenge is to get approval from the community of art observers, from the audience and from the spectators. If an audience watching a robot move on the stage and qualifies this movement as ‘dance’, for instance, then according to this criterion, it *is* dance. If observers say a robot ‘draws’, then that robot *is* an artist. If people say the neural network has created a Van Gogh then it is one—never mind the process (expression or imitation) or objective criteria.

Let me stress that when, according to some of these criteria, machines can in principle create art, this does not always mean that (1) it actually happens that art is created and (2) that it is *good* art. Like human artists, some machine artists may be better than others and some works of art they create are better than others. Indeed, even if one accepts that machines can create art, it is good to keep in mind that there are *degrees* of creativity, a view which many computational creativity researchers such as Boden (1994) accept.

However, let me end this question with two remarks. First, as Colton rightly observes, people do not always seem to look at the aesthetic qualities of an art work but ‘are really celebrating the creativity of the artist rather than the value of the artefact’ (Colton 2008). This suggests that also in a conventionalist, outcome-oriented discussion, the romantic notions of art may still be very important and continue to play a role, for instance, the notion of artistic genius. It may be that some people’s appreciation is more

⁸ This notion of the art consumer may be seen as very problematic if one holds the view that ‘consumption’ of art is different from other types of consumption: to experience a work of art seems different from, say, consuming an ice cream. Let alone that buying an artwork would be the same as giving a positive evaluation of an artwork. This view about art consumption as found in this literature seems rather naive to me since entirely insensitive to a more social and political understanding of art. But, I will not further discuss this issue here.

‘complex’ and, as Colton argues, relies on a discovering process including effort, ingenuity and skill (Colton 2008). But, more ‘simple’ ways of evaluating art might be at least as common if not more common. Often, the person or indeed label or ‘brand’ of the artist plays an important role: once a particular artist gets the label of ‘artist’, ‘genius’ and so on, the aura of the artist is bestowed onto her works—at least to a significant extent regardless of what art critics may label as the ‘aesthetic qualities’ of the work of art. I suggest that this model partly works because of the influence of the romantic tradition, which in its individualist version tends to emphasize the artist and sees the work of art as a mere expression of the artist and her genius.

Second, both the process-oriented and outcome-oriented approaches seem to assume that the main goal of trying to make machines creative should be to mimic *human* creativity—either as process or as product. But, this assumption can and must be questioned; there might be other, non-human forms of creativity (see below).

Let me further critically discuss the positions and distinctions introduced so far.

3.1 Further Discussion

The objective-subjective distinction was helpful to frame the discussion about the definition of art. However, there is a straw man problem. We can safely assume that most of us do not hold either an objective or a subjective view of art but think in less extreme terms about art. Most of us, we can assume, believe that art is more than what people say about it; at the same time, we think that rules are not sufficient for creating a work of art or that art cannot easily be captured in terms of formal definitions, and that ‘taste’ and approval do matter somehow—even if we are not sure about exactly how. Capturing such more ‘grey’ views is a challenge for art theory and aesthetics, and it is a challenge for those who seek clear criteria for judging the artistic status of machine art and machine creativity (or indeed for *designing* a creative machine).

Moreover, looking at this discussion, one may well ask how stable the distinctions between process and product and between objective and subjective criteria are, given that the subjective appearance (of the product) seems crucial in the case of process (the process is judged by the product) and given that also objective criteria need to be agreed upon by humans, which may lead back to process (the product is judged by the process). In other words, it seems that the distinctions collapse into one category: subjective agreement.

To solve this problem and accommodate the more grey intuitions most of us have about art, we could redefine aesthetic status in more relational terms⁹: as being about a relation between subject and object, and one could add here, about a relation between process and product. What a work of art is cannot be determined on the basis of objective features alone since it depends on the observation and experience of subjects. But, neither is it true that its status is entirely subjective, since when evaluating the object’s artistic-creative status, there is a relation between the features of the object and the mind and culture of the subject. Indeed, keeping in mind Beardsley’s point, objective features afford certain experiences, and this could be interpreted in a relational way: the properties are defined in terms of the experience they afford, and experience is

⁹ I am inspired here by relational theories in moral philosophy, in particular in thinking about moral status, see for instance Author 2012.

made possible by the properties. Hence, it does not make sense to define art in exclusively objective or subjective terms. The artistic status of process and product emerges from the interaction between object and subject, which mutually constitute one another. What meaning and interpretation art observers, listeners, etc. give to the object shapes its artistic and creative status; at the same time, this is never a *merely* subjective matter since the object and its properties afford and support certain experiences rather than others. Moreover, the subjective appreciation and evaluation is not merely an individual matter but takes place within the horizon of a social and cultural whole, which has a historical nature and shapes (but does not determine) the hermeneutic process in a way that has a quasi-objective character. What the work of art 'is' then emerges from this subject-object interaction in the encounter with what *might* become a work of art.

For thinking about product and process, this also means that the status of the product is fully constituted by a process (it cannot be defined without it), and that the process must be judged by its product, since there is no process separate from the product either.

Moreover, this view cannot simply be reduced to 'it all comes down to agreement' or decision, since although there is a social dimension to this process, neither the features of the object nor the language, culture, etc. of the subject are entirely a matter of agreement or decision (language: see below). Even if the language of agreement is used by people, according to this account, the artistic status of the object emerges rather than that it is (merely) agreed upon.

However, if we endorse this approach, it creates the following difficulty for crediting the machine with having created a work of art, at least from a *theoretical* point of view: it becomes unpredictable how this evaluation process pans out, since it cannot be predicted how an object and subject will interact and entangle and what (status) will emerge from it. It means, effectively, *that there are no criteria*, or rather, that criteria are not relevant since the process is not a deliberation at all. There is a process and art may emerge from it (or not). But, the status is not a matter of decision and deliberation, and not everything is known in advance. Yet, on further reflection, this is also the case for human (aspiring) artists, who have to wait for what will happen between what they made (the artefact as object) and the spectators/viewers/audiences/etc. Both human and non-human (would-be) artists are dependent on this encounter, which is itself dependent on and related to a lot of elements that are beyond the control of the artists. It turns out that the very exercise and project of defining a priori criteria for evaluating the artistic status of something/someone is itself problematic, since it fails to capture this uncertain and not at all predetermined process. This process does not only concern the art creation in the narrow sense but also a much longer process which also involves those who experience the art (and their social-cultural context and history) and potentially all kinds of stakeholders who influence the status and 'making' of the art, such as people from art institutions, journalists, academics, politicians and so on.

This means that theoretical efforts always come too late. Theory is too late since the artistic status already emerged in the experience. First, there is experience; first, there is the encounter. At the moment when one starts theorizing and deliberating about the status of the process and the product, one's view is already framed by experience. The theoretical exercise of thinking about the status of (machine) art is already framed by the particular encounters we had with art—as individuals and collectively as a group, society and culture. Thinking in terms of process and product, for instance, is influenced

by an industrial way of thinking and hence by industrial ways of experience. And thinking about art consumption is part of a consumer culture.

This point also suggests that language plays a role in our thinking and perception of art and creativity. Indeed, we may consider more transcendental conditions in this emergence of the artistic status of art, or the making of art. An important condition is language: what art is depends on the language we use. It depends on how we call the artefact (e.g. ‘a work of art’) and the maker (e.g. ‘the artist’). And, if we use ‘product’ and ‘process’, we use industrial language. Or we may use pre-modern language, for instance ‘craftsmanship’ or even *techne* and *poiesis*—see below. Our thinking about art cannot be separated from the language we use to think about art. But what if our language changes? For instance, today, we are not used to talk about machines in terms of art and ‘artists’; it is not very common to speak of ‘machine artists’. It is still a provocation, especially in the eyes of those who see it as their mission to defend ‘humanity’ against ‘the machines’—who setup humanity as against machines. But, if more people were to speak about what the machines do in terms of ‘artistic creation’ and ‘works of art’, then would we really have an objective basis for saying that they are wrong? Even if today we might be opposed to the very idea of machine art, in the course of time, our language might change and let in the machines via the backdoor: whereas at the front door, we have our traditional theory, our language might change through the experiences we have with machine art and machine artists.

Technology is also part of the transcendental conditions of artistic status ascription. Our thinking and language about the status of machines and their art is itself dependent on technological-material development. We can assume that if machines become better in making art, more people will say that it is art. The technology will influence our thinking, as it already does now. For example, in the past, no one would have said that a machine could create art. But today, some people think they can. So, *if* technology is pushing itself in, can we still keep the door closed? We can try to close it by using a discourse that has been shaped in times when machines could do a lot less than today. And we can refer to older ideas about art and creativity, such as mimesis or expression. But, how many chances does such a discourse have in the new world/language that is in the making?

That being said, romantic language is still often used in the case of human artists. For those who fear machine art, this may be a consolation. But one could also ask why we fear machine art at all. It would be worth further examining this fear. Why do we humans insist on being the only artists? *If* machines were artists, would this be a problem, and why? For example, is this a matter of clinging on to power? But why do we want to colonize and dominate the artistic domain? It is not clear what keeps us from opening it up to non-humans such as machines or animals, or what keeps us from recognizing that these are already ‘invading’ the domain. And can we talk about what is happening in a different language, or is the language of domination and hegemony itself something that resists the coming into being of a more diverse human/non-human artistic world?

Moreover, do we really have reasons to fear that machine art will ‘take over’, that is, *replace* human artists given what *actually* happens in artistic processes involving technology? The latter question is the topic of the following section.

4 Can *machines* create art?

The following assumption in the previous discussion needs further attention: the assumption that machines should imitate *human* creativity. At first sight, this seems obvious: human creativity is the model, the example to be followed. But if one took seriously the ‘emergence view’ articulated in the previous section and connected to insights in artificial intelligence research, one could also consider the view that there are *different* ways of being creative, that a machine need not mimic human creativity but could have its own form of creativity. Perhaps machines could surprise us with their creativity, if we open up to whatever may happen in concrete encounters with machines.

In computational creativity research, the question has been asked ‘whether or not the system should attempt to be humanlike’ (McGregor et al. 2014); some researchers try not to model or simulate human creativity but try ‘to develop a human-independent, computational flavor of creativity’ (Besold et al. 2015, xx). This view could deliver a more optimistic reply to both the process-oriented approach and the outcome-oriented approach if these approaches were to lead to a ‘no’ to machine creativity: a machine may have non-human creative processes and the evaluation of the outcome (the artefact, the performance, etc.) need not rely on the criterion how much it mimics human art.

The latter response could easily be accounted for with the criterion that people merely have to like it. Then it does not matter whether what the machine does is imitation of human art or not—here, the purpose is *not* to imitate human art. But the first response could be a good reply to those who judge the process of machines in merely human (romantic) terms or those who try to mimic human (mental) creative processes: if creativity must be understood in terms of process at all, then why not at least *consider* the possibility that machines (and other non-humans) may have *their own* forms of creativity? Why should only humans be deemed creative? At least this question deserves further discussion.

Another unexamined assumption in the previous discussion about criteria is that it is *either* machines *or* humans that create art. Maybe the situation is not so bleak for humans (and non-humans) if we take into consideration the following observations:

First, contemporary machine art does not always seem to be about machines taking over, given that machines do not always replace humans. Often human and non-human artists collaborate on making a work of art. For instance, an artist who created a drawing robot, Patrick Tresset, claims about his recent work that it is collaboration between him and the machine. From one perspective (the one I started from in this paper), this complicates the discussion once more: if a work of art and indeed an artistic process is hybrid human/non-human, what does that mean for its artistic status? Is such a work less artistic because it is less ‘pure’ (purely human), and if so, why is this a problem? Is it less artistic because a machine is used? From another perspective, opening up to the possibility of human-machine collaboration makes things easier: maybe this takes the ‘competitive’ angle out of the discussion: machine and humans can co-create. It also enables us to ask further, perhaps more interesting questions: *how* can machines and humans collaborate in a way that gives us better art and creativity? For instance, in computational creativity research, McCormack and d’Inverno’s ask ‘how can computers enhance human creativity?’ (McCormack and d’Inverno 2012, p. 422). Here the perspective is that computers and other machines are not a threat to

human creativity but may enable us to be *more* creative. Here the ‘contamination’ of the artistic process by machine interventions is welcomed.

Second, if the question “is a work of art less artistic because a machine is used?” were to be answered negatively, this would create problems for all human artists, since there are at least two senses in which all art and artistic work is technological, which correspond to the product/process distinction. Works of art (outcomes) are material or immaterial artefacts, and therefore, correspond to at least one conception of technology: technology as artefact. Moreover, the artistic process is always technological in the sense that it always involves the use of technologies/media. Machines, then, can be seen as one particular form that art, understood as a human-technological process, takes. Art and creativity can be interpreted as technologically mediated, both as processes (the making of art, the creative process) and as (experienced) products.

Of course one may still try to argue that some of these processes involve humans to a larger extent and that they are therefore *more* artistic. But to support this conclusion, one needs at least one more premise. Just to say that because it is more human it is more artistic does not seem to be sufficient. The humanness, by itself, does not make it art. Therefore, an extra criterion is necessary, which takes us back to the beginning of our discussion: how to define creativity and art.

One could get around this problem by defining humanness in a more technological way as well. In that case, the problem seems to be at least less urgent. If we think that to be human also means to be technological,¹⁰ then machine art could be seen as a very human expression or extension: not the expression of only one human individual perhaps but an expression and extension of our techno-humanity. Then one may still discuss whether or not a particular object is a work of art, but it is no longer possible to have a principled, fundamental objection to calling anything produced by a machine art by saying that it is not made by a human.

Yet, one must ask why it is so important that machine art should be a *human* expression or intention. Perhaps this argument is biased towards human creativity and is insufficiently appreciative of, and open to, the possibility of different, *non-human forms of creativity* (see the previous assumption).

Note also that the point about the consumption of art assumed that only humans can be art evaluators. But one may ask why machines could not be art ‘consumers’ and *evaluators*. Does creativity presuppose the capacity to evaluate art (and vice versa)? Again, it may not be easy to answer this question, but, to the extent that machines get more agency in the field of creativity and art, it is a question which must at least be raised and which deserves further discussion by both philosophers and computational creativity researchers. For instance, in the artificial intelligence literature, Colton has argued that for a system to be creative, it needs to have ‘appreciation’, by which he means ‘the capability of the system to evaluate the artefacts it produces’ (Colton 2008). But what is ‘evaluation’ here? Is it a kind of mindless ‘Chinese Room’ procedure¹¹ enough to use the name of Searle’s thought experiment which is famous in artificial

¹⁰ In the philosophy of technology (starting with Kapp) and indeed philosophical anthropology (e.g. Plessner), there is a long tradition that defends the idea that humans are technological beings. One may also consider the posthumanist strand of thinking.

¹¹ When a system uses a database to evaluate (Norton et al. 2013), for instance, this seems to be a Chinese Room case.

intelligence, or does proper aesthetic evaluation require consciousness, meaning giving and so on? Do only humans have these properties and capacities or could machines, in principle, have them? (Again, this discussion mirrors broader discussions in philosophy of mind and artificial intelligence).

Finally, this discussion about the question whether machines can create art also raises the more general question concerning the relation between technology and art. Let me say more about this relation and shed new light on the previous discussion about humans and machines by using Heidegger. Heeding Heidegger's discussion about *techne* and *poiesis* (see his later work, for example Heidegger 1977), one could distinguish between at least two ways of conceptualizing the relation between technology and art, in particular between *machines* and art. On the one hand, one could argue that technology has nothing to do with art, that it is a very different mode of experience and a very different kind of activity. This is the view one arrives at if one thinks about industrial machines, for instance, which render possible mass production instead of crafts. This view of technology is assumed by William Morris and Karl Marx when they objected to machines in the nineteenth century. It is also the 'modern technology' Heidegger criticizes when he is nostalgic about a more ancient kind of *techne*. On this view, machines have no chance to become artists, especially if one assumes an expressivist view of art. Machines, so it was argued by Morris and others, kill the possibilities for free self-expression in crafty and arty products, let alone that they could make such products themselves. Morris expressed the hope that 'the workshop would once more be a school of art' (Morris 1884).

On the other hand, when Heidegger links *techne* to *poiesis*, art and craft are also put forward as good ways of relating to the world, but a different view of technology and *poiesis* opens up: one that sees both art/craft and technology as forms of *poiesis*, as ways of revealing and bringing into being. For Heidegger, who thinks about large power plants for instance, modern technology is a very different way of revealing than poetry. Modern technology reveals everything and everyone as a 'standing-reserve' (Heidegger 1977), things for human use. But, against Heidegger but based on his view that modern technology is *also* a way of revealing, one could also argue that in principle, contemporary technology could be redirected and used in a way that makes it do the kind of revealing art does. Perhaps contemporary machines could show us a different perspective on the world, one that does not let appear everything as a standing-reserve (of information, for instance) but one that reveals the world in a different way than what we are used to see. And, *if* machines did that, then they would definitely be artists, at least if we think that it is a task of art to see the world in new ways. Then, we would have not only creative but also *poetic* machines.

For this revealing to work, the machine may not need to have consciousness, since the revealing can either be interpreted as an effect—in which case the mental state does not matter—or the poetic revealing may be interpreted in a romantic way, but not necessarily in an expressivist way. Let me explain. Expressivism might be rooted in the romantic tradition, but that tradition (see for instance Novalis and Fichte) also contains views that see the human artist as a vehicle and medium for transformations and workings of a larger spirit and whole (see for instance Novalis 1799). Now on the one hand, there does not seem a reason to exclude machines from being such a vehicle, a medium through which a larger spirit works (human or not). If we interpret 'vehicle' in a technological, ordinary way (against romanticism), then machines need not have a

self which they express; rather, they are instruments used by a larger entity and spirit (whatever that means). This leaves open the properties the machine (or any other entity) must have in order to be an artist. On the other hand, more in line with romanticism one may argue against this version that the whole can only work through its parts if those parts contain a spark of the larger spirit, which *could* be interpreted as meaning that there must be consciousness. If that spark is lacking, then machines would not qualify as artists and they could not take part in poetic revelation.

To presuppose a ‘larger spirit’ or similar metaphysical entity is of course very controversial. There may be other ways to elaborate this view that artists are a vehicle through which things can be revealed and new understandings of reality can take shape, ways that do not involve romanticism or (other) metaphysics. In any case, if one defines art and artistic activity in terms of its capacity to reveal, indeed more in terms of its poetic capacity and less in terms of artistic *agency*, then machines cannot be excluded a priori. If people experience the machine as revealing something that has been hidden before and as shedding a different light on the world, then the machine is doing what human artists also are supposed to do. Then, in principle, there is no problem whatsoever with either humans or machines, or humans and machines together, trying to create art and trying to be *poetic* (in a broadly Heideggerian sense).

5 Conclusion

In this paper, I have analysed the question if machines can create art by breaking it down into different sub-questions. I have then discussed these sub-questions: I offered some answers and distinctions and explored the implications of these views and distinctions for machines. This exercise has offered a conceptual framework for philosophical thinking about machine art, which links arguments for or against giving artistic status to machine art and machine creation to specific views about creation and art. Furthermore, I have questioned some assumptions about art creation and evaluation which seem to exclude non-humans a priori when it comes to art and creativity or which disregard the possibilities and varieties of human-machine collaboration in the sphere of art creation (and perhaps art evaluation). In addition, this analysis also opened up a gateway between the philosophy of machines and discussions in aesthetics—discussions to which I hope this paper has also made a small contribution. For instance, I have made suggestions how one might deal with the problematic objective/subjective distinction by employing a relational, phenomenological view which focuses on experience and on appearance as what happens between an object and a subject and how—with and against Heidegger—one could think about the relation between technology and art in terms of revealing. Finally, throughout the paper, I have also made some references to discussions in artificial intelligence, in particular computational creativity. Clearly, more work could and should be done to further elaborate the links between thinking about technology, aesthetics and artificial intelligence research.

Note that in this paper, I have considered some of the more difficult routes that try to address the machine art problem. There are some easier answers. For instance, if one interprets the human as a machine, then the philosophical question whether machines can create art is solved. Then it is clear that ‘human machines’ already created art long before their silicon fellows. Then the ‘only’ challenge left is scientific and technological

work which tries to explain and model the human machine and then create an artificial, non-biological version of this machine (this is an extreme position some scientific and technological work leans to). Or if, on the other hand, one sees an unbridgeable gap between humans and technology, and if one places art entirely on the side of the humans, then there is also not much to say: then machines can never create art and that is the end of the story (this is an extreme position some work in the humanities lean to, especially in so far it does not even consider or discuss the possibility of machine art). Furthermore, it is also a lot easier to assume one of the extreme positions on the objective-subject continuum: doing so gives us a clear definition of art, which can then easily (or so it seems) be applied to machines. Instead of endorsing or defending one of these views, this paper has explored more difficult routes. This has led to questioning even the very project of defining a priori criteria for answering the question. A truly relational view, that is, a truly critical and philosophical view, should not be content with playing the game of criteria and their application but should also question the question and ask *what makes possible our thinking about this question* and ask what is presupposed when we ask the question.

In particular, the suggested approach enables us to question the very exercise of addressing the problem by means of criteria. It seems that all criteria fall apart in the face of the encounter with the work of art and lived experience of the work of art, an encounter in which there are no criteria but instead experience and activity that ‘makes’ the work a work of art (or not). It seems that theorizing in terms of criteria can even get *in the way* of interpreting and understanding what goes on in that process, instead of helping it, in so far as it misleadingly presents artistic status as the outcome of a deliberative and theoretical process. I have argued that before theorizing or before any agreement or decision, there is our experience of (our interaction with) the machine and its product, which then frames our theorizing. Moreover, I have argued that this making or emerging is always a hybrid human/non-human, human/technological process. The very question ‘can machines create art’, therefore, is misleading in so far as it suggests that (1) experience (or language) play no role in shaping our thinking about this question and (2) that there is such a thing as a machine disconnected from the human or a human that has nothing to do with technology.

Of course in the case of ‘machines’, that is, in the case of automation technology, we have a very specific kind of human/technology mix, a very specific human/non-human collaboration, and, given the previous discussion, the question whether this is art remains open. One way to try to close it is by using a theory to give a specific answer. But, if we confine ourselves to theory, then of course much depends on one’s presuppositions, which are always unstable once we make them explicit and analyse them. This is a game we can play. But in the end, the question remains open, in so far as the distinctions made collapse in the end. However, the question may become less open when we leave the philosopher’s desk and move to the actual encounter with machine art, where language/concepts may not be so prominently present and where the machine *shows* what it is doing and indeed might show how artistic it is (or not). In the meeting of subjects and objects, and humans and non-humans, things are revealed (or not). And here, we cannot confirm a specific status on beforehand. We cannot a priori exclude the possibility that the human-machine may reveal itself/herself/himself to us as an artist. And indeed, in spite of all the scepticism we as philosophers may have about the ‘real’ creativity of machines, on the basis of the ‘emergence’ approach to

creativity I have started to articulate in this paper, we cannot exclude a priori that new encounters with machines and their products may reveal *new forms of creativity*, forms of creativity we have not seen yet in human art. Furthermore, influenced by Heidegger's (romantic) epistemology, I have made the suggestion that machines may join human artists in their *poetic* mission.

We can try to further articulate this approach with words. For instance, we can try to further explore what may happen in the encounters with machines and machine art or reflect on the meaning of *poiesis* and machine *poiesis*. Indeed, even apart from concerns about machine art, we can try to say something more general about creativity and related issues: the previous discussion suggests a more general model of what happens in artistic perception and engagement—human or non-human—which rests on a non-dualistic view of what goes on between subjects and objects and which is based on a more poetic epistemology than is usually found in discussions of these issues. These suggestions deserve further development. However, in this paper, I limit most of my conclusions to the machine art discussion. Moreover, in response to Boden and other computational creativity researchers in that tradition, and keeping in mind what I wrote about emergence and revealing (and as a nod to the romantic tradition): when it comes to the aesthetics of machine art, or human art for that matter, maybe it would be helpful if we could live with a bit of mystery. Machines are there to stay, and so is the mystery of art and creativity.

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