

Delete ‘Persons’, Insert ‘Information Processing Systems’: Art and the machinistic discourse of computationalism.

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This paper focuses on explicit attempts at developing artificial intelligence in the production of art that generate outcomes similar to, or even technically superseding, the works of human artists. We aim at revealing the underlying discourses that equate art production with transformation of information, artists with input/output systems, and artistic creativity with an unlimited and autonomous generation of art-like outcomes. As a point of departure, we begin from an exposition of Margaret Boden’s account of creativity and proceed by examining different arguments to the effect that computers can be truly creative, primarily those offered by Boden (2004, 2010). We question what the assumptions, operative in the discourse on artificial or computational creativity, entail. AI-agents can produce creative outcomes because they implement our best models of creativity. By implementing these models, however, AI-agents evidence a particular understanding of what art is and what constitutes artistic production. This understanding does not fully conform to how contemporary artistic practices are perceived and valued. As a result, we argue, better models to frame artistic AI and computational creativity are needed to fully appreciate the developments in this field and their articulation within the existing art world.

Artificial Intelligence. Computational Creativity. Machinistic Discourse

1. INTRODUCTION

Art is often understood as an essential and constitutive human practice. In this sense, the production of art becomes a symbolic threshold in the development of more human-like artificial intelligence (AI). For many, the crossing of this threshold marks a meaningful shift from artificial intelligence to artificial or computational creativity (CC).

In this paper, we focus on project that explicitly attempt to develop AI-artists or computational agents in the production of art, i.e., AI that aims to produce artistic outcomes that are similar to, or even technically supersede, the works of human artists. We aim at describing the underlying discourse that equates art production and artistic creativity with information processing and input/output systems. We depart from a critical examination of different arguments to the effect that

computers can be truly creative, primarily those offered by Margaret Boden (2004, 2010). Then, by looking at specific projects of artificial or computational creativity, we describe the assumptions that this account of creativity evidences and its effect on how artistic creativity is also framed.

Current projects in AI and CC often embody a narrative that reappears in different epistemological debates as an unprecedented challenge to the status of humans as the sole agents of knowledge and creative production. This seems to perpetuate what Andreas Broeckmann has identified as the “myth of the machine” (2018). As artist and scholar Stephen Wilson (1995) notes, artificial intelligence research is “at its root [...] an investigation into the nature of being human, the nature of intelligence, the limits of machines, and our limits as artifact makers.” However, although recent developments in computational creativity advance the idea of an

independent artificial artist/agent, these projects also implement a discourse that equates artistic practice to an unrestrained art production and frequently dismiss other features related to art-making and artistic identity.

To be clear, our position is not that computers cannot be *truly creative*, or that the outcomes of CC cannot be described as *true art*. To some extent, anything placed within the structure of an art institution and adjudicated as art by a credited authority is, in effect, *true art* (De Duve 1999). Instead, we focus on the discursive assumptions implied in artificial intelligence research and we question how these assumptions frame and characterize what artistic creativity is and what it entails. AI can produce creative outcomes; in other words, it can implement our best psychological models of creativity. Consequently, creative results of AI are often equated to artistic productions. By implementing specific models of creativity, AI-agents implicitly present a particular understanding of what art is and what constitutes artistic production. This understanding, however, does not seem to fully conform to how contemporary artistic practices are perceived and valued. Not surprisingly, when art critics assess artworks created by AI, they often dismiss them as uninteresting or non-creative. Thus, we argue, better models to frame artistic AI and CC are needed to fully appreciate the developments in this field and their articulation within the existing art world.

2. WHAT IS CREATIVITY?

Margaret Boden offers an account on creativity that is based on the mental processes that it entails. It should be noted that Boden's definition is not the only take on creativity, but it has become one of the most prominent positions around creativity and artificial intelligence and many CC projects are founded on an understanding of creativity indebted directly or indirectly to Boden's (e.g. Tresset & Dreussen 2014). Boden defines creativity as a characteristic of artefacts or ideas that are (1) novel, (2) surprising, and (3) valuable (2010).

Novelty, understandably, refers to the newness of the idea or artefact, which can be historical or personal; in other words, an artefact or idea can be novel to a social/historical group or novel to a single person.

The surprising factor, which Boden calls "the road to surprise" informs and gives shape to her three types of creativity. These three types of creativity, according to Boden, imply three different psychological processes.

(i) Combinational creativity: coming up with unfamiliar combinations of ideas;

(ii) Exploratory creativity: exploring the possibilities within a pre-existing conceptual space;

(iii) Transformational creativity: transcending and transforming a pre-existing conceptual space by creating something that seemingly could have not been created within it.

Boden's third characteristic of creativity is that it offers something valuable. Boden, however, does not pay too much attention to this feature since value is something that produces general disagreement. In art history, for instance, scholars are often discouraged from making statements of value about works of art or artists. However, as we shall see, the issue of value becomes relevant when approaching the potential of AI in creating art.

3. CAN COMPUTERS BE CREATIVE?

Based on the previous three-fold understanding of creativity, Boden (2004) argues that computers can be creative and she addresses and replies to the main counterarguments against the idea that computers can be *truly* creative and not just *seemingly* creative. These include what we have labeled as the "no consciousness, no creativity" argument, the "no understanding, no creativity" argument, and the "no authority, no entitlement to artistic transformation" argument.¹

The "no consciousness, no creativity" argument states that creativity requires consciousness. An example of such argument can be found in the writings of the philosopher Anthony O'Hear, for whom, if there is no human, there is no art (O'Hear 1995). The reply to this argument, naturally, requires a definition of consciousness. Boden's definition of consciousness can be summarized as a reflective evaluation of outcomes against a background of specified parameters; thus, in Boden's reply to the "no consciousness, no creativity" argument, a "sort of consciousness" can be achieved by AI in the future, as AI systems can develop reflexive evaluations of internal processes against previously specified parameters (2004). At the time of Boden's forecast, no AI possessed these evaluative programs; however, some current AIs have implemented systems that monitor and evaluate outcomes and results. For instance, a relatively new system called Generative Adversarial Networks (GANs) developed by Ian Goodfellow in 2014, performs something similar to what Boden predicted fourteen years ago.²

The “no understanding, no art” argument states that since AI has no understanding of what it is doing, it cannot be artistically creative. This argument has also been applied to the issue of whether AI can produce knowledge (Mindt & Montemayor msc.). The reply to this argument, according to Boden (2004), is that understanding should be judged by what the agent actually does—i.e. what mechanisms are taking place—so that for an agent to *understand* a command is to run certain processes/operations on a computer. Such treatment of understanding, according to Boden, is further supported by a possibility of an analogical definition of a human understanding: a human subject *understands* a statement or a situation by running certain processes on the brain. In addition, in some CC projects the issue of understanding is also delegated to the perception of the outcomes. For instance, when describing Paul the robot (Tresset & Dreusen 2014), a system that creates live portraits of human sitters, creators Patrick Tresset and Oliver Deussen explicitly state that an important factor for them was that the outcomes looked “informed” as opposed to random, as to imply that the system had the “intention” to create them like that. In this sense, apparent or perceived intention and understanding are conflated. Furthermore, audience perception has become a major element in the judgement of AI as creative and artistic (Elgammal et al 2017). Similarly, Simon Colton’s, the creator of the Painting Fool, emphasizes the significance of audience’s perception in judging that the work has been produced by intelligent processes (Kappala-Ramsamy 2012). Colton paired the Painting Fool with emotion-detection software, which allows the creation of pictures in different styles according to the viewer’s mood. Such addition was meant to challenge a perceived view of computers as incapable of appreciating the effects of outcomes on the audience.

Finally, the “no authority, no entitlement to artistic transformation” argument claims that computers cannot be creative due to their lack of moral authority over art. Consider the following thought experiment: An AI system, like Tresset and Dreusen’s Paul, is designed to produce figurative portraits of human faces. If this system starts to draw circles, triangles, and straight lines, we would probably not think that the program has reached its cubist period; instead, we would think it is a mistake, a glitch. The “no authority, no entitlement to artistic transformation” argument states that since AI lacks epistemic and moral authority, then it has no right to be taken seriously when they (radically) transform our standards—transformation being one of Boden’s three types of creativity. Boden (2004) replies to this argument by claiming that AI can, or will have this moral authority in the future when AI systems would have become so

ubiquitous and would have taken over many of our social functions like psychotherapy, health care, financial consulting, etc., i.e. when AIs fully become members of society.

To summarize, Boden’s argument over whether computers can be truly creative can be stated as follows: Creativity does not require (1) consciousness that is over and above a reflective self-evaluation and (2) understanding that is over and above running a program in response to a command, or being simply perceived as such by the audience, but (3) necessitates authority, which AI will gradually obtain as it takes over socially important functions of providing expertise and generating knowledge. By implication, for Boden, creativity as a property of computer-generated outcomes is real creativity.

3. INFORMATION-PROCESSING SYSTEMS AND PERSONHOOD.

Boden’s dismissal of the “no consciousness, no art” and the “no understanding, no art” arguments relies on two problematic assumptions that frame computational creativity and artistic creativity under a particular discourse.

- (i) The identification of *person* with *information-processing system*. This relates also to the reduction of persons to their brains in what is known as “the astonishing hypothesis” as formulated in 1994 by Francis Crick (Noë 2010), and a prior identification of the brain as an information-processing system.
- (ii) The view of art as the manufacturing of goods, i.e., as producing outcomes (artworks) that elicit some effect on viewers. This is an oversimplified view on art, in other words, the idea that art is nothing over and above the production of artworks.

Artistic creativity is instantiated by persons and in a person’s artistic behaviour, not by information-processing systems or in the transformation of inputs into outputs. Personhood consists in a range of cognitive, cogitative, conative, perceptual, and emotional capacities, the possession and exercise of which manifest in its behaviour, first and foremost in a linguistic behaviour (Bennett & Hacker 2004). Furthermore, a person is a subject of experience, where experience is being-in-the-world, a practically- and socially-engaged pre-theoretical understanding of things, oneself and the world. Additionally, the creation of an artwork is not always the ultimate goal of artists, who often do not fully know what their goal is until they have achieved it (Dreyfus 1972, p.188). Why does it matter that persons are not information-processing

systems and that it is persons, not systems, who create art? Again, unlike authors like Dreyfus (1972) or O'Hear (1995), we do not claim that the production of art is an unachievable goal for AI; instead, we are interested in understanding the discursive underpinnings that are implied in AI and CC. Furthermore, we believe that this reduction is also detrimental to the proper appreciation of art created by computers: If art-making is equated to information processing, then the value of artificial creativity seem to be reduced to how it is produced and its appreciation confined to three features: automation, being art-like, and imitating masters.

Clearly, these are not values that are considered when looking at contemporary, human-made art. For instance, in 2016 a project called The Next Rembrandt was created for ING Bank by a team of more than 20 people at the J. Walter Thompson creative firm in Amsterdam in partnership with Microsoft, TU Delft, Mauritshuis, and The Rembrandt House Museum. For the project, more than 340 paintings by the Dutch artist were analysed in order to "distil the artistic DNA of Rembrandt." The resulting painting consists of a portrait of a Caucasian male that seems to capture and recreate the style of Rembrandt more than 300 hundred years after the artist's death. The project won 16 prizes at the Cannes Festival in 2016. Yet, despite the impressive results, the Next Rembrandt emerged, rather, as an average Rembrandt and not what Rembrandt would have painted next. The value of The Next Rembrandt seemed to have solely existed in the process of its creation and not in the aesthetics that it put forward. As a project of CC, it was a success; but as a Rembrandt, it was an average Rembrandt.

As stated earlier, in Boden's account, values do not play such a prominent role as the first two features, i.e. novelty and the way in which an idea or artefact fits into pre-existing conceptual space (combination, exploration, transformation). However, whereas it is true that specific values, such as what counts as being mathematically interesting or generate disagreement, instances of creativity across various domains of human inquiry depend on different *families* or *types* of value. For example, while creativity in sciences will depend on cognitive values, art is dominated by non-cognitive and generally non-epistemic values such as aesthetic values, relevance to socially or critically engaged topics, etc., as well as values that *are not intended* from the beginning.

So, AI produces outcomes that look art-like because they are designed for this task. The outcome is creative and it can certainly be exhibited within the institutionalized venue for art. Human artists, on the other hand, are not designed for doing art and are not optimized for information

analysis and exchange. Therefore, the issue of understanding in AI should be put differently: is there an understanding of why AI does what it does, in other words, why doing art in the first place? AI does not have a choice to do art or not to do art, and it does not initiate art creation in the first place. AI also does not present its outcomes as art or claims its recognition. In other words, it is not capable of meta-motivation to pursue art.³

This is also why the fact that expert AIs, which are seemingly better art historians and distinguish artworks and styles much better than humans, does not necessarily mean that they *understand* art better or that they *understand* it at all. The question, we argue, might not be pertinent. AIs are simply better, given that important conditions are met, at analysing and learning the patterns of information and representation. (One of these conditions also requires AIs to receive already-processed information (images, data), as AIs are significantly deficient when interacting with real-life 3D objects). However, these skills might not be sufficient within an art system that does not value skill anymore. Famously, David Cope deleted part of his EMI (Emmy) music library as it sounded too much like the great composers it was set to imitate and, thus, for many critics the music became simply not interesting.

In addition, as stated before, a program does not process unprocessed information: the information needs to be represented in formats allowing a program to effect algorithms on it. For example, an AI designed to generate pictures learns from a large amount of samples—digitized pictures of famous paintings, where information is represented by arrangements of pixels. These samples are selected by the designer, or a team of designers, artists, and art historians. In return, such an AI generates the outputs that show statistically most probable patterns of representations. Therefore, it cannot choose to do one type of art or the other, to decide on the medium, on what is worthy of artistic pursuit, or reflect on the nature of art...before the information is represented in requisite formats. One, however, can reply that, perhaps, a future super-AI will become completely autonomous from the input of information by humans. In this vein, Boden (2004) suggests that computer understanding can be improved if more conceptual spaces are specified, i.e. more information is represented. Similarly, Smith (Smith 2014) ponders a possibility of a super-AI that takes the whole textual and visual content of the Internet as its samples. In this case, however, it is the *novelty* of the outcome, as one of the factors of creativity, that will depend on the *updates*, i.e. newer interactions with the world being represented in suitable formats and input by human subjects, as well as on their judgement about what is worth representing.

4. ENTITLEMENT TO TRANSFORMATION

The entitlement to transformation, as understood by Boden (2010), is not an easy issue because transformation, or an instance of transformative creativity, is not an *all-or-nothing* phenomenon. For creativity to be recognized, a potentially creative outcome ought to be transformative. However, the transformation need not be taken as radically as transcending a pre-existing conceptual space. Rather, it can be understood, in line with Tresset and Dreussen (2014), as coming up with one's own style. Boden notices that the reason why Cope's Emmy was taken as inauthentic and rejected as art, especially considering the acclaim of Harold Cohen's AARON, is because Emmy was intended to imitate the style of old masters rather than create its own style or forge Cope's artistic identity. Emmy's works are the result of exploring the possibilities within the space of the chosen's musician style. It is music, but a mannerist one: yet another Vivaldi is an average Vivaldi. In other words, if AIs are coming into the art world and the market they should produce outcomes that are transformative in the sense specified above.

However, a radical transformation of the conceptual space is another matter. Boden holds that the entitlement to transformation necessitates the epistemic and moral authority, which AI will obtain if it becomes capable of setting the goals for itself and realizing a socially important function of knowledge production. She also notices that AIs would be "considered morally" if they were more human-like and easier to empathize with. Hence, the issue of meta-motivation transpires again, and the discourse on artificial creativity circles around being human-like: art production by AI is a threshold to it's being more human-like yet the recognition of the transformative results as creative and not merely erroneous depends on AI being human-like.

First, we should distinguish between AI producing reliable information (information that can constitute our knowledge) and AI's knowing, or being knowledgeable. The latter is relevant to the issue of entitlement inasmuch as an AI knows what it does, which goes back to the issue of understanding. We will therefore focus on AI knowledge.

We suggest that AI producing reliable information and being human-like are somehow tangential to the issue of AI's entitlement to transformation. As Kelly (2017) notices, there is no generalized AI but various AIs that are designed and optimized for different tasks and employ diverse technologies. The development of a group of AIs, which satisfy our requirements of reliability and are, as a result, afforded the epistemic authority, does not mean that it will be extended to yet another group of AIs

designed to produce art-like outcomes or make them aesthetically authoritative. Even if various AIs, as they carry a bigger amount of socially important functions, will become more trustworthy, it does not bear on the aesthetic authority as much as the author's justification of transformation, which human artists effect in and by their artworks. In other words, the transformative results can be recognized as creative and not merely erroneous when the designers of a given AI, i.e. human subjects, claim such recognition.

On the other hand, production of art-like outcomes does not guarantee that AI indeed became human-like, or as Smith puts it, that it is injected "a truly human perspective" (2014). It is because AI needn't be human-like to generate such outcomes. On Boden's account (2004), the similarity of the outcomes with artworks would guarantee that we understand human creativity and that AI instantiates creativity. However, that need not be so. A particular AI, say a learning machine, can generate outcomes with outstanding intrinsic or other properties, specified by its designers, but do it in a way that is inscrutable to them. The processes (analyses of data representation, inferences and their rules) that a program effects need not be and, for a set of technologies, are not essentially similar to how a human subject learns and does art. The problem here is somehow similar to the issue of an unexplainable AI in the generation of knowledge. A learning machine can generate reliable information, such as a report on cancerous cells, yet its operations are inaccessible and opaque to their designers or users. And that such information is indeed knowledge depends on a possibility to access and evaluate these operations. On the other hand, whether and which brain processes can be described as computations similar to those realized by learning machines needs to be investigated. Moreover, the production of outcomes that are art-like (artefacts that look like paintings, musical compositions, poems, etc.) does not guarantee that they were generated by the same processes that enable us humans to produce art. To make an analogy, the fact that an airplane flies does not mean that it does so by performing the same mechanisms as a bird. Both outcomes of AI and human creativity can be recognized as art, but that does not mean that AI effectively performs the operations that occur in a human brain.

5. CLOSING REMARKS

In a recent segment on HBO's *VICE News Tonight*, Jerry Saltz, senior art critic at New York Magazine appeared evaluating art created by artificial intelligence. He began the segment by stating "I am looking for humanity, dignity, horror, originality...something, that's what we are looking

for.” After reviewing works created using Cloud Painter, Google Deep Dream, and AICON, pronouncing some as boring or non original, and relating others to Lisa Yuskavage’s paintings, Saltz concluded by saying “We have the most amazing tool ever... so let’s get busy. Get to work!”

Saltz’s assessment of works created by AI systems exemplifies the gap that still exists between the recent developments in artificial intelligence and the art world. Part of the reason of this gap is due to the implications that AI and CC assimilate in modelling what artistic creativity is and what artistic production entails. Artificial intelligence can generate creative outcomes, and these outcomes can be exhibited, rightfully, as works of art. However, it is important to understand the discursive underpinnings in many artificial intelligence projects, which highlight the production of artworks and frame artistic practice as information processing. These discursive implications might limit the way in which these systems can be valued and articulated within the art world.

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NOTES

1. Boden addresses also the argument of the multiple realizability of computational functions, i.e., the idea only an organic entity can be creative. This idea is espoused, among others, by O’Hear (1995).
2. Boden also refers to the concept of phenomenal consciousness—a subjective character of mental states that, as widely debated, cannot be characterized in functional terms. She dismisses the argument that computers cannot be creative because they are not phenomenally conscious with reference to the wider disagreement on the notion of phenomenal consciousness (Boden 2004).
3. We borrow the term ‘meta-motivation’ from Mindt and Montemayor (msc.). The authors use the term in the context of AI and the generation of knowledge.