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AGAINST (INTELLIGENT) MACHINES?

ON ART IN THE TIMES OF ARTIFICIAL INTELLIGENCE

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Artificial intelligence (AI) is currently one of most topical debate subjects not only among highly specialised scientists and academics interested in this field professionally but also in many communities seemingly unrelated to issues of information technology, artificial life, algorithms, linguistics, or robotics. For scholars in the humanities, including those studying contemporary art, artificial intelligence has become, out of necessity, another crucial area demanding deep reflection. Located in the borderland between exact sciences, philosophy, neurology, cognitive studies, and psychology – to name just a few domains – artificial intelligence places humanities scholars in a most difficult position. Namely, their competences usually prove woefully insufficient to allow for successful and cognitively fruitful excursions into issues of fuzzy logic, neural networks, genetic algorithms, expert systems, or artificial life (AL). Even publications aimed at giving an accessible introduction to this fascinating world¹ are a formidable challenge for a reader coming from the humanities. Yet it

¹ See, e.g., Krzysztof Ficoń, *Sztuczna inteligencja nie tylko dla humanistów*, BEL Studio, Warszawa 2013.

is a challenge that has to be confronted before any attempt at understanding the modern world of new media art.

AI is an extremely complex and ambiguous area. I will, however, refrain from delving into definitional issues. For our intents and purposes, artificial intelligence is a phenomenon from the fields of technology and information science, used to solve complex questions falling outside the operational scope of traditional computer code; AI is aimed at self-improvement, learning, and enhancing its cognitive capabilities, in which it can resemble human intelligence. The point of AI, however, might not be for it to become similar to human intelligence but to create something different altogether, which rather than compete with natural intelligence would cooperate with it in an integral fashion.

All these aspects find their necessary or possible elaboration in the realm of robotics. John Spacey² distinguishes as many as thirty-three types of artificial intelligence. Let us list just some of them: Activity Recognition, Artificial Life, Bot and Chatterbot, Computer Automated Design, Computer Vision, Evolutionary Algorithms, Neural Network, Self Replicating Systems, Strong Artificial Intelligence, Superhuman, Superintelligence, Technological Singularity. This diversity translates into dozens of possible applications of different types of AI in different areas of human (and machine) activity, including the area of artistic strategies. In this paper, I will not address the fascinating theme of superintelligence and technological singularity. I wrote about the latter in some detail elsewhere,³ referring to the concepts of Vernor Vinge and, above all, Ray Kurzweil. Superintelligence, especially in the transhuman milieu, is in its turn a very enticing and interesting theme, but one not directly related to the art of creative machines or considerations regarding the potential for art creation by non-human subjects. The possible ‘intelligence explosion’ connected with the development of AI has been heralded on many occasions, yet most observers remain cautious in predicting a particular point in time when it could occur. Therefore, instead of fuelling the great expectation and hopes, it is worthwhile to focus on what already is our everyday reality. Although one cannot help but be impressed by the lists compiled by Nick Bostrom – perhaps the most prominent and influential transhumanist philosopher – which clearly demonstrate that already today artificial intelligence achieves decidedly better results than humans in many areas, for instance in a range of different games.⁴

The world of new media art is an environment where the subject matter of artificial intelligence has naturally been present for a long time. It is not by accident that the main theme of the 2017 Ars Electronica Festival was *Artificial Intelligence – The*

² John Spacey, *33 types of Artificial Intelligence*, <https://simplicable.com/new/types-of-artificial-intelligence> (accessed 1.10.2018).

³ See, Piotr Zawojski, *Technokultura i jej manifestacje artystyczne. Medialny świat hybryd i hybrydyzacji*, Wydawnictwo Uniwersytetu Śląskiego, Katowice 2016, p. 25–29.

⁴ See, Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies*, Oxford University Press, Oxford 2014, p. 12–13. Bostrom points out that various systems of artificial intelligence have beaten humans in such games as checkers, chess, backgammon, scrabble, and go. What is meant here are not isolated events (like Deep Blue’s game with Garri Kasparov in 2007) but AI outperforming humans in a repeatable way, as proven in many games. It is, however, important to add that in any activity other than chess Deep Blue would be completely ‘thoughtless’ and could not manage the simplest of task requiring ‘logical thinking’.

Other I. The festival is the world's major event devoted to cyber art and the most important trends in modern societies dominated by new technologies. Once again, its organisers were able to aptly recognise the key cultural and civilizational trends emerging at the crossroads of art, science, and technology in the given historical moment. Over the last two decades, the themes have included: *Code – The Language of Our Time* (2003), *Hybrid – Living in Paradox* (2005), *Goodbye Privacy* (2007), *A New Cultural Economy – The Limits of Intellectual Property* (2008), *Human Nature* (2009), *Origin – How It All Begins* (2011), *Total Recall – The Evolution of Memory* (2013), and *Post City – Habitats for the 21st Century* (2015). Of course, as is usually the case with large festivals organised under a theme, not all presentations, activities, exhibitions, conferences, concerts, and performances address the leading subject. Yet practically each of the organisers' chosen topics was at the heart of current debates concerning the arts, technology, and society. After all, while the subject of AI has, with varying intensity, been present in the public space for over sixty years, it has undoubtedly recently become a recurring theme in the press, the mass media, and popular culture. What is more, it is now also a rapidly developing area of knowledge. If we add to that the broadly defined knowledge-based market and economy, we can safely say that there is not a single area of human activity today which would not warrant reflection on the possible applications of AI and its impact on reality.

One such area is art, which is subjected to the influence and expansion of new technologies but simultaneously is essential to shaping the constantly renewing – one might say, upgrading – technium, or 'the modern system of culture and technology'.⁵ Technium is the foundation, even though in fact it is fluid or rather in the state of constant becoming. This state of becoming is the essence of protopia (from both *progress* and *process*) as one of twelve inevitable traits/processes that will determine the development of humanity in the nearest future. Protopia offers a way to go beyond the black-and-white dichotomy between technophobes and technophiles, or utopians and dystopians, which keeps reappearing among authors dealing in futurism. Other processes supposed to shape the future include flowing, filtering, remixing, screening, interacting, sharing, and – importantly in the context of our discussion – cognifying.

Cognifying might be characterised as the advancing artificial intelligence spreading into new fields and permeating all possible objects, machines, tools, and finally artificial creatures. As Kevin Kelly writes: 'It is hard to imagine anything that would "change everything" as much as cheap, powerful, ubiquitous artificial intelligence. To begin with, there's nothing as consequential as a dumb thing made smarter'.⁶ These words might offer a vantage point for considering

⁵ Kevin Kelly, *The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future*, Viking, New York 2016, p. 273. Elsewhere, Kelly offers a more precise description of his understanding of the technium as 'that largest network of all the technologies working together to support each other, and while this pen [I'm writing with] is definitely not alive, there is a sense in which the technium as a whole exhibits life-like behaviors in the same way that your neuron doesn't really think, but the network of neurons in your brain can make an idea'. Kevin Kelly, *The Technium*, https://www.edge.org/conversation/kevin_kelly-the-technium (accessed 30.09.2018).

⁶ K. Kelly, *The Inevitable*, p. 29. It bears reminding that already almost twenty years ago, Howard Rheingold in his book *Smart Mobs* (Howard Rheingold, *Smart Mobs: The Next Social Revolution*, Basic Books, New York 2002) pointed out the significance of artificial intelligence permeating wide masses of people and the tools they use. This thread

the fundamental change that is currently ongoing also in the arts. Jacek Dukaj – who is an original thinker as well as an excellent writer – calls this phenomenon the second phase transition in the history of Homo Sapiens’ culture, meaning by that ‘the transformation of culture by the broadly understood artificial intelligence technology’.⁷

The first phase transition, according to Dukaj, was accurately identified by Walter Benjamin in his study *The Work of Art in the Age of Mechanical Reproduction*.⁸ This essay, which has inspired a very rich literature and has been commented on countless times, is one of the most influential texts about the non-auratic art, which was emerging in the 1930s. The possibility of mechanical reproduction of an artefact from the field of art not only completely changed the art world. It also laid foundations for a radically new life of artistic objects in the public space and forced a rethinking of fundamental aesthetic issues, like those of the original and the copy, authenticity and originality of the artwork, or authorship.

In the art field, artificial intelligence is often linked with using robots as, firstly, human-made tools and objects, and, secondly, as independent machines which themselves become the producers (or creators? – see below) of objects of artistic character that might be considered in aesthetic categories and therefore belong to the world of art. Reflecting on the possibilities of robot replacement, Kevin Kelly presents a typology of situations in which robots might take over jobs that have thus far been done (or not done) by humans. He distinguishes four such types: ‘1. jobs humans can do but robots can do even better; 2. jobs humans can’t do but robots can; 3. jobs we didn’t know we wanted done; 4. jobs only humans can do – for now’.⁹ Does the fourth type of jobs include artistic activity as the domain of the creative human? This leads to another question, concerning the essence of creation and creativity: are they an immanently human trait, reserved exclusively to us? Today, there is no general agreement in this regard.

Even now, humans are authors of creations which can make other creations. It is, nevertheless, disputed if the latter can be considered art, or is ‘fetishised authenticity’ – as Jacek Dukaj puts it, echoing Benjamin’s category of auracity – reserved solely for the creative beings that are people. And is authenticity still tenable as a criterion of creativity? Dukaj’s opinion is decisive: ‘the conviction that “machines cannot be creative” is a relic of a Turing’s era philosophy of mind, along with statements like “machines have no soul” [...], already today, in specific fields, programs are as creative as humans’.¹⁰ I share his view (at least its first part – as for machine ‘souls’, my convictions are not that clear-cut). Machine creations, or creative machines, are the next step in the technological revolution

was continued in Rheingold’s next work (Howard Rheingold, *Net Smart: How to Thrive Online*, MIT Press, Cambridge MA – London 2012), in which his idea of artificial intelligence development is based above all on the use of intelligent network systems in an increasing range of situations.

7 Jacek Dukaj, ‘Sztuka w czasach sztucznej inteligencji’, *Gazeta Wyborcza*, 4–5 November 2017, p. 25.

8 Walter Benjamin, *The Work of Art in the Age of Mechanical Reproduction*, <https://www.marxists.org/reference/subject/philosophy/works/ge/benjamin.htm> (accessed 15.11.2020).

9 K. Kelly, *The Inevitable*, p. 54–60.

10 J. Dukaj, ‘Sztuka’, p. 5.

related above all to the fields of information technology and robotics, or to the incredible, tightly interwoven development of both these areas.

Within new media art, there is a rich, and well documented,¹¹ tradition of human creators sharing with non-humans their hitherto exclusive areas of activity. One of the most significant examples is algorithmic art. Works of algorists like Georg Nees, Frieder Nake, Manfred Mohr, and Roman Verostko have entered the new media art canon due to their pioneering employment of computer algorithms in the arts. In algorithmic art, which uses ‘code as a kind of material’,¹² the artist shares authorship with the system he or she has designed. The system achieves some degree of autonomy and independence and produces a creation which is equally (or in various proportions) a work of a human and a machine. Thus, the basic feature of generative arts, its distinguishing attribute, ‘is appropriately designed automated system of rules, to which the author delegates some responsibility for the form of the resultant artefact’.¹³ The delegation might be done in many ways that encompass various practices. Sometimes, like in the case of software art,¹⁴ the produced artefacts are not highly autonomous, in other projects (not only within the arts), the main idea guiding the creators is designing a system in which the role of machine will be equal to that of human.

The changing relationship between the artist as demiurge (controlling in full not just the tools used to create art but also the results of their application) and autopoietic systems is well illustrated by the boundary case of Brian Eno’s generative art,¹⁵ both his music and audio-visual productions. Accepting as his basic tenet that ‘machines are art’, Eno started experimenting with generative procedures as early as in the mid-1970s (his ground-breaking album *Discreet Music* appeared in 1975). In this early stage, his main venue was creating ‘music environments’ based on a system of parallel multi-channel playback of various audio tracks, with every moving listener (‘immersant’), wrapped around in a distinctive sound bubble, mixing a never-ending musical composition that consisted not in repetition but in diverse and unique works co-created each time by the listener.

The multi-channel sound installations were only the beginning. Later on, Eno turned to audio-visual works, the most famous of which is probably the *77 Million*

11 See, e.g., George Stiny, James Gibs, *Algorithmic Aesthetics: Computer Models for Criticism and Design*, University of California Press, Berkeley – Los Angeles – London 1978; Cynthia Goodman, *Digital Vision: Computers and Art*, Harry N. Abrams, New York 1987; Dominic McIver Lopes, *A Philosophy of Computer Art*, Routledge, London – New York 2009; *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts*, ed. Hannah B. Higgins, Douglas Kahn, University of California Press, Berkeley – Los Angeles – London 2012; Grant D. Taylor, *When the Machine Made Art: The Troubled History of Computer Art*, Bloomsbury, New York – London – New Delhi – Sydney 2014.

12 Joachim Sauter, ‘A Touch of Code’, in: *A Touch of Code: Interactive Installations and Experiences*, ed. Robert Klanten, Sven Ehmman, Verena Hanschke, Gestalten, Berlin 2011, p. 5.

13 Marcin Składanek, *Sztuka generatywna. Metoda i praktyki*, Wydawnictwo Uniwersytetu Łódzkiego, Łódź 2017, p. 10.

14 Bruce Wands notes that although in this type of art the source of the work is the program (algorithm), the latter is nevertheless written by the human. Automated creation of artistic objects is, in this case, essentially similar to the traditional model of creativity, in which authorship is assigned unambiguously to humans. Bruce Wands, *Art of the Digital Age*, Thames & Hudson, New York 2006, p. 164.

15 I wrote in detail about Eno’s works in: Piotr Zawojski, *Sztuka obrazu i obrazowania w epoce nowych mediów*, Oficyna Naukowa, Warszawa 2012, p. 252–291.

Paintings project.¹⁶ Starting in the mid-2000s, the artist realised dozens of exhibitions, using specially designed software to turn a finite number of elements into infinite audio-visual works of art. Two DVD editions of the work also appeared. This kind of ‘visual music’ stemmed from Eno’s views on the autonomy of music, its ability to produce new constellations of sounds, which he likened to the view from a house overlooking the sea, with ostensibly always the same but in fact constantly changing view.¹⁷ He managed to realise his dream about infinite music that never repeats itself. Once initiated, owing to the algorithmic procedures, the track plays continuously anew, driven generatively by the internal logic of the designed yet autonomous system. This software solution can hardly be called creative. Rather, it is a highly autonomous system producing an infinite stream of non-repeating sound structures.

From here, it is only one step to realisations that are not merely human-designed and – to a greater or lesser extent – human-controlled creations, but can produce (create?) completely on their own artefacts which might be treated as works of art, or at least aspire to that status. Historically speaking, a number of various artistic experiments might be named here which consisted in creating works, tools, or systems tasked with making other creations. Starting from eighteenth-century automata constructed by Jacques de Vaucanson (*The Flute Player*, *The Tambourine Player*, *The Digesting Duck*) or Pierre Jaquet-Droz and his collaborators (*The Writer*, *The Musician*, *The Draughtsman*), to Jean Tinguely’s kinetic sculptures (*Machine à dessiner*, 1955), to AARON by Harold Cohen (1973), and MEART – *The Semi-Living Artist* by Guy Ben-Ary (2002–2006). These projects anticipated proto-algorithmic and algorithmic strategies or themselves used algorithms as elements in the creation of works less and less dependent on humans. As such, they may be considered a necessary transitory mode towards the subsequent stage, in which tools are sought that would generate creations in full autonomy. The creations sometimes resemble artistic artefacts. Sometimes, on the other hand, they prove that human-devised programs can become so independent that the program’s/algorithm’s creator can in no way predict the ultimate effect of its work/creative process.

I will quote just a few examples that compel us to rethink our traditional views regarding the status of the artist, creator, and author – a status which up till recently was reserved for humans. The StatsMonkey software (and its successor, Quill) is a tool for automatic generation of sports news that uses raw data to ‘write’ elaborate and original press reports from sports events. Authors of the software went on to found a firm, called Narrative Science, which soon added new areas to its portfolio, including economic texts that are better (in substantive terms) than the work done by professional (human) analysts. Some observers of the press market project that in the nearest future these ‘meta-writers’ of ‘robonews’ might be responsible for over ninety per cent of all journalistic and analytical texts,

¹⁶ See, <https://www.lumenlondon.com/77galleries> (accessed 1.10.2018); Brian Eno, *77 Million Paintings*, DVD-ROM and DVD. Hannibal Records, New York 2006.

¹⁷ Cf. Brian Eno, *Music for Installations*, booklet accompanying the six-CD edition, Opal Records, Leigh-on-Sea 2018, p. 45.

essentially replacing human labour in that area. According to Kris Hammond, within a few years, a text-generating algorithm will be awarded the Pulitzer Prize.¹⁸

These experiments (and now full-fledged activities) would be impossible if it were not for the recently ongoing process of rethinking some fundamental questions about the essence of creativity, hitherto reserved for the human – more precisely, for the human brain. Looking for ways to build creative machines, scientists turned to certain analogies. One of them was the Darwinian natural selection and its information technology consequences: genetic algorithms. Already in 1990,¹⁹ John R. Koza sought to implement genetic algorithms. This led to his studies where the algorithms are used as ‘automated invention machines’.²⁰ As was to be expected, his research showed that in most cases genetic algorithms copied – or, at most, slightly modified – existing solutions. On some occasions, however, they also created new inventions which could be patented as solutions to thus far unresolved problems. In short, and allowing for certain simplification, we might say that creativity does not have to be treated as an exclusively human trait, and that it can be achieved by artificial intelligence. This view has been met with strong opposition. Lev Grossman, for instance, is convinced that real creative activity in the field of arts (and not only arts) is inextricably linked with consciousness, the self, and a sense of personal identity. He writes:

*Creating a work of art is one of those activities we reserve for humans and humans only. It's an act of self-expression; you're not supposed to be able to do it if you don't have a self. To see creativity, the exclusive domain of humans, usurped by a computer built by a 17-year-old is to watch a line blur that cannot be unblurred, the line between organic intelligence and artificial intelligence.*²¹

Below I will present some examples of using human-made machines in a way which makes them create certain artefacts, which might be regarded in the context of artistic strategies. David Cope is a musicologist, composer, but also a programmer whose software and algorithms analyse musical pieces and compose their own music. In the early 1990s, he developed EMI software (*Experiments in Musical Intelligence*) that applies artificial intelligence to write music imitating the styles of particular composers. At first, EMI specialised in mimicking the style of Johann Sebastian Bach (*Bach by Design*, 1993). Its next album (*Classical Music Composed by Computer*, 1997) contained imitations of both Bach and other classical composers, including Chopin, Rachmaninov, Stravinsky, and Beethoven. These compositions are worth listening to. Let us add that Cope's original music is also composed in synergy with computer programs.

18 See, Steven Levy, ‘Can an Algorithm Write a Better News Story Than a Human Reporter?’, <https://www.wired.com/2012/04/can-an-algorithm-write-a-better-news-story-than-a-human-reporter/> (accessed 4.10.2018).

19 John R. Koza, ‘Genetic Programming: A Paradigm for Genetically Breeding Populations of Computer Programs to Solve Problems’, <http://i.stanford.edu/pub/cstr/reports/cs/tr/90/1314/CS-TR-90-1314.pdf> (accessed 4.10.2018).

20 Martin Ford, *Rise of the Robots: Technology and the Threat of a Jobless Future*, Basic Books, New York 2015, p. 110.

21 Lev Grossman, ‘2045: The Year Man Becomes Immortal’, *Time*, 10 February 2011, <http://content.time.com/time/magazine/article/0,9171,2048299-1,00.html> (accessed 5.10.2018).

Another David Cope project was Annie, a virtual author of music and poetry, whom he created after his earlier ‘authors’/programs: Sara, Emma, Emily Howell, and Alice.²² In 2011, Cope published *Comes the Fiery Night: 2,000 Haiku by Man and Machine*, which brought together – or, to put it better, mixed together – haikus written by Annie (a machine) and by humans. Hardly any of the surveyed readers of these formally traditional pieces of poetry was able to tell poems written by a human from those created by Annie, a computer program based on algorithms and the use of artificial intelligence. In 2017, a Microsoft-developed artificial intelligence system, known as XiaoIce (or Xiao Bing, or Little Ice), allegedly guided also by emotional intelligence, appeared as the author on the cover of *The Sunshine Lost Windows*. The volume contained 139 pieces selected from tens of thousands of poems written by the ‘artist’. The book’s reception was mixed but dominated by critical voices arguing that the phenomenon should be treated not as poetry but rather as ‘marketing for a technology’.²³

Simon Colton is another name active in the ‘robot artists’ field, who tackles the questions of intelligent machines as creators of ‘machine art’. Are the artefacts produced by these machines ‘non-human’ art, or are they different art, just like artificial intelligence is ‘different’ intelligence? Colton is the creator of an AI program, called The Painting Fool, which ‘can identify emotions in photographs of people and then paint an abstract portrait that attempts to convey their emotional state. It can also generate imaginary objects using techniques based on genetic programming’.²⁴ On the project’s website,²⁵ the software introduces itself, ‘saying’ that it is a computer program, and an aspiring painter and creative artist. The interesting fact is that The Painting Fool uses an art-critiquing program called Darci to verify its achievements and develop self-criticism.²⁶ Colton draws attention to problems associated with defining art and classifying some artefacts as artistic objects, and to the controversies that have grown up around the notion of creativity. His painting-making software raises important questions. Can software grow increasingly autonomous and develop its own, distinctive style, not limited to producing photorealistic images of reality? Can it ‘work through’ external data in a critical and original manner, and then create unique paintings? Or even: can it create without ‘seeing’ digital images beforehand, and without needing to consult them?

In 2012, the London Symphonic Orchestra performed *Transits – Into an Abyss*. The piece was composed by a computer, in fact a computer cluster, constructed by Melomics Media²⁷ and located at the University of Malaga. In essence,

22 See, David Cope, *Tinman Too: A Life Explored*, iUniverse, New York – Bloomington 2012, p. 300.

23 Beata Wasilewska, ‘Robot szuka czytelnika’, *Gazeta Wyborcza*, 7 February 2018, p. 14.

24 M. Ford, *Rise of the Robots*, p. 112.

25 <http://www.thepaintingfool.com/index.html> (accessed 6.10.2018).

26 See, Kadhim Shubber, ‘Artificial Artists: When Computers Become Creative’, *Wired*, 7 August 2013, <https://www.wired.co.uk/article/can-computers-be-creative> (accessed 6.10.2018).

27 The term ‘melomics’ was coined as a blend word of ‘genomics’ and ‘melodies’. More precisely, the word is derived from ‘genomics of melodies’.

the working principle of this computational system – called IAMUS – consists in utilising biological algorithms to automatise the process of composing contemporary music. Having received a quite modest amount of data (including, for instance, what instruments will be performing), the system needs a relatively small time to produce/create a practically unlimited number of compositions. What kind of compositions are they? One way to find out is to listen to the 2012 album called simply *Iamus*, which features the London Symphonic Orchestra’s performance of the system’s compositions.²⁸ Do they have aesthetic value? If we were to organise a blind test, even among seasoned connoisseurs of contemporary music, would they be able to tell that the author of this music is a creative machine?

One more example: Taro Yasuno and his vision of ‘zombie music’. The music is machine-performed by robots of Yasuno’s construction, which play wind instruments using synthetic fingers and pressure pumps. In the future, the creator and programmer prophesies, mankind will die out, but the autonomous machines of his design will continue to play their music, which reaches far beyond human perception habits and listening ‘pleasure’. Listening to Yasuno’s work is in fact more of a ‘displeasure’, the music is difficult to evaluate in aesthetic terms. Yet its conceptual background is certainly food for thought, not only about the future of music but also more broadly about the procedures of producing artefacts which aspire to recognition as art.²⁹ Experiments of this kind encourage reflection on a range of topics, not always pessimistic, they also bring awareness of the need to rethink our views – historically-founded yet unchanging over centuries – about who is and who can be a creator, an author, and an artist.

The above examples are well supplemented by one of the exhibitions within the aforementioned 2017 edition of the Ars Electronica Festival. Its title – *Media Art Between Natural and Artificial Intelligence* – neatly encapsulates the explorations undertaken by the many contemporary new media artists who focus on organic (natural) and non-organic (artificial) intelligence, and their convergence. The exhibition presented twenty-six works variously addressing a number of issues, including:

1. machine-created poetry (*AI Poetry Hits the Road*, Kenric McDowell);
2. visualised archive, taking on the form of an immersive video installation generated by algorithms and a deep learning system operating on 1,700,000 images/documents (*Archive Dreaming*, Refik Anadol);
3. a work inspired by the neural network of the human brain and by deep learning, aiming to automatise the cognition of textual, visual, and aural datasets (*Learning to See: Hello, World!*, Memo Akten);
4. using the brain-computer interface to control a hi-tech robot painter (*A3 K3. Intermedia/Trans-technological Performance/Installation*, Dragan Ilić);

²⁸ For more on IAMUS, see, Sylvia Smith, ‘Iamus: Is This the 21st Century’s Answer to Mozart?’, <http://www.bbc.co.uk/news/technology-20889644> (accessed 5.10.2018).

²⁹ On a performance of the concert version of the project, see, Katarzyna Ryzel, ‘Piękne zaskoczenie’, *Ruch Muzyczny* 1, 2018, p. 52.

5. controlling machines with the use of biometric data collected from sensors placed on the human body (*Neurotransmitter 3000*, Daniel de Bruin);
6. artificial intelligence algorithms creating images based on the ways the human brain works while interpreting data (*Latent Space. Closed Loop*, Jake Elwers);
7. a project using Brian Eno's generative music and an enormous number of photographs documenting the twentieth-century history of mankind as 'remembered' or recorded in images (*Brian Eno's 'The Ship' – A Generative Film*, Dentsu Lab Tokyo).³⁰

One of the most extraordinary and fascinating among the recent projects of Patrick Tresset and his collaborators is Paul³¹ – a robot sketching portraits with the now classic Bic pen. The experience of the portrayed person is unique, especially if he or she has sat for paintings or photographs before (the author of this text has done both). This time it is not a human but a creative machine, itself a work of art, that tries to create a portrait based on the observation of the model's face. Tresset stresses that his aim

*is to develop autonomous systems that are capable of conceiving and producing artifacts that have a range of qualities and characteristics that enable their status as a work of art. Objects, to be considered as having such status, must be exhibited–evaluated–appreciated–acquired in a contemporary art context, and in the same manner as artist-made artworks.*³²

Paul and other 'embodied agents', the artist admits, 'only implement very low-level creative behaviours',³³ with various measuring standards for creativity used. At the same time, however, there can be no doubt that we are dealing with a special kind of machine, which – designed by a man – is on its way to autonomous action. How would that be expressed? Above all, in the development of its own style, which would in no way imitate any pre-existing style or way of capturing reality but strive for a distinct style-space: an original, unique manner of transforming the observed objects (for example, human faces). Tresset admits that 'the systems are not yet able to develop their own style-spaces'³⁴ – but neither are their works mechanical imitations. The adopted aim of developing a distinct, non-imitative style is a fundamental task for every (organic) artist but likewise for a creative machine which 'embodies' the agentive character of the human-developed system allowing for the creation of original works. Paul is an astonishing creative machine: not yet a subjective artist conscious of his worth but already a system transcending simple imitation. His presence inevitably undermines the

³⁰ The complete list of presented works, along with their descriptions, is to be found in the catalogue: *Artificial Intelligence. Das Andere Ich*, ed. Gerfried Stocker, Christine Schöpf, Hannes Leopoldseder, Hatje Cantz, Berlin 2017, p. 58–89.

³¹ Paul's essence, construction and principles of operation have been described in detail in: Patrick Tresset, Frederic F. Leymarie, 'Portrait drawing by Paul the Robot', *Computer & Graphics* 37, 2013.

³² Patrick Tresset, Oliver Deussen, 'Artistically Skilled Embodied Agents', p. 1, https://kops.uni-konstanz.de/bitstream/handle/123456789/27046/Tresset_270467.pdf (accessed 15.11.2020).

³³ P. Tresset, O. Deussen, 'Artistically Skilled Embodied Agents', p. 1.

³⁴ P. Tresset, O. Deussen, 'Artistically Skilled Embodied Agents', p. 3.

long-established belief that only an organic intelligence, deposited in wet organic flesh is capable of creating original works.

Unarguably, both Paul and Tresset's next project (e-David, led by Oliver Duesen and Thomas Lindemeier) force us to radically reformulate many of our views on the essence of the creative act, creative process, and the concept of authorship. In today's era of new technologies, distributed authorship, whereby humans share their demiurgic agency with other beings, is accepted as normal. Yet it is a different matter entirely to not simply make an intelligent machine a co-author but to set it free completely by endowing it with unlimited agency. In other words, to make it an autonomous creator/artist. Tresset is certain that, for the time being, his machines only work the way each computer system works – mostly on the basis of existing knowledge (gathered data), and only to a small extent learning and modifying their own future decisions. Although seemingly debatable in an era of self-learning systems, Tresset's conclusion is unambiguous: 'both systems cannot at present be evaluated as being creative.'³⁵ The words 'at present' sound like a rational assessment of the current capabilities of his machines, an assessment conscious of their limitations. Nonetheless, is this perspective not bound to soon become a relic of the conviction that only humans can be rightful creators of art?

The persons, projects, inventions, and experiments presented in this text are all very interesting and inspiring but they are only symptoms of a process of freeing artistic creativity from domains reserved exclusively for humans the way we know them, as organic beings. It is nowadays a commonplace that a robot artist, in its digital form, can produce an object in a technically superior way than the (still analogue, albeit digitally enhanced) human. In an act of self-defence, we keep repeating that the machines will never be as creative as we humans, they will always be mere media-replaying apparatuses. That, however, is neither obvious nor does it seem certain, even in the nearest future, not to mention a longer perspective.

In times of AI supremacy, of postdigital, ubiquitous algorithms steering and controlling our every online move, every choice, every purchase, every like, all the decisions we make regarding our artistic and aesthetic preferences – it is rather dubious to assume that the global artificial intelligence might be stopped from dominating over the human creativity by an autonomous gesture of the artist. As Yuval Noah Harari writes: 'The idea that humans will always have a unique ability beyond the reach of non-conscious algorithms is just wishful thinking'.³⁶ There is strong and progressively universal conviction that the human – and more generally: every organic creature – is nothing but an algorithm or a system of algorithms for data-processing. The Quantified Self Movement expresses this idea explicitly: the self is simply a set of mathematical patterns that the human mind is so far unable to understand.

³⁵ P. Tresset, O. Deussen, 'Artistically Skilled Embodied Agents', p. 7.

³⁶ Yuval N. Harari, *Homo Deus: A Brief History of Tomorrow*, Signal, New York 2016.

The homocentric worldview is being replaced by the dataist and datacentrist perspective. It is a perspective that is techno- rather than posthumanist, the latter being seen as a threat to mankind. Separating the obligatory intelligence from the optional consciousness is a challenge brought about not only by the development of AI but also by art as an area of creativity manifestation for both humans and the autonomising and emancipating machines. Let us quote Harari once more: ‘According to the life sciences, art is not the product of some enchanted spirit or metaphysical soul, but rather of organic algorithms recognising mathematical patterns. If so, there is no reason why non-organic algorithms couldn’t master it’.³⁷ This, however, is not to say that future humans will no longer create masterpieces, only that they will probably increasingly be assisted in their artistic endeavours by artificial intelligence.

Translated by Jakub Ozimek

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³⁷ Y. N. Harari, *Homo Deus*.



ABSTRACT: The article presents reflections regarding creative machines which use algorithmic principles to create, such as biological algorithms, generative designs, neural networks, learning systems and deep learning as well as robotic tools. One of the most distinctive examples of an artist that constructs autonomous machines capable of creating artistic artifacts is Patrick Tresset and his Paul. The discussion focuses on the recurring question: Is the position of the artist in the times of AI still reserved strictly for humans, or can artistic and aesthetic values be also attributed to works of creative machines?

KEY WORDS: artificial intelligence, new media art, algorithms, robotics, creative machines

