

Dejan Grba

Brittle Opacity: Ambiguities of the Creative AI

Abstract

This paper outlines the ambiguities which influence AI science, manifest in the production of AI artists, and shape the representation of creative AI in the media and in popular culture. Looking at the interrelated conceptual, discursive, ethical and other aspects of the prevailing approaches towards AI, it discusses some of the factors which obscure or mystify the important features of AI technologies vis-à-vis human cognition and artistic expression. Through a combination of tendencies and circumstances, these misconceptions and fallacies both emerge from and exacerbate the current issues of AI, which calls for vigilance and critical consideration by the creative actors and by the public. With regards to the existing literature, which primarily addresses the creative AI issues from technoscientific and historical perspectives, this study focuses on the ideas, methodologies, cultural contexts, and social impacts of AI art practices. It shows that current capabilities and transformative potentials of AI require artists—as well as scientists and entrepreneurs—to engage in a sharper critique of their motivations and goals, in a deeper creative investigation of their tools, and in a more nuanced scrutiny of their work. This will catalyze research in science, arts and humanities to define more robust concepts of creativity, to map its perspectives, and to inform our directives for further development and responsible application of AI.

Keywords: AI Art, Artificial Intelligence, Creative AI, Creativity, Deep Learning, Intelligence, Machine Learning.

Publication

xCoAx, 9th International Conference on Computation, Communication, Aesthetics and X Proceedings. Graz and online, 12-16 Jul 2021 (forthcoming).

Full Text

Will be available upon publication.

References

Aguera y Arcas, Blaise, Alexander Todorov, and Margaret Mitchell. 2017. "Physiognomy's New Clothes." Medium, 7 May. <https://medium.com/@blaisea/physiognomys-new-clothes-f2d4b59fdd6a>.

Akten, Memo. 2017. "Learning to See." Memo Akten's website. <http://www.memo.tv/works/learning-to-see>.

Anadol, Refik. 2020. "All Works." Refik Anadol's website. <https://refikanadol.com>.

Anonymous. 2016. "Rembrandt Goes Digital." ING Next Rembrandt website. <https://www.nextrembrandt.com>.

Anonymous. 2019. "3 Things You Need to Know About AI-Powered 'Deep Fakes' in Art & Culture." Cuseum website. <https://cuseum.com/blog/2019/12/17/3-things-you-need-to-know-about-ai-powered-deep-fakes-in-art-amp-culture>.

Anonymous. 2021a. "Unanswered Questions About AI." AIArtists website. <https://aiartists.org/unanswered-questions>.

Anonymous. 2021b. "Beeple's Opus." Christie's website. <https://www.christies.com/features/Monumental-collage-by-Beeple-is-first-purely-digital-artwork-NFT-to-come-to-auction-11510-7.aspx>.

Bach, Joscha. 2016. "Machine Dreams - Dreaming Machines." Joscha Bach's website. December 28. <http://bach.ai/machine-dreams>.

Bailey, Jason. 2018. "Helena Sarin: Why Bigger Isn't Always Better with GANs and AI Art." Artnome, November 26. <https://www.artnome.com/news/2018/11/14/helena-sarin-why-bigger-isnt-always-better-with-gans-and-ai-art>.

Barbrook, Richard. 2007. *Imaginary Futures: From Thinking Machines to the Global Village*. London: Pluto Press.

Bishop, Chris. 2017. "Artificial Intelligence, the History and Future." The Royal Institution YouTube podcast. https://youtu.be/8FHBh_OmdsM.

Bishop, Claire. 2012. "Digital Divide: Contemporary Art and New Media." *Artforum*, 51, 1: 434–441.

Boden, Margaret A. 1998. "Creativity and Artificial Intelligence." *Artificial Intelligence*, 103: 347-356. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.667.3710&rep=rep1&type=pdf>.

Boden, Margaret A. 2004. *The Creative Mind, Myths and Mechanisms*. 2nd edition. London/New York: Routledge.

Boden, Margaret A. 2010. *Creativity and Art: Three Roads to Surprise*. Oxford: Oxford University Press.

Boden, Margaret A., and Ernest Edmonds. 2019. "A Taxonomy of Computer Art." In *From Fingers to Digits: An Artificial Aesthetic*, 23-59. Cambridge: The MIT Press.

Bogart, Ben. 2019. "Watching (2001: A Space Odyssey)." AI Art Gallery's website. <http://www.aiartonline.com/community-2019/ben-bogart>.

Bostrom, Nick. 2014. *Superintelligence: Paths, Dangers, Strategies*. Oxford: Oxford University Press
Keith Mansfield.

- Bourgade, Pierre. 1972. "Man Ray Talks with Pierre Bourgade." In *Bonsoire, Man Ray*. Paris: P. Belfond.
- Brambilla, Marco. 2019. "Nude Descending a Staircase No. 3." Marco Brambilla's website. <https://www.marcobrambilla.com/selected-works>.
- Broad, Terrence, Frederic Fol Leymarie, and Mick Grierson. 2020. "Amplifying the Uncanny." *xCoAx, 8th Conference on Computation, Communication, Aesthetics & X*: 33-42.
- Browne, Kieran. 2020. "Who (or what) is an AI Artist?" Preprint. https://kieranbrowne.com/publications/who_or_what_is_an_ai_artist.pdf.
- Buss, David M. 2015. *Evolutionary Psychology: The New Science of the Mind*, 5th edition, 9: 15-18. London/New York: Routledge.
- Castells, Manuel. 2010. *The Information Age Vol. 1: The Rise of the Network Society*, 169-180. Chichester: Wiley-Blackwell.
- Cetinić, Eva, and James She. 2021. "Understanding and Creating Art with Ai: Review and Outlook." Preprint (19 February). <https://arxiv.org/pdf/2102.09109>.
- Chang, Vanessa. 2020. "Prosthetic Memories, Writing Machines." Noema website, December 3. <https://www.noemamag.com>.
- Chatel, Marie. 2018. "In Focus: Mario Klingemann." Medium/Digital Art Weekly. <https://medium.com/digital-art-weekly/in-focus-mario-klingemann-783533ec91fe>.
- Chung, Sougwen. 2020. "Selected Works by Sougwen Chung." Sougwen Chung's website. <https://sougwen.com/artworks>.
- Copeland, B. Jack, 2020. "The Church-Turing Thesis." In Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Summer 2020 edition). <https://plato.stanford.edu/archives/sum2020/entries/church-turing>.
- Cormen, Thomas H., Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. 2001. *Introduction to Algorithms*, 5. Cambridge: The MIT Press.
- Crawford, Kate, and Trevor Paglen. 2019. "Excavating AI: The Politics of Training Sets for Machine Learning." Excavating.ai website (published by The AI Now Institute, NYU). <https://excavating.ai>.
- Curtis, Adam. 2011. "All Watched Over by Machines of Loving Grace, Part 2: The Use and Abuse of Vegetational Concepts." BBC TV Miniseries (directed by Adam Curtis).
- Czarnecki, Gina. 2006. "Nascent." Gina Czarnecki's website. <https://www.ginaczarnecki.com/nascent>.
- Czarnecki, Gina. 2006. "Spine." Gina Czarnecki's website. <https://www.ginaczarnecki.com/spine>.
- Davies, Stephen. 2013. *The Artful Species: Aesthetics, Art, and Evolution*. Oxford: Oxford University Press.

Dimaggio, Paul, and Michael Useem. 1978. "Social Class and Arts Consumption: The Origins and Consequences of Class Differences in Exposure to the Arts in America." *Theory and Society*, 5, 2: 141–161.

Disnovation.org (Nicolas Maigret and Maria Roszkowska). 2017. "Predictive Art Bot V3." Nicolas Maigret's website. <http://peripheriques.free.fr/blog/index.php?/works/2017-predictive-art-bot-v3>. Project website: <http://predictiveartbot.com>. Artbot Space: <http://artbot.space>. Twitter: <http://twitter.com/predartbot>.

Dixon, Steve. 2019. *Cybernetic-Existentialism: Freedom, Systems, and Being-for-Others in Contemporary Arts and Performance*, 3. New York: Routledge.

Eaton, Scott. 2020. "Entangled II." Scott Eaton's website. <http://www.scott-eaton.com/2020/entangled-ii>.

Elgammal, Ahmed. 2018. "When the Line Between Machine and Artist Becomes Blurred." The Conversation website. <https://theconversation.com/when-the-line-between-machine-and-artist-becomes-blurred-103149>.

Eltes, Jonas. 2017. "Lost in Computation." Jonas Eltes' website. <https://jonaselt.es/projects/lost-in-computation>.

Epstein, Ziv, Sydney Levine, David G. Rand, and Iyad Rahwan. 2020. "Who Gets Credit for AI-generated Art?" *Isience*, 23, 9, 101515.

Finzer, Devin. 2020. "The Non-Fungible Token Bible: Everything You Need to Know About NFTs." OpenSea website. <https://opensea.io/blog/guides/non-fungible-tokens>.

Gobet, Fernand, and Sala Giovanni. 2019. "How Artificial Intelligence Can Help Us Understand Human Creativity." *Frontiers in Psychology*, Vol. 10. <https://www.frontiersin.org/article/10.3389/fpsyg.2019.01401>.

Goodwin, Ross. 2016. "Sunspring." YouTube website. <https://youtu.be/LY7x2lhqjmc>.

Goodwin, Ross. 2018. "Automatic on the Road." YouTube website. <https://youtu.be/TqsW0PMd8R0>.

Grba, Dejan. 2019. "Forensics of a Molten Crystal: Challenges of Archiving and Representing Contemporary Generative Art." *ISSUE Annual Art Journal*, 08, (*Erase*): 3-15.

Grba, Dejan. 2020. "Alpha Version, Delta Signature: Cognitive Aspects of Artefactual Creativity." *Journal of Science and Technology of the Arts*, 12 (3): 63-83.

Grba, Dejan. 2021. "Immaterial Desires: Cultural Integration of Experimental Digital Art." *The International Conference on Art, Museums and Digital Cultures*.

Groß, Benedikt, Joey Lee et al. 2016. "The Aerial Bold Project." The Aerial Bold Project website. <http://type.aerial-bold.com/tw>.

- Harris, Sam. 2019. "Can We Avoid a Digital Apocalypse?" Edge.org, 14 June.
<https://www.edge.org/response-detail/26177>.
- Hautamäki, Jukka. 2019. "New Parliament." AI Art Gallery's website.
<http://www.aiartonline.com/community-2019/jukka-hautamaki>.
- Hawkins, Max. 2021. "Randomized Living." Max Hawkins' website.
https://maxhawkins.me/work/randomized_living.
- Heaney, Libby. 2019a. "Euro(re)vision." AI Art Gallery website.
<http://www.aiartonline.com/highlights/libby-heaney-2>.
- Heaney, Libby. 2019b. "Resurrection (TOTB)." Libby Heaney's website.
<http://libbyheaney.co.uk/resurrection-totb>.
- Heller, Michael, and James Salzman. 2021. *Mine!: How the Hidden Rules of Ownership Control Our Lives*, 14-18, and passim. New York: Doubleday/Penguin Random House.
- Hentschläger, Kurt. 2009-2012. "CLUSTER." Kurt Hentschläger's website.
<http://www.kurthentschlager.com/portfolio/cluster/cluster.html>.
- Hentschläger, Kurt. 2011. "HIVE." Kurt Hentschläger's website.
<http://www.kurthentschlager.com/portfolio/hive/hive.html>.
- Hertzmann, Aaron. 2020. "Computers Do Not Make Art, People Do." *Communications of the ACM*, 63, 5: 45–48.
- Hertzmann, Aaron. 2021. "Why Would Anyone Buy Crypto Art – Let Alone Spend Millions on What's Essentially a Link to a JPEG File?" The Conversation website, 15 March.
<https://theconversation.com/why-would-anyone-buy-crypto-art-let-alone-spend-millions-on-whats-essentially-a-link-to-a-jpeg-file-157115>.
- Høgh-Olesen, Henrik. 2019. *The Aesthetic Animal*. New York: Oxford University Press.
- Hong, Joo-Wha, and Nathaniel Ming Curran. 2019. "Artificial Intelligence, Artists, and Art: Attitudes Toward Artwork Produced by Humans vs. Artificial Intelligence." *ACM Transactions on Multimedia Computing, Communications, and Applications*. 15, 2s, Article 58 (July).
- Hooker, John. 2018. "Truly Autonomous Machines Are Ethical." Preprint.
<https://arxiv.org/pdf/1812.02217>.
- Jobin, Anna, Marcello Ienca, and Effy Vayena. 2019. "The Global Landscape of AI Ethics Guidelines." *Nature Machine Intelligence* 1 (9): 389–399.
- Kearns, Michael, and Aaron Roth. 2019. *The Ethical Algorithm: The Science of Socially Aware Algorithm Design*. Oxford: Oxford University Press.

- Khamis, Alaa. 2019. "The 7-Step Procedure of Machine Learning." Towards Data Science website. <https://towardsdatascience.com/the-7-step-procedure-of-machine-learning-c15c922e7300>.
- Klingemann, Mario. 2017. "Alternative Face." Mario Klingemann's website. <https://underdestruction.com/2017/02/04/alternative-face>.
- Klingemann, Mario. 2018a. "Memories of Passersby I." Mario Klingemann's website. <https://underdestruction.com/2018/12/29/memories-of-passersby-i>.
- Klingemann, Mario. 2018b. "Neural Glitch / Mistaken Identity." Mario Klingemann's website. <https://underdestruction.com/2018/10/28/neural-glitch>.
- Kurzweil, Ray. 2005. *The Singularity Is Near: When Humans Transcend Biology*. New York: Penguin.
- Lee, Kai-Fu. 2018. *AI Superpowers: China, Silicon Valley, and the New World Order*, 126-129. Boston/New York: Houghton Mifflin Harcourt.
- Levin, Michael et al. 2021. "Research: Lab's New Directions" The Levin Lab blog, <https://ase.tufts.edu/biology/labs/levin/research/newDirections.htm>.
- Loi, Michele, Eleonora Viganò, and Lonneke Plas van Der. 2020. "The Societal and Ethical Relevance of Computational Creativity." Preprint. <https://www.researchgate.net/publication/343179320>.
- López de Mántaras, Ramón. 2016. "Artificial Intelligence and the Arts: Toward Computational Creativity." *The Next Step. Exponential Life*. Madrid: BBVA. <https://www.bbvaopenmind.com/en/articles/artificial-intelligence-and-the-arts-toward-computational-creativity>.
- Marcus, Gary F., and Ernest Davis. 2019. *Rebooting AI: Building Artificial Intelligence We Can Trust*. New York: Pantheon Books.
- Marks, Anna. 2019. "How AI is Radically Changing Our Definition of Human Creativity." *WIRED*, 27 May. <https://www.wired.co.uk/article/artificial-intelligence-creativity>.
- McCorduck, Pamela. 2004. *Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence*. Natick: A. K. Peters, Ltd.
- McCormack, Jon, Toby Gifford, and Patrick Hutchings. 2019. "Autonomy, Authenticity, Authorship and Intention in Computer Generated Art." *EvoMUSART: 8th International Conference on Computational Intelligence in Music, Sound, Art and Design*, vol 11453: 35-50.
- Miller, Arthur I. 1996. *Insights of Genius: Imagery and Creativity in Science and Art*. New York: Copernicus/Springer-Verlag.
- Miller, Arthur I. 2019. *The Artist in the Machine: The World of AI-Powered Creativity*, 289-295. Cambridge: The MIT Press.

Miller, Geoffrey. 2001. *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature*, 274-307, and passim. Anchor Books/Random House, Inc.

Mitchell, Melanie. 2019a. *Artificial Intelligence: A Guide for Thinking Humans*. Kindle edition. New York: Farrar, Straus and Giroux.

Mitchell, Melanie. 2019b. "We Shouldn't be Scared by 'Superintelligent A.I.'" *The New York Times Opinion*, 31 October. <https://nyti.ms/3255pK2>.

Newton-Rex, Ed. 2019. "Creative AI: A Reading List." Medium, 15 December. <https://medium.com/creative-ai/creative-ai-a-reading-list-9a6d1d13563f>.

Nielsen, Michael. 2019. "Neural Networks and Deep Learning." Online book. <http://neuralnetworksanddeeplearning.com>.

Nye, Maxwell, Luke Hewitt, Joshua Tenenbaum, and Armando Solar-Lezama. 2019. "Learning to Infer Program Sketches." <https://arxiv.org/pdf/1902.06349>.

O'Hear, Anthony. 1995. "Art and Technology: An Old Tension." *Royal Institute of Philosophy Supplement*, 38 (Philosophy and Technology): 143–158.

Paul, Christiane. 2015. "From Immateriality to Neomateriality: Art and the Conditions of Digital Materiality." *ISEA 2015 Proceedings*. https://isea2015.org/proceeding/submissions/ISEA2015_submission_154.pdf.

Pinker, Steven. 2002. *The Blank Slate: The Modern Denial of Human Nature*. New York: Penguin.

Pinker, Steven. 2018. *Enlightenment Now: The Case for Reason Science Humanism*, 323-327. New York: Viking.

Raatikainen, Panu. 2021. "Gödel's Incompleteness Theorems." In Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2021 edition). <https://plato.stanford.edu/archives/spr2021/entries/goedel-incompleteness>.

Ramesh, Aditya, Mikhail Pavlov, Gabriel Goh, and Scott Gray. 2021. "DALL·E: Creating Images from Text." OpenAI blog. <https://openai.com/blog/dall-e>.

Ridler, Anna. 2018. "Myriad (Tulips)." Anna Ridler's website. <http://annaridler.com/myriad-tulips>.

Rothco. 2018. "JFK Unsilenced." Rothco agency website. <https://rothco.ie/work/jfk-unsilenced>.

Roudavski, Stanislav and Jon McCormack. 2016. "Post-anthropocentric Creativity." *Digital Creativity*, 27: 1, 3-6.

Saltz, Jerry. 2019. "What the Hell Was Modernism?" *New York Magazine*, 30 September. <https://www.vulture.com/2019/10/jerry-saltz-new-moma-modernism.html>.

- Schwab, Katharine. 2018. "An AI Learned to Make Fireworks, and They're Mesmerizing." Fact Company online article. <https://www.fastcompany.com/90156087/an-ai-learned-to-make-fireworks-and-theyre-mesmerizing>.
- Shanken, Edward A. 2016. "Contemporary Art and New Media: Digital Divide or Hybrid Discourse?" In Chrisitane Paul (ed.), *A Companion to Digital Art*, 463–481. Chichester: John Wiley & Sons, Inc.
- Sherwin, Martin J. 2020. *Gambling with Armageddon: Nuclear Roulette from Hiroshima to the Cuban Missile Crisis*, 15-16, 369-380, and passim. Kindle edition. New York: Knopf Doubleday Publishing Group.
- Shinseungback Kimyonghun. 2019. "Mind." Shinseungback Kimyonghun's website. <http://ssbkhy.com/works/mind>.
- Sloss, Andrew N., and Steven Gustafson. 2019. "Evolutionary Algorithms Review." <https://arxiv.org/pdf/1906.08870>.
- Stallabrass, Julian. 2006. *Contemporary Art: A Very Short Introduction*. Oxford: Oxford University Press.
- Taylor, Grant D. 2014. *When the Machine Made Art: The Troubled History of Computer Art*. New York and London: Bloomsbury Press.
- Tegmark, Max. 2017. *Life 3.0: Being Human in the Age of Artificial Intelligence*. New York: Alfred A. Knopf.
- Todorović, Vladimir, and Dejan Grba. 2019. "Wandering Machines: Narrativity in Generative Art." *CITAR Journal of Science and Technology of the Arts*, 11, 2: 50-58.
- Tokui, Nao. 2016-. "AI DJ Project." Tokui Nao's website. <http://naotokui.net/projects/ai-dj-project-2016>.
- Tokui, Nao. 2018a. "Imaginary Landscape." Nao Tokui's website. <https://naotokui.net/projects/imaginary-landscape-2018>.
- Tokui, Nao. 2018b. "Imaginary Soundwalk." Nao Tokui's website. <https://naotokui.net/projects/imaginary-soundwalk-2018>.
- Trivers, Robert L. 2011. *Deceit and Self-Deception: Fooling Yourself the Better to Fool Others*. New York: Penguin.
- Winner, Langdon. 1980. "Do Artifacts Have Politics?" *Daedalus*, 109, 1: 121-136.
- Yi, Huang. 2021. "Huang Yi & KUKA." Huang Yi's website. <https://huangyistudio.com/huangyiandkuka>.
- Zhang, Weidi. 2018. "Lavin." Weidi Zhang's website. <https://www.zhangweidi.com/lavin>.
- Zheng, Chenyu, and Douglas C. Sicker. 2013. "A Survey on Biologically Inspired Algorithms for Computer Networking." *IEEE Communications Surveys & Tutorials*, 15, (3), 3rd Quarter: 1160-1191.
- Żmijewski, Artur. 2011. "Artists Are Just as Capable of Setting the Same Chain of Events as Politicians: Artur Żmijewski in conversation with Joanna Warsza." *Das Magazin der Kulturstiftung des Bundes*, 18.
- Żylińska, Joanna. 2020. *AI Art: Machine Visions and Warped Dreams*. London: Open Humanities Press.