# Machine Flaws in Generative Art

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## Abstract

This panel focuses on opening up a discussion on the role of art in the times when AI systems are becoming ubiquitous. It embraces the machine flaws, irregularities and errors that artists explore to push the boundaries of their art practice and find new thematic, technological and conceptual grounds for experimentation. The panel explores and compares multiple views, case studies and projects produced in various disciplines including data driven city portraits, generative media facades, urban media art, spatio-temporal visualizations, machine learning narrative experiments in VR, neural networks and art; and discrepancies or interrelatedness between human creativity and the future of Artificial general intelligence (AGI).

## Keywords

Generative art, virtual reality, machine learning, AI, cognitive mapping, error, generative visualization, inaccuracy, urban media art, media city, software city, hardware city.

## Media Ruins: Aesthetics of Neglected Media in the Software City

### Kristy H.A. Kang

In *Soft City*, a personalized account of London life in the early 1970s writer Jonathan Raban stated that "the city as we imagine it, the soft city of illusion, myth, aspiration, nightmare, is as real, maybe more real, than the hard city one can locate on maps, in statistics…and architecture." [1] As global cities aspire to become "smart", merging technology with urban infrastructure in the interest of increased efficiency and usability, Raban's vision of the hard city has transformed into the hardware city, and the soft city has become software city — the local, intimate human dimension of urban life now increasingly mediated using digital technologies. These comprise the spatial narratives of the city layered over time and place. Cities embed technology into everyday life, aspiring towards a utopian vision of a computational, data-driven urban infrastructure that does not break down. But what if the hardware city glitches or stops working? What would an aesthetics of a flawed, forgotten and neglected media city look like? And what kinds of artistic expressions could be generated from this? This paper will explore how artists use digital media in and of urban space to create poetic frictions between the hardware and software city and challenge us to see what is overlooked. It offers a reading on the creative practices and expressions that emerge between hardware and software city by looking at the work of urban media artists Krzysztof Wodiczko and Refik Anadol.

Though each artist's practice differs both generationally and formally, one can say that they are both concerned with creating portraits of the city. While the urban media and projection works of Wodiczko concern themselves with giving voice to overlooked bodies in the city, Anadol's urban projection mapped performances deal with the quantified body. Anadol's portraits are "derived from data" and "augment the more instrumental monitoring and administering of the city promulgated by IT infrastructures…" [2] Wodiczko's "instruments" or media "prostheses" ask the urban dweller or witness to share an experience that is deeply intimate or traumatic and is not typically shared with strangers in public. [3] His works create a relational interface or an empathy exchange that allows for the possibility of collective healing and reflection within the hardware city. Whereas Refik Anadol transforms the collective body of machine informatics collected and generated by the quantified city into a poetics of data amplification in his architectural projection performances. Each of

these artists create ways of revealing characteristics of the media city which may be imperfect, neglected or overlooked in its aspirational vision to be smart and efficient. They craft encounters with the (data)body of the city that challenge us to see the urban anew. Each creates in their work, a point of contact – a relational interface between human and machine, and between hardware and software city.

## STUDY 7/0: Error-Generated Spatiotemporal Visualization

### Dejan Grba

*Study 7/0* project visualizes the positioning errors generated by a static GPS receiver. Motivated by the idea of cognitive mapping as an individual, non-linear and discontinuous spatiotemporal experience, the project explores error and imperfections as generators of interesting conceptual, and narrative source material for further creative processing and expression unlike typical glitch art where the error is an aestheticised frontline layer. [4] *Study 7/0* is a concise study of the effective approaches to emergence in generative art in which the simple initial settings of a system can produce complex and surprising phenomena. [5] In this context, it is spatiotemporal configurations and relations.

Placing a Garmin GPSmap 60Cx receiver on my desk, I turned it on with a *draw track* function, and kept it there powered on for 7 days, 7 hours, 16 minutes and 11 seconds (from 7 July 2010 04:46:36PM to 15 July 00:02:47AM). While the ideal GPS plot for an immovable object is a single point, this setup had recorded 8438 trackpoints on a path 34.7km long, covering an area of 2.1km$^2$ with average speed of 0.2km/h and maximum speed of 17.9km/h. The path is a consequence of the limited precision of a commercial GPS receiver working inside a building under changing weather conditions, combined with the general GPS inaccuracy. With time-stamps, horizontal positions, altitudes and speeds for all trackpoints, the path constitutes a large dataset.

In the initial iteration I animated the horizontal positions (lon/lat), speeding up the 630,971 seconds of real-time record into 4 minutes and 41 seconds (281.26 seconds at 30fps). The first animation isolates the current 2.25% (780m) of the whole path, revealing the complex dynamics of error-generated motion. The second animation follows the current 2.25% building up into the complete path. Each animation displays the numerical values from the dataset.

With Philippe Kocher from Zürcher Hochschule der Künste, I am working on a 3D animation with sound, in which a circle spline will be extruded along the GPS path into a NURBS tunnel. The tunnel inner surface will have a 100% (mirror) reflectivity while the material will have a degree of one-way transparency so the inside will be illuminated from a rig of external light sources. The point camera will be animated along the GPS path in a subjective point of view, [6] [7] at the speed and acceleration dynamics of the GPS-error-generated data. The animation will be sped up from its real-time record to approximately 5 minutes of running time. The combination of tunnel's self-reflectivity and transparency with subjective POV will produce complex visual dynamics referring to the idea of an environment that challenges its own material and visual reality. [8] Philippe Kocher is developing granular synthesis algorithms for the sonic layers in which the altitude will be a specific generative parameter interacting with the luminochromatic values registered by the point camera.

## The Running Nude: Narrative Mistakes of a Generative VR Experience

### Vladimir Todorović

*The Running Nude* is a generative VR experience inspired by the early chronophotographs of human body in motion. It renders a running nude figure in a 3D game engine by making use of generative storytelling, machine learning and invasive effects that the VR experience can have on users' perception. Numerous artworks and approaches that are referenced and appropriated in this work include dadaist poetry, Queneau's literature influenced by mathematics, Duchamp's *Nude Descending a Staircase, No. 2,* and Mamoru Oshii's *Ghost in the Shell*. The core narrative aspect of the project consists of stories created by tinkering with the recurrent neural network (RNN) *Neural Storyteller*. This machine learning system is trained to write a romantic story based on an image that it analyzes [9]. Multiple stories generated by this creative machine were used as voice over whispered in the style of Autonomous sensory meridian response (ASMR) recording. The generated narratives sound like fragmented memories of the running nude. This element of the project also functions as a layer of the digital VR world capable of piercing transversally the membranes of physical reality and that way making this artwork permeable. By using pseudo-random functions, the system determines and generates the music, sounds, points of view, as well as the flexibility and properties of the nude's animation rig/skeleton. Orchestrating and controlling these elements with random logic, as well as enabling the system to make creative decisions, unveil the Frankensteinesque nature of the created character and the whole project. Its overall narrative architecture enables users to observe the running nude, to become one, and to experience traversing through nudes' ghostly figures and imprints located inside the 3D digital world. These visceral encounters connect the VR experience with the early beginnings of film and experiments conducted by Étienne-Jules Marey and Eadweard Muybridge.

## On Consciousness, Memory, and the Role of Art in the Era of VR & AI Maturity

### Melentie Pandilovski

Henri Bergson claimed that we have to change our way of thinking when facing new objects: "The idea that, for a new object, we might have to create a new concept, per-

haps a new way of thinking, is deeply repugnant to us." [10]

Memory has resurfaced as an important concept. Although much has been achieved with Analytical, Human-inspired, and Humanized Artificial Intelligence the loss of memory in AI can be treated as catastrophic and represents a big hurdle in the development of AI. For Vilem Flusser in the first phase of manipulating information we deal with creation or production of information, and in the second phase with the deployment of memories with the aim of storing them. [11] Flusser emphasizes two significant aspects of the technical image: its capacity for memory and its mathematical logic.

For McLuhan, the nature of media determines the nature of society. He writes, "[o]nce a new technology comes into the social milieu it cannot cease to permeate that milieu until every institution is saturated." The Tetrad, or Four Laws of Media, according to the McLuhans, refers to enhancement, obsolescence, retrieval, and reversal. McLuhan notes: "[v]ideo related technologies must produce a form of psychological death for all mankind [sic] by separating it permanently from the natural order, the book of nature, through narcissus-like self-involvement" a conclusion reached by McLuhan operating on three analytical levels at once: the perceptual, the historical, and the analogic. [12]

Thomas Metzinger draws attention to the fact that we do not know what the psychological consequences of the use of VR will be and emphasizes the risks of depersonalization after extended immersion in virtual environments, as well as to the need to study its long term effects. [13]

Antti Revonsuo points out how conscious experience exactly is a virtual model of the world, a dynamic internal simulation, which in standard situations cannot be experienced as a virtual model because it is phenomenally transparent—we "look through it" as if we were in direct and immediate contact with reality. [14]

## The Meaning of AI Art Following the Challenges of Artificial General Intelligence

### Paul Boyé

Artificial general intelligence (AGI), or the notion of a computational system that is operational at the level of human intelligence, could be tentatively posed as the central concern for modern machine intelligence engineering. Qualities such as natural language processing, representation, teleological consciousness and the execution of judgements, if incorporated by an AGI system would not only level the system with the human, but would additionally secure an 'outside view', producing a schism between experience and its exterior. [15] The agents of this system, emerging out of a history of human-bound conceptions, now self-conceive their own practical movements, guided by intelligence-qualities and ideas semantically bound to statements of what intelligence is, and what the agents

ought to do to make changes. In this sense, the 'artificial' in AGI is not merely indicating the system's status as the artifice of a human engineer, but is the apprehension by the system itself of its own artificiality; the ability to make oneself the artefact of one's own ends, intelligently crafting worlds exterior to any human-bound construction of concepts.

Although it is widely understood –by organizations such as OpenAI [16] and the Machine Intelligence Research Institute – that AGI development projects are more or less in their infancy, the constructive potential of AGI has challenged the supposed substantiality of many human-oriented semantic systems. It is as if the potential what AGI systems and their agents could do has altered the interactions of meaning-generating language in its actual performance. This paper will be considering this point by examining the semantics of contemporary art – how value is secured through stating the putative meaning of a given work – and how this has been challenged following the use and response of artists to AI computation. For instance, the Paris-based collective, *Obvious,* has used Generative Adversarial Networks (GAN) to produce images based on classical family portraiture, genre-mashing and algorithmically collapsing several epochs, styles and materials into a single material expression. Their *Portrait of Edmond de Belamy* (2018) was controversially placed and sold through a Christie's auction [17], raising questions on how the works were valued. It could be argued that the absence of author, expression and creativity – or the value of a work of art vis-à-vis the market – demands that the work needs to argue for its value in a different manner. This paper will explore this contentious ground as an analogue to the philosophical implications of AGI – between human-bound creative intelligence and the exterior-general edifice of future AGIs; how they might produce meaning and subsequent disruption, error and manipulation of the standard rules determining the value of art.

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## Authors Biographies

**Paul Boyé** is a writer and artist based in Boorloo (Perth, Western Australia). His research investigates the interface between media and intelligence, functionalist accounts of semantic content, new materialist philosophy and future-oriented political constructivism. He is currently a PhD Candidate at the University of Western Australia, writing on the contemporary artistic responses to the philosophy of Quentin Meillassoux.

**Kristy H.A. Kang** is a practice-based researcher whose work explores narratives of place and geographies of cultural memory. She is Assistant Professor at the School of Art, Design and Media at Nanyang Technological University, Singapore. Her research interests combine urban and ethnic studies, mapping, animation and emerging media arts to visualize cultural histories of cities and communities. She is currently developing a project with the Urban Redevelopment Authority mapping the spatial narratives of Singapore's ethnic communities. Her works have been exhibited internationally and received awards including the Jury Award for New Forms at the Sundance Online Film Festival. She was co-organizer of an international symposium on mediated public space "Emergent Visions: Adjacency and Urban Screens" (http://www.emergentvisions.org) and her article "Interfaces and Intentionalities: Adjacent Practices of Urban Media Art in Singapore" will be published in a forthcoming special issue on Urban Interfaces in Leonardo Electronic Almanac.

**Dejan Grba** is a media artist, author and educator. He has exhibited, curated and/or lectured at venues including ISEA Manizales and Hong Kong, SIVA Shanghai, SU Syracuse, SIGGRAPH Los Angeles, ZKM Karlsruhe, IFA Berlin, GfZK Leipzig, Montevideo Amsterdam, MiP Vienna, <rotor> Graz, MoCA Novi Sad and Belgrade. He has published papers in new media art journals worldwide. He is currently a visiting associate professor at the School of Art Design and Media, Nanyang Technological University in Singapore. He is a founding chair of the international interdisciplinary MA program The Art of Digital Media at University of the Arts in Belgrade, and a founding chair of New Media department at the Faculty of Fine Arts in Belgrade where he teaches Transmedia Research. He teaches Poetics of Digital Art at Digital Art doctoral program at University of the Arts in Belgrade.

**Vladimir Todorovic** is a filmmaker, new media artist and educator. He works with new technologies for immersive and generative storytelling. His projects have won several awards and have been shown at various festivals, exhibitions, museums and galleries including: HANIFF, Cottbus (28th), Visions du Reel (49th, 46th, 44th) Cinema du Reel (37th), IFFR (42nd, 40th and 39th), Festival du Nouveau Cinema (42nd), BIFF, SGIFF, L'Alternativa, YIDFF, Siggraph, ISEA (2008,2006), Ars Electronica, Transmediale, Centre Pompidou, The Reina Sofia Museum(Madrid), and Japan Media Art Festival.

**Dr Melentie Pandilovski** is an art theorist/historian/curator. He deals with examining the links between art-culture, science-technology. He is Director of Riddoch Art Gallery. He has curated more than 200 projects in Europe, Australia, and Canada: Stelarc's *Contestable Bodies – Alternate Anatomical Architectures*; *Inaugural International Limestone Coast Video Art Festival*; *The Rise of Bio-Society*; *Age of Catastrophe*; *Toxicity, Marshall McLuhan & Vilém Flusser Communication&Aesthetics Theories Revisited*; *Biotech Art-Revisited; Skopje Electronic Art Fair (SEAFair)*. He is author of *The Rise of Bio-Society* (2019) Palgrave MacMillan; *Arts & Science – the Intersection (re)engineered* in: "A Companion to Curation", Wiley Blackwell (2019); *The Phenomenology of (Non) Habitual Spaces for the Bioarts* in: "Naturally Postnatural—Catalyst: Jennifer Willet", with Catalyst Book Series (2017). He has edited *Marshall McLuhan & Vilém Flusser Communication & Aesthetics Theories Revisited"*(2015); *Energy, Biopolitics, Resistance Strategies and Cultural Subversion* (2012), The Apparatus of Life and Death (2011), *Art in the Biotech Era* (2008).