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IN FOCUS

AI and the Moving Image

170	Introduction: AI and the Moving Image Mihaela Mihailova
175	Ghosts in the Celluloid: AI Video Dubbing and TrueSync Christopher Holliday
183	Emissary of Another Intelligence: Ian Cheng and the Art of AI Rob King
189	To Err Is Generative: The Flaw as Flow in Prompt-Based Animation Mihaela Mihailova
196	The Threat of the AI Actor Tanine Allison
202	The Synthetic Real: AI-Documentary Connections Joshua Glick

In Focus Introduction: AI and the Moving Image

While the gradual commercialization of artificial intelligence has been underway since the 1980s, 2023 marked “an inflection moment” in mainstream adoption and public awareness of AI technologies and processes.¹ AI tools permeated every stage of moving image production, from concept art and previsualization to editing and post-production work.² Thanks to image-generating interfaces such as DALL-E, Stable Diffusion, and Midjourney; lip-sync visualization software such as TrueSync; and synthetic speech platforms such as Resemble AI, AI-generated (a.k.a. synthetic or algorithmic) audiovisual content produced with the aid of deep learning algorithms now forms part of the aesthetic landscape and production workflow of contemporary media and entertainment industries.

Discourse on this phenomenon has highlighted the problematic applications of machine learning, such as the production and online dissemination of non-consensual deepfake pornography and the use of artificially generated footage in digital disinformation campaigns.³ The unremunerated and

- 1 Matt O'Brien, “2023: The Year We Played with Artificial Intelligence—and Weren't Sure What to Do About It,” *AP News*, December 14, 2023, accessed January 17, 2024, <https://apnews.com/article/ai-2023-artificial-intelligence-chatgpt-dangers-565ff5b817b5db0d4e74829ae3d68611>.
- 2 Joshua Glick, “AI Isn't Hollywood's Villain—It's a Flawed Hero,” *Wired*, January 13, 2023, accessed January 15, 2023, <https://www.wired.com/story/artificial-intelligence-film/>.
- 3 Olivia B. Newton and Mel Stanfill, “My NSFW Video Has Partial Occlusion: Deep-fakes and the Technological Production of Non-consensual Pornography,” *Porn Studies* 7, no. 4 (2020): 398–414, <https://doi.org/10.1080/23268743.2019.1675091>; and Noémi Bontridder and Yves Poulet, “The Role of Artificial Intelligence in Disinformation,” *Data & Policy* 3 (2021): e32, <https://doi.org/10.1017/dap.2021.20>.

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unregulated use of copyrighted material by tech companies to train chat-bots and text-to-image generators has sparked debates around online data scraping and mass-scale art theft, culminating in lawsuits.⁴ Efforts to develop technological safeguards against invasive uses of AI have yielded “data poisoning” tools such as Nightshade, created by computer science professors and PhD students at the University of Chicago to discourage the unauthorized use of copyrighted content in AI model training by rendering scraped images unsuitable for this task.⁵

As automated processes threaten to replace and devalue skilled human labor, codifying the use of AI in media production has emerged as a key battleground in Hollywood’s labor movement, as demonstrated by the SAG-AFTRA and WGA strikes in 2023.⁶ While the resulting contractual agreements partially alleviated some of the early panic surrounding the technology, contentious applications of generative AI programs across various entertainment industries continue to arise at a disconcerting rate. Examples include the unauthorized mimicry of stars’ images, the digital resurrection of deceased individuals, and the licensing of “digital replicas” of actors’ voices for use in video game production.⁷ In the wake of these developments, scholars have warned that unionized craft labor is in danger of being replaced with “prompt jockey[s]” while mastery of AI image generators may become a standard job requirement in creative industries, forcing artists to subscribe (both ideologically and monetarily) to Big Tech in order to stay relevant.⁸

AI’s potential to further infringe upon and limit the (often already tenuous) labor rights, employment opportunities, and legal protections afforded to entertainment industry workers and independent artists, alongside the

4 Blake Brittain, “Artists Take New Shot at Stability, Midjourney in Updated Copyright Lawsuit,” Reuters, November 30, 2023, accessed November 30, 2023, <https://www.reuters.com/legal/litigation/artists-take-new-shot-stability-midjourney-updated-copyright-lawsuit-2023-11-30/>.

5 Melissa Heikkilä, “This New Data Poisoning Tool Lets Artists Fight Back Against Generative AI,” *MIT Technology Review*, October 23, 2023, accessed December 20, 2023, <https://www.technologyreview.com/2023/10/23/1082189/data-poisoning-artists-fight-generative-ai/>.

6 Keith Johnston, Jay Pattisall, and Emily Collins, “Hollywood Strikes Sparking AI Negotiations in Every Creative Industry,” *Forbes*, October 6, 2023, accessed October 8, 2023, <https://www.forbes.com/sites/forrester/2023/10/06/hollywood-strikes-set-the-stage-for-ai-negotiations-in-each-creative-industry/>.

7 Christopher Holliday, “Rewriting the Stars: Surface Tensions and Gender Troubles in the Online Media Production of Digital Deepfakes,” *Convergence: The International Journal of Research into New Media Technologies* 27, no. 4 (2021): 899–918, <https://doi.org/10.1177/13548565211029412>; Tamara Kneese, “Using Generative AI to Resurrect the Dead Will Create a Burden for the Living,” *Wired*, August 21, 2023, accessed August 27, 2023, <https://www.wired.com/story/using-generative-ai-to-resurrect-the-dead-will-create-a-burden-for-the-living/>; and Conor Murray, “Video Game Voice Actors Criticize SAG-AFTRA Over Agreement with AI Company,” *Forbes*, January 10, 2024, accessed January 10, 2024, <https://www.forbes.com/sites/conormurray/2024/01/10/video-game-voice-actors-criticize-sag-aftra-over-agreement-with-ai-company/>.

8 J. D. Connor, “Things Will Get Shittier: AI and the Dial of Business Basiness,” *Los Angeles Review of Books*, July 22, 2023, accessed August 10, 2023, <https://lareviewofbooks.org/article/things-will-get-shittier-ai-and-the-dial-of-business-basiness/>; and Kate Brown, “Hito Steyerl on Why NFTs and A.I. Image Generators Are Really Just ‘Onboarding Tools’ for Tech Conglomerates,” *Artnet*, March 10, 2023, accessed April 29, 2023, <https://news.artnet.com/art-world/these-renderings-do-not-relate-to-reality-hito-steyerl-on-the-ideologies-embedded-in-a-i-image-generators-2264692>.

other harmful, unethical, and possibly illegal uses of these technologies, merit the careful scrutiny they are receiving. However, zeroing in on AI's disruptive power poses the risk of overshadowing any genuine consideration of its generative potential. As Jennifer O'Meara and Cáit Murphy have pointed out, AI's entry into the moving image fields marks the "the co-construction of both art and artists" wherein "people train a system . . . which in turn, trains artists and consumers in a new type of artistic practice."⁹ Indeed, even as generative AI programs are shaping emergent synthetic media aesthetics, the scope and nature of formal interventions facilitated by such tools remain fundamentally constrained by the patterns and styles a given algorithm is able to reproduce. This dossier aims to unpack the co-construction of AI output and workflows by exploring a range of creative possibilities and modes of artistic expression opened up by algorithmic processes and adopted, in provocative, self-reflexive, and sometimes problematic ways, by film and media makers.

While espousing a critical, rather than a techno-optimistic, view of AI's ongoing transformation of the various landscapes of our discipline, this collection of essays nevertheless intends to challenge and complicate the view of AI technologies as an unambiguous threat to moving image arts and industries. This dossier advocates for a more nuanced interpretation of how algorithmic processes contribute to contemporary culture, arguing that AI-assisted creative workflows can be tantalizingly generative for media artists *and* for media scholars, through the questions they raise about intentionality, creative control, and collaborative filmmaking in the algorithmic age. Essays collected here delve into a diverse range of intersections between AI and the moving image, from works that lean on AI to explore our evolving understanding of the role of intelligence in the creative process to ones that prolong the systemic erasure of marginalized people from digital spaces. Across these production contexts, the dossier offers a reminder that, as with any tool, AI's applications reflect the motivations and ethics of their wielder as much as they demonstrate their own capacities. In that sense, the entry of these new tools into established creative spheres is a rare opportunity to rethink the underlying frameworks—ideological, political, and aesthetic—of those spheres and question the implications of their apparent ripeness for algorithmic disruption (and corruption).

The dossier positions synthetic media at the intersection of well-established filmmaking practices and novel machine learning processes, following the lead of Lisa Bode, Dominic Lees, and Dan Golding, whose themed issue of *Convergence: The International Journal of Research into New Media Technologies* analyzes deepfakes by exploring "their historical continuities and points of rupture with older practices of media manipulation, technological mediation, fragmentation, and commodification of human images."¹⁰ While

9 Jennifer O'Meara and Cáit Murphy, "Aberrant AI Creations: Co-creating Surrealist Body Horror Using the DALL-E Mini Text-to-Image Generator," *Convergence: The International Journal of Research into New Media Technologies* 29, no. 4 (2023): 3, <https://doi.org/10.1177/13548565231185865>.

10 Lisa Bode, Dominic Lees, and Dan Golding, "The Digital Face and Deepfakes on Screen," *Convergence: The International Journal of Research into New Media Technologies* 27, no. 4 (2021): 850, <https://doi.org/10.1177/13548565211034044>.

theorizing the aesthetics and applications of algorithmic art, the five essays reflect on the creative and ideological opportunities and challenges (often inextricable from each other) that emerging production tools and workflows pose for film and media and their academic study. In doing so, these essays also speculate on the shifting status of AI in our cultural and social landscapes, highlighting how our field is already articulating, making sense of, and charting AI's multiple trajectories.

Focusing on synthesized speech technologies, Christopher Holliday's opening essay connects issues that resonate throughout the dossier: the role of automation in emerging modes of creative labor, the ethical and legal challenges that AI-generated content poses to intellectual property and authorial agency, and the responsible and respectful use of an individual's likeness and voice in synthetic media. Holliday addresses these topics via a close study of the AI engine TrueSync, which generates sophisticated lip-synced digitized translations for audiovisual media, allowing the original mouth movements of screen performers to be reanimated to match new national language dubs. He unpacks the "uncanny ventriloquy" of the resulting speech acts, which, combined with AI face-mapping techniques, highlight the increasingly precarious place of the performer in emerging (and largely unregulated) industrial systems reliant on the algorithmic mimicry of human artistry. At the same time, he traces the industrial roots of TrueSync back to silent cinema's multiple-language version (MLV) productions. Modeling a historically grounded approach to synthetic media, Holliday argues that TrueSync's output is shaped by the same "dual rhetoric of multilingualism and localization" that underpinned MLVs, making AI video dubbing the latest in a long list of cinema's technologically driven internationalization efforts.

The next two essays highlight applications of artificial intelligence processes to the production of software art and digital animation. They focus on works that not only model emerging AI-assisted production workflows but also leverage AI-generated imagery's distinct aesthetics to think through the ontology of algorithmic art and the human artist's place in this quickly evolving technological and industrial landscape. Rob King's essay focuses on contemporary visual artist Ian Cheng, known for creating digital environments navigated by artificially intelligent animated bots. King situates Cheng's practice "at the crossroads where software art meets cognitive science," summarizing the principles of the artist's approach and delving into his work's engagement with cognitive and computational intelligence and its centering of intelligence as new media art's "most pressing theme." My essay looks at short-form animated works created with the aid of generative AI, considering their embrace of the imperfection and randomness of algorithmically constructed imagery as a key feature of the creative process and visual aesthetic of synthetic media. The essay focuses on case studies that transform the animated flaw into animation flow, questioning what an emerging mode of production grounded in the digital discord of algorithmic output, which I am calling "delimited animation," can tell us about AI art's links to older forms of animated disruptions. The essay also considers AI's impact on digital production pipelines and its role in both provoking and attempting to voice anxieties surrounding the potential loss of human creative agency and

the increasing opacity of our creative toolkits. Both essays are united in asking what is at stake—formally and ideologically—in emerging art practices for which AI is not only a means of production but also a self-reflexive mode of critical engagement with the outcomes and implications of moving image cultures’ algorithmic turn.

The final two contributions turn a critical eye toward the social and political applications of synthetic image-making, exploring AI’s contentious role as a tool equally capable of facilitating social justice media initiatives and perpetuating some of the entertainment field’s long-standing problematic practices and representational strategies. Tanine Allison’s essay examines the role of AI in the digital visual effects industry, specifically in relation to the automated creation of digital characters in mainstream cinema. Focusing on machine learning’s impact on digital de-aging, she demonstrates that, as new programs and engines are currently being trained on datasets of past filmed footage that overwhelmingly centers white men, Hollywood’s application of this software exacerbates already existing racial and gender inequities in cinematic representation and labor opportunities. Finally, Joshua Glick’s piece examines AI’s impact on documentary filmmaking practices, raising questions about the relationship between documentary ethics and aesthetics, the nature of consent and subject participation, and the shifting status of audiovisual evidence in the algorithmic age. His piece offers a fittingly open-ended conclusion to the dossier, as it touches on a rich array of case studies to gesture toward the future(s) of AI in documentary craft while also demonstrating how AI “intensifies the need” to reflect on the ethical and ideological motivations of documentary practice. Together, the two essays invite us to think critically about the opportunities and pitfalls of integrating AI into filmmaking and to consider who and what might be left out of its computations, and at what cost.

Given the current speed of AI development and the increasing scope of its applications, it is inevitable that, by the time these essays are published, some of the case studies they reference will already be outdated. While remaining aware of the rapid obsolescence of early generative tools, this dossier lays the groundwork for the study of future iterations of these technologies, proposing critical, historically grounded, and social justice-oriented approaches for theorizing the emerging aesthetics, workflows, and cultural impact of AI-generated artworks. By demonstrating synthetic media’s potential to (re)generate key disciplinary debates on authorship, representation, labor rights, and the role of automation in the creative process, it advocates for a nuanced evaluation of the artistic and ideological implications of AI’s incorporation into moving image cultures.

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Christopher Holliday

Ghosts in the Celluloid: AI Video Dubbing and TrueSync

A vital, if often overlooked, component of contemporary synthetic art practices and new media culture's expanding suite of digital processes and procedures has been the application of synthesized speech technologies to accompany the latest in computer-mediated visuals.¹ The growing spectrum of remixed, reconstituted, and restored voices that now populate a wide range of mainstream media content—whether produced within the institutional parameters of Hollywood or disseminated online by skilled video artists—reflects the acceleration of digital art and creativity, alongside the accompanying powers of machine learning. The emergence of specialized companies involved in the production of AI-generated voice actors and the technological remixing of vocal performances, as well as off-the-shelf tools such as Resemble AI, PlayHT, and Speechify that offer users realistic AI voice generators, has further secured the rising influence of digitized voices, modulated voice cloning, and vocal alteration upon the contemporary media ecology. Writing in 2018 in the aftermath of Donald J. Trump's election campaign of half-truths and the internet's capabilities for "sowing false information," John Fletcher identified the growing involvement of digitized vocality

1 See Zahra Khanjani, Gabrielle Watson, and Vandana P. Janeja, "Audio Deepfakes: A Survey," *Frontiers Big Data* 5 (January 2023): 1–24, <https://doi.org/10.3389/fdata.2022.1001063>.

Christopher Holliday, "Ghosts in the Celluloid: AI Video Dubbing and TrueSync," *JCMS* 64, no. 1 (Fall 2024): 175–182.

and synthetic speech in the image-altering effects of deepfake technology. Fletcher cited the “counterfeit” sounds produced by software such as Lyrebird, which uses “deep-learning techniques to produce ever-more-convincing facsimiles of famous voices,” to argue that “[t]raditional mechanisms of trust and epistemic rigor” are increasingly being surpassed due to rapid developments in voice synthesis and vocal mimicry.²

This essay takes as its focus the growing dialogue between the sophisticated visual elements of deepfakes and new computer-mediated vocality in synthetic media production as necessary and timely for critical reflection, framed as it is by persistent anxieties around the impact of digital technologies, machine learning, and artificial intelligence upon the industrial systems and aesthetic possibilities that constitute contemporary moving image production.³ The cautionary tales that have defined several industrial and cultural responses to the acceleration of synthetic media are varied, yet typically include the implications of computer intervention for creating new modes of labor and craft (including links between automation and de-skilling); the creative possibilities for mimicry and the disruption to the ownership and originality of identity; the ethical questions regarding the respectful and responsible application of a star’s image in cases where audiovisual material is used posthumously; and the relationship all these techniques of fakery have with intellectual property and copyright laws.

I reflect on these areas of concern through a consideration of the artificial intelligence engine TrueSync as the latest convergence of stardom, performance, and the ambivalent presence of the physical body in the computer age. Developed by Flawless AI—a neural network lab based in Santa Monica and London—TrueSync utilizes machine learning to create sophisticated lip-synced digitized translations for audiovisual media. It has primarily been used when adapting English-language films for foreign release, whereby performers’ mouth movements are digitally retouched in postproduction to match new national language dubs. Reflecting on the new creative possibilities of TrueSync and the use of generative AI to effectively reshoot filmed dialogue in postproduction, this essay identifies how AI video dubbing (known as vubbing) technologies are offering new opportunities for multilingual film production that emphasize national specificity and accessibility. Yet the sophisticated face-mapping AI techniques involved in the TrueSync tool, alongside the new speech acts that the technology conjures, raise unavoidable questions about the rights of the performer within increasingly unregulated spaces of creativity.

2 John Fletcher, “Deepfakes, Artificial Intelligence, and Some Kind of Dystopia: The New Faces of Online Post-fact Performance,” *Theatre Journal* 70, no. 4 (2018): 464, <https://doi.org/10.1353/tj.2018.0097>.

3 See Lisa Bode, “No Longer Themselves? Framing Digitally Enabled Posthumous ‘Performance,’” *Cinema Journal* 49, no. 4 (Summer 2010): 46–70, <https://doi.org/10.1353/cj.2010.0019>; and Christopher Holliday, “Retroframing the Future: Digital De-aging Technologies in Contemporary Hollywood Cinema,” *JCMS: Journal of Cinema and Media Studies* 61, no. 5 (2021–2022): 210–237.

SYNTHETIC SPEECH AND THE DIGITIZED VOICE

The rising importance of digitized voices in framing the machine as a viable and valuable co-author certainly owes a debt to the commercial rise of voice-assisted technologies and predictive virtual assistants. Following the launch of Siri on October 4, 2011, similar smart systems such as Google Now (2012) and Alexa and Cortana (both 2014) accelerated the cultural visibility of “natural-speech voice interactivity” as a way to support “artificially intelligent method[s] of internet use.”⁴ Although, as Jennifer O’Meara reminds us, the “technologized” voice predates the digital age, the recent “actualities of scientific developments in synthetic voices and speech technologies” and contributions of the programs Lyrebird, CereProc, and Adobe VoCo have collectively sharpened what she identifies as the sonic capabilities for voice cloning and recognition technologies.⁵

Innovations in speech synthesis technology and machine learning have further permitted digital voices to convincingly impersonate an individual’s vocalizations and speech patterns, including the familiar cadences of recognizable celebrities. Replica Studios specializes in text-to-speech voicework in which vocal performances are entirely AI generated, with their AI model trained so that it “learns how to perform by copying the real voice actors’ unique speech patterns, pronunciation, and emotional range.”⁶ The Modulate company similarly trades in celebrity “voice skins,” a voice-based technology software that impersonates stars’ intonation and accents. In the case of Respeecher, existing human voices can similarly be recombined to speak anew, with the “target voice” (again typically a celebrity performer) sourced from archival audio that is captured and remixed to produce an “original” performance.⁷ The creation of convincing vocalizations via machine learning remains widely used across the entertainment industry, from popular film and television to gaming and the marketing and advertising sectors, with voice synthesis technology able to de-age the vocals of star performers, generate fictional character voices, provide the illusion of celebrity narration, or even AI generate new musical cover versions of existing sound recordings.

Framed by this industrial turn toward computerized speech and vocality, though not fully commensurate with the smart (often feminized) voice technologies that inscribe the pervasive cultural “whiteness” of AI and gendered media constructions of techno-bodies, the TrueSync program marks the latest stage in the evolving art and craft of synthetic speech.⁸ Brian Contreras explains that “neural networks, or computer programs mimicking the structure of a brain” can “transpose one actor’s facial expression onto

4 Liz W. Faber, *The Computer’s Voice: From Star Trek to Siri* (Minneapolis: University of Minnesota Press, 2020), 161.

5 Jennifer O’Meara, *Women’s Voices in Digital Media* (Austin: University of Texas Press, 2022), 57, 73.

6 Replica Studios, “About Replica Studios,” accessed July 30, 2024, <https://help.replicastudios.com/about-replica-studios>.

7 Respeecher, accessed July 30, 2024, <https://www.respeecher.com>.

8 See Stephen Cave and Kanta Dihal, “The Whiteness of AI,” *Philosophy & Technology* 33 (2020): 685–703, <https://doi.org/10.1007/s13347-020-00415-6>. As Richard Dyer argues, the android conventionally functions “as a definition of whiteness.” Richard Dyer, *White* (London: Routledge, 1997), 213.

another's face," and as a result, "the company's tech can identify patterns in an actors' phonemes (or the sounds they make) and visemes (or how they look when they're making those sounds), and then—when presented with newly recorded phonemes—update the on-screen visemes to match."⁹ The outcome is, as *Variety*'s Todd Spangler puts it, an "artificial-intelligence dubbing technology system" that permits filmmakers to convincingly alter "the mouth movements of the actors to match the alternate dialogue being spoken."¹⁰

As a creative tool that supports the workflow of visual effects (VFX) production, TrueSync has also been applied to remove verbal expletives from film footage without the need for expensive reshoots. The AI Reshoots feature of the software was first used for *Fall* (Scott Mann, 2022) to change the filmed dialogue of its lead actors Grace Caroline Currey and Virginia Gardner after the film's producers recognized that a PG-13 rather than its original R rating would potentially ensure a wider theatrical release. Currey and Gardner re-recorded their original audio, switching more than thirty curse words for inoffensive equivalents. The original filmed footage was then digitally modified in postproduction using the TrueSync software so that the mouth movements of the actors more closely matched the re-recorded dialogue.¹¹ Beyond its use in *Fall*, however, the generative AI software has mainly been applied in foreign language dubs, with TrueSync sold largely on the promise of how it revolutionizes the jarring rhythms and clumsy audiovisual synchrony that has historically defined conventional dubbing practices. The reality of these new virtual performances is certainly a heightened degree of visual illusionism and accuracy for linguistic translations. However, TrueSync's new alignment of sound and digital image has not fully sidestepped some of the perceived weaknesses in earlier dubbing practices, with the technology displaying its own uncanny outcomes rooted in the distancing effects and sheer visual curiosity of its computer graphics–assisted multilingualism.

The linguistic possibilities enabled by the software are placed front and center on the Flawless AI website, which advertises TrueSync and its AI Reshoots function through a series of sequences taken from popular Hollywood cinema, including *A Few Good Men* (Rob Reiner, 1992) and *Forrest Gump* (Robert Zemeckis, 1994), the latter of which was credited back in the late 1990s by writers such as Stephen Prince with mainstreaming digital imaging technologies, compositing techniques, and "the creative and remunerative possibilities of computer-generated imagery (CGI)."¹² As the promotional

9 Brian Contreras, "A.I. Is Here, and It's Making Movies. Is Hollywood Ready?," *Los Angeles Times*, December 19, 2022, accessed July 30, 2024, <https://www.latimes.com/entertainment-arts/business/story/2022-12-19/the-next-frontier-in-moviemaking-ai-edits>.

10 Todd Spangler, "Lionsgate's 'Fall' Used Deepfake-Style Tech to Change 30-Plus F-Bombs, Bringing Movie from R to PG-13 Rating," *Variety*, August 9, 2022, accessed July 30, 2024, <https://variety.com/2022/digital/news/lionsgate-fall-deepfake-f-bombs-rating-1235337017/>.

11 Spangler.

12 Stephen Prince, "True Lies: Perceptual Realism, Digital Images, and Film Theory," *Film Quarterly* 49, no. 3 (Spring 1996): 27, <https://doi.org/10.2307/1213468>. See also Scott McQuire, "Digital Dialectics: The Paradox of Cinema in a Studio without

video for TrueSync unfolds, a courtroom scene from *A Few Good Men* has actors Tom Cruise and Jack Nicholson seeming to converse in French, followed by footage from *Forrest Gump* that is replayed on a loop with Tom Hanks speaking German, then Japanese, then Spanish. Each time Hanks speaks, the footage is quickly re-animated so that the actor's facial movements convincingly match each new audio track provided by the dubbing performer. The neural net technology processes and building blocks of the illusion are described throughout in four stages (face-off, performance blending, neural rendering, and face-on). These technical phases evoke the kinds of vocabulary employed by online video artists such as Ctrl Shift Face who regularly describe their playful deepfake processes as acts of sophisticated "reskinning" and "masking" in that they involve the imposition of new digitized physiognomies onto existing bodies.¹³ Furthermore, the selection of "able-bodied cisgender white men" as something of a default testing ground for the TrueSync software, alongside pertinent questions around the broader racial politics of digital imaging technologies, evidences the repeated use of a particular kind of Hollywood star as "makeweights that offset, arbitrate and legitimise technological change" who become figures of trust in the face of VFX innovation.¹⁴

THE LOGIC OF ORIGINS

Given that TrueSync's AI video dubbing techniques are intended to both solve the disarming effects of out of sync foreign language dubbing and, from a commercial perspective, help filmmakers to "[u]nlock the value in additional language markets by providing a fully immersive experience for every audience," the software can be understood as the latest example of cinema's many trials and errors of internationalization.¹⁵ Indeed, TrueSync finds an industry precursor from the early sound period that was likewise rooted in the conjunction of technological innovation with the preservation of original spoken language for so-called foreign audiences. Amid a number of practical experiments with the possible application of synchronized sound during the late 1920s, the multiple-language version (MLV) stands as perhaps the most ill-fated solution to cinema's language problem, at least within interwar European cinema.¹⁶ A counterpoint to intertitles that otherwise afforded readily flexible language transfer across nations, the production of MLVs involved shooting feature films in several languages concurrently, typically

Walls," *Historical Journal of Film, Radio and Television* 19, no. 3 (1999): 379–397, <https://doi.org/10.1080/014396899100226>.

13 Christopher Holliday, "Rewriting the Stars: Surface Tensions and Gender Troubles in the Online Media Production of Digital Deepfakes," *Convergence: The International Journal of Research into New Media Technologies* 27, no. 4 (2021): 915, <https://doi.org/10.1177/13548565211029412>.

14 Holliday, 914. See also Tanine Allison, "Race and the Digital Face: Facial (Mis)Recognition in *Gemini Man*," *Convergence: The International Journal of Research into New Media Technologies* 27, no. 4 (2021): 1000–1017, <https://doi.org/10.1177/13548565211031041>.

15 Flawless AI, "AI Powered Filmmaking Tools," accessed July 30, 2024, <https://www.flawlessai.com/ai-tools>.

16 See Ginette Vincendeau, "Hollywood Babel: The Multiple Language Version," *Screen* 29, no. 2 (Spring 1988): 24–39, <https://doi.org/10.1093/screen/29.2.24>.

reusing sets and costumes, sharing scripts and technical equipment between production units, and, in some instances, casting polyglot performers who could speak multiple languages across transnational features.¹⁷

The first MLV produced in this manner was Ewald André Dupont's British drama film *Atlantic* (1929), which, as Markus Nornes notes, was shot at London's Elstree Studios simultaneously in both English and German using the same sets and locations but featuring different casts and occasional narrative and character variations.¹⁸ The German-language version *Atlantik* (1929) was released the same year as the English production (which appeared in both sound and silent prints) and a few months before the French-dialogue version *Atlantis* (1930) began production, again directed by Dupont, but this time in collaboration with director Jean Kemm and starring French stage and film actors Maxime Desjardins and Alice Field. The English-, German-, and French-language productions did, however, share the same cinematographer, Charles Rosher.

Despite the convenience of multilingualism afforded by MLVs and the production of tailored versions for local audiences by directors across Europe and, later, in Hollywood, such as Alfred Hitchcock, Josef von Sternberg, Alexander Korda, G. W. Pabst, and William Thiele, MLVs as a labor-intensive and ultimately costly process was short lived. As Ginette Vincendeau argues, they were "on the whole, too standardised to satisfy the cultural diversity of their target audience, but too expensively differentiated to be profitable."¹⁹ Several companies reverted back to dubbing as a more viable alternative (which had equally improved as a technological process in the interim), and by the early 1930s, MLVs began to be phased out as audiences were seemingly more willing to accept a degree of asynchrony between cinema's sounds and images. Although evidently removed from the historical and industrial forces that shaped MLVs, the innovative "neural reshoots" and human face digitization processes central to TrueSync's visual translations are nonetheless implicated in the dual rhetoric of multilingualism and localization that first supported MLV production.

If MLVs were intended to counter the spectatorial experiences of dubbing as "the lowest form of translation," then TrueSync is driven by the same desire for seamlessness and to grant cultural products maximum exposure and exchange value within the global market.²⁰ Just as AI invites ongoing reflection upon who or what can possess a consciousness, TrueSync likewise plays with the logic of origins. This is because TrueSync's generative AI technology enters into the broader interdisciplinary operations of transnational film and media studies, which considers identities and bodies through histories of colonialism and globalization, which create traumas of bordering and feelings of being inside and outside, core and periphery. Hamid Naficy's approach to such modes of dislocation and uncertainty within colonial and

17 Mark Betz, *Beyond the Subtitle: Remapping European Art Cinema* (Minneapolis: University of Minnesota Press, 2009), 62.

18 Markus Nornes, *Cinema Babel: Translating Global Cinema* (Minneapolis: University of Minnesota Press, 2007), 137.

19 Vincendeau, "Hollywood Babel," 29.

20 Nornes, *Cinema Babel*, 219.

postcolonial spaces usefully incorporates a linguistic component. His notion of an “accented cinema” uses the socio-political and cultural meanings of “accent” to describe an alternative to Hollywood film that visually, thematically, and narratively translates or “pronounces” the exilic experiences of filmmakers and personal histories of migration, deprivation, division, and loss.²¹ Naficy’s vocal analogy is ultimately in service of identifying narrative and stylistic features of “deterritorialized” filmmakers as “empirical subjects” (including a regular use of bilingualism and multilingualism in their “accented” films) and to shore up the counter presence of a “dominant” and “universal” accentless Western cinema as one that conversely erases or denies global and postcolonial flows.²² Yet such connections between the voice, legacies of displacement, and alternative modes of cultural production have been given a new technological dimension due to the digital’s growing contribution to cross-cultural exchange within the globalized media ecology.

As a generative AI dubbing toolkit driven by the spectacle of vocalized speech, TrueSync might be understood to deliberately “accent” Hollywood via a similar emphasis on the new “bilingual, even multilingual, multivocal, and multiaccented” quality of star bodies. TrueSync introduces new processes of accenting that, without the need for “extensive titling” often required by Naficy’s exilic and diasporic cinema, catch its subjects in a hybridized space, opening up the question of global distribution by offering language and vocality as signposts to regional and national belonging.²³ The software’s claims to accessible multilingualism are intended to be reflexively understood as achievable only through VFX wizardry that preserves the spectatorial pleasure and profitability of Hollywood stars who are made to now speak in local accents and dialects. TrueSync’s broader myth of authorship is closely tied to the software’s specific dislocation of voice and body and confronts the audience’s fluctuating ability to locate actorly contribution in the contemporary digital media environment. Not since the very first wave of cyberstars, synthespians, avatars, and vactors (virtual actors) in the early 2000s—and the connected debates around motion-capture as a “symbiotic production process” of collaborative labor—have actors had to contend with credible threats to and erasure of their voice and likeness.²⁴ As many scholars have already commented, the *post-ing* of film performance requires fresh ways of determining agency and actorly labor, as well as the specific conditions under which screen figures are made to perform.

The uncanny ventriloquy of TrueSync as an experimental and technological approach to screen translation further complicates these discourses of ownership in a culture already wary of AI intervention and a Hollywood film industry progressively trialing its uses. The technology’s possibilities for sophisticated video dubbing produce new modes of synthetic speech that

21 Hamid Naficy, *An Accented Cinema: Exilic and Diasporic Filmmaking* (Princeton, NJ: Princeton University Press, 2001), 12, 24.

22 Naficy, 4.

23 Naficy, 24–25.

24 Mihaela Mihailova, “Collaboration without Representation: Labor Issues in Motion and Performance Capture,” *animation: an interdisciplinary journal* 11, no. 1 (March 2016): 41, <https://doi.org/10.1177/1746847715623691>.

mark cinema's latest collision of economic, industrial, and technological forces with artistic discourses of originality, authenticity, and creativity. The implications of TrueSync are yet to be fully felt across the film industry, yet its story as a tool of digitally assisted augmentation is already being told via familiar narratives of loss and gain. The software raises timely questions concerning where the real-time manipulation of supposedly live photographic footage can (and should) go, what affordances such digital processing offers, and where its limits and deceits ultimately lie.

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Rob King

Emissary of Another Intelligence: Ian Cheng and the Art of AI

Under what conditions does intelligence, artificial or otherwise, become an object of aesthetics? To survey the existing literature on AI and art is to find considerable handwringing over the use of artificial intelligence as an artistic *tool*, whether in popular discussions of phenomena such as de-aging and generative art or in more theoretical interventions like Hito Steyerl's work on the "mean" image.¹ But what about those artworks for which AI is not only the means but also the end—where the AI's processes and operations are in fact the *point* of the art? As an entry into these issues, this short essay looks to New York-based artist Ian Cheng—"one of the most radical" figures working in new media art today, per the *New York Times*.² A Berkeley graduate who majored in both Cognitive Science and Art Practice, Cheng first turned to AI in his artwork just over a decade ago, following a stint at the visual effects company Industrial Light & Magic. In the years since, he has made waves for what he calls his "simulations"—that is, digital environments populated by

1 Hito Steyerl, "Mean Images," *New Left Review* 140/141 (March/June 2023): 82–97.

2 The quote is from Hans Ulrich Obrist, artistic director of London's Serpentine Gallery, in Frank Rose, "Very Personal Computing: In Artist's Work, A.I. Meets Fatherhood," *New York Times*, August 27, 2021, AR10, <https://www.nytimes.com/2021/08/27/arts/design/ian-cheng-shed-life-after-bob.html>.

Rob King, "Emissary of Another Intelligence: Ian Cheng and the Art of AI," *JCMS* 64, no. 1 (Fall 2024): 183–188.



Figure 1. A moment from *Emissary Forks at Perfection* (2015–2016). (Courtesy of Ian Cheng.)

artificially intelligent, animated bots (whom he calls “agents”) whose actions are represented in live video installations (see Figure 1).³

In general terms, Cheng’s work falls within the orbit of “software art”—that is, digital art that draws explicit attention to its own computational processes or to the software itself rather than just its output.⁴ More specifically, his artistic practice exists at the crossroads where software art meets cognitive science, for Cheng’s simulations are intended as laboratories for ideas derived from the speculative frontiers of cognitive research. His works are experiments in both the scientific and artistic sense, whose understanding demands competencies in computational processes and cognitive theory alike. Conveniently for this analysis, Cheng has provided a roadmap through his own writings, which to date encompass three books: the catalogs *Live Simulations* (2015) and *Forking at Perfection* (2016), which accompanied exhibitions in Düsseldorf and Zürich, respectively, and his single-authored *Emissary’s Guide to Worlding* (2018), released following his *Emissaries* trilogy about cognitive evolution (2015–2017). In what follows, I will first summarize the principles of Cheng’s practice before exploring their implications for artistic exploration in the field of cognitive and computational intelligence.⁵ In the process, I hope to show how Cheng’s work realigns the parameters of new media art to foreground intelligence as the field’s most pressing contemporary theme.

My starting point will be the chapter from *Emissary’s Guide* in which Cheng lists four artists’ “masks” or “states of mind,” arranged on a spectrum of artistic control.⁶ The first three align with familiar territories of creative practice. Top of the list is the *director*, which corresponds with traditional

3 On Cheng’s concept of simulation, see Gianna Jetzer, “Portrait Ian Cheng,” *Spike Arts Magazine*, no. 47 (Spring 2016), <https://spikeartmagazine.com/articles/portrait-ian-cheng>.

4 Erkki Huhtamo, “WEB STALKER SEEK AARON: Reflections on Digital Arts, Codes and Coders” (2003), *Prehysterics of New Media* (blog), July 13, 2008, accessed July 10, 2024, <http://prehysterics.blogspot.com/2008/07/erkki-huhtamo-web-stalker-seek-aaron.html>.

5 Other writings of Cheng’s can be found on his website, <http://iancheng.com>.

6 The quoted words and phrases in this paragraph are all from Ian Cheng, *Emissary’s Guide to Worlding* (New York: Metis Suns, 2018), chap. 2, Kindle. Rather confusingly, Cheng has released two versions of this book, each of which is substantially different in content and slightly different in title. In the notes that follow, *Emissary’s Guide to Worlding* refers to the version released exclusively on Kindle, which lacks page numbers, whereas *Emissaries Guide to Worlding* (London: Koenig Books, 2018; note the plural *emissaries*) refers to the hardcopy book that accompanied the exhibition of the *Emissaries* trilogy at London’s Serpentine Gallery.

ideas of the artist as source of meaning and of narrative as the primary vehicle for that meaning. Next is the *cartoonist*, whose work forgoes narrative for symbols and slogans, trading in the gut-feeling immediacy that is a hallmark of the popular arts. And third is the *hacker*, who creates disruption by “exploiting a hidden principle or mechanism”—the mask, that is, of the tinkerer, who harnesses new tools and explores their affordances (like much of the work done with generative AI apps today, such as RunwayML, DALL-E, etc.). But the fourth is more mysterious: the *emissary to a world* who is “concerned with ensuring long-term health and growth of a life”—or what Cheng calls “worlding.” What kind of creativity does the task of worlding call for?

It is tempting to take *worlding* as just another word for *world-building*, as exemplified by franchise filmmakers James Cameron, J. J. Abrams, and the like. But that would be wrong. Most world-builders, Cheng writes, are simply “directors in disguise who want to unify meaning and trigger a ceremonious ending.”⁷ True emissaries, by contrast, do not seek to contain or narrativize the worlds they create; rather, they simply seed them with possibilities and then nurture their unfolding. The form of creativity at work here is close to the idea of “tending,” in the sense in which a gardener, say, tends to plants as they grow. Cheng codes his bots—akin to planting seeds—and lets them thrive within the simulated environment of his video installations, taking on the gardener’s role of nurturing growth without dictating direction.

Cheng’s *Baby feat.* series (2013), for example, consists of screens of animated debris whose movements are controlled in real time by live, unscripted conversations between two AI chatbots who audibly respond to each other’s questions. Cheng first gave visual form to his bots two years later, in his *Emissaries* trilogy. Sometimes the bots take the form of animals (like his beloved Shiba Inu dogs), while at other times they appear humanoid. Some of the bots are coded to optimize future-oriented goals, while others are purely reactive. As Cheng explains of his first *Emissary* piece, *Emissary in the Squat of Gods* (2015):

[The emissary’s] goal might be to climb to the top of a mountain, acquire a bucket, put ash in it, go talk to the shaman. Those goals are a way of simulating the idea of consciousness as an ability to imagine yourself narratively in the future, when you face a new problem. But because all the other AIs in her little virtual community behave reactively, based on their impulsive needs, they can distract the emissary from fulfilling her goals. The work is about these two forces sculpting each other and seeing which one wins; which one is more adaptive under various conditions.⁸

Cheng’s explanation here hinges on a number of interconnected ideas. The term *emissary* derives from Iain McGilchrist’s account of the structure of the human brain (according to which the brain’s right hemisphere serves as

7 Cheng, *Emissaries Guide*, 173.

8 Cheng quoted in Jetzer, “Portrait Ian Cheng.”

the “master” and the left its “emissary”).⁹ Also important are the writings of Julian Jaynes, who argued that human consciousness first emerged just three millennia ago, the result of a series of human mass migrations that spawned a new ability to imagine the self in narrative and metaphoric terms.¹⁰ Each installment of the *Emissaries* series, accordingly, is designed as though to submit these speculative theories to the test of their reproducibility. *Emissary in the Squat of Gods*, for instance, sets in motion the conditions theorized in Jaynes’s hypothesis about the awakening of narrative thought within pre-conscious communities but does so in a controlled setting that removes organic variables.

Cheng often describes his approach by referencing philosopher James P. Carse’s distinction between finite and infinite games. “A finite game,” Carse writes, “is played for the purpose of winning, an infinite game for the purpose of continuing the play.”¹¹ Put another way, a finite game has a clear win state, such that victory ends the game; an infinite game, by contrast, has no winning or losing but is played simply “to keep everyone in play.”¹² What connects Cheng’s simulations to Carse’s idea here is a shared commitment to “emergence” as a creative principle, that is, to the way in which unpredictable outcomes can arise out of simple properties and rules. Although Cheng’s bots are coded, their programs do not guarantee what happens when the bots interact. This, in fact, is why the simulations need to be live, not prerecorded videos—visual representations of code operating in real time, whatever may occur. Cheng recalls a memorable instance from the *Emissaries* series: “One time . . . a child character dragged a dead body to an open area and started to pee on it. Other characters nearby saw this, stopped what they were doing, walked over, and started peeing on the dead body too. . . . It was a really magical moment.”¹³

How to understand such behaviors? Not by treating the bots as fully conscious agents or human equivalences (they aren’t), but by attending to the alchemy generated whenever intelligent systems interact. The AI artist, Cheng has written, is one whose medium of expression is behavior itself: “Can we compose with behavior? Can we train to be behavior writers?”¹⁴ There are art-historical precedents for this: for example, the work of Fluxus artists like Allan Kaprow, whose happenings involved human participants following sets of instructions, or movements such as relational art, where the artwork becomes a catalyst for new social relations among people. Such precursors might be thought of as *heterotopic*, in Michel Foucault’s terms, inasmuch as they allow individuals to explore modes of behavior that differ

9. Iain McGilchrist, *The Master and His Emissary: The Divided Brain and the Making of the Western World* (New Haven, CT: Yale University Press, 2009).

10. Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (New York: Houghton Mifflin, 1976).

11. James P. Carse, *Finite and Infinite Games: A Vision of Life as Play and Possibility* (New York: Ballantine Books, 1987), 3.

12. Carse, 8.

13. Dylan Kerr, “Artificial Ecology: Ian Cheng on the Strange Art of Simulating Life, and the Conceptual Merits of Pokémon Go,” *Artspace*, August 26, 2016, accessed July 10, 2024, available at https://www.gladstonegallery.com/sites/default/files/20160826_IC_Artspace_Feature_01.pdf.

14. Ian Cheng, *Live Simulations* (Leipzig: Spector Books, 2015), 15.

from daily routine.¹⁵ But Cheng's simulations are not heterotopias; they are petri dishes in which the building blocks of intelligence can be isolated and extracted, tested and observed. He has described his agents as having only "minimum viable sentence," like Lego bricks to build with, which he uses to explore intelligence in a game engine setting.¹⁶ The point, then, is to experiment with intelligence outside its human or organic manifestation. As Cheng puts it, "AI is one way to think beyond our own cognition."¹⁷

Worlding, emergence, behavior. We can condense Cheng's practice into a tight formula: *worlding* implies a conception of the artist as one who prepares a world, *emergence* is what results when the artist cedes control of that world to their bots, and *behavior* is the medium in which those results are realized. Art here becomes the envoy of cognitive science, humanist themes (truth, beauty, etc.) are switched out for posthumanist counterparts (machine sentence, systems, etc.), and intelligence gets disincarnated from any human or organic reference point.

Put another way, we are no longer in the same universe as the Turing test, which Cheng has criticized for its limited options of "anthropocentric mimicry or bust."¹⁸ For decades, Turing's famous test for "thinking machines"—the indistinguishability of their output from that of a human—has been the gold standard of AI achievement.¹⁹ Cheng's work, though, inverts all that. Its effect is not to assimilate computer intelligence to a human standard, but to defamiliarize human intelligence through computational means. Viewed from this perspective, what we call artificial intelligence should be seen not as artificial at all, as though in contrast with a purportedly real human or organic standard, but instead as what media scholar Joanna Zylińska dubs "another" intelligence.²⁰ What we call consciousness, in turn, will no longer seem to be the seat of human sovereignty or exceptionalism. Instead, consciousness becomes what Cheng calls an "internal model of attention" that could plausibly be built into computational systems.²¹ What counts, in other words, is not just the potential humanness of machine intelligence—which is what the Turing test addresses—but the machine-ness of the human and how the boundaries between the two are being redrafted.

15 Michel Foucault, "Of Other Spaces," trans. Jay Miskowicz, *Diacritics* 16, no. 1 (1986): 22–27.

16 Ian Cheng, "Minimal Viable Sentence: What I Learned from Upsetting BOB," 2020, accessed July 10, 2024, <http://iancheng.com/BOB> (emphasis added).

17 Quoted in Christiana Polycarpou, "Artist Ian Cheng's Virtual Ecosystems Installation Debuts at Carnegie Museum of Art," *Virtual Multimodal Museum Plus*, October 25, 2017, accessed July 10, 2024, <https://www.vi-mm.eu/2017/10/25/artist-ian-chengs-virtual-ecosystems-installation-debuts-at-carnegie-museum-of-art>.

18 Cheng, "Minimal Viable Sentence."

19 Alan Turing, "Computing Machinery and Intelligence," *Mind* 59, no. 236 (October 1950): 434, <https://doi.org/10.1093/mind/LIX.236.433>.

20 Zylińska, *AI Art*, chap. 12.

21 Ian Cheng, interview by the author, Zoom, May 4, 2023. The definition of consciousness as an internal model of attention is the cornerstone of the "attention schema theory" of consciousness, as presented in Taylor W. Webb and Michael S. A. Graziano, "The Attention Schema Theory: A Mechanistic Account of Subjective Awareness," *Frontiers of Psychology* 6, no. 500 (2015), <https://doi.org/10.3389/fpsyg.2015.00500>.

It is appropriate, then, that Cheng's most recent work has turned explicitly to the theme of our dependence on such machines. Titled *Life after BOB*, the work in question is a planned eight-episode sci-fi series speculating on the future of human-computer interaction. In this imagined future, a BOB is a "Bag of Beliefs": an experimental AI system that serves as a virtual aide for the humans in whom it is installed, taking care of life's mundane duties and responsibilities and, in the process, freeing up its human hosts to focus their thoughts and creativity elsewhere.²² But what if a BOB could do a better job of living our lives than we can? asks Cheng. And how much of ourselves can we offshore in this way and still remain ourselves?

Paradoxically, the first—and, to date, only—episode to have been released is not another of Cheng's simulations but a scripted film for which he adopts the mask of director (writer-director, in fact). Film might be a misleading term, though. The episode, titled "The Chalice Study" (2021), was created in the Unity game engine and, for its initial gallery exhibition, ran as a live program whose animation was generated afresh each time it played. Cheng has said of this approach that he "wanted to turn movie-making into software building," much in the way game designers sometimes opt to render cutscenes in real time.²³ As such, "The Chalice Study" represents a clear departure for Cheng as a work that is about AI without really using AI, although it may be too early to gauge the extent to which he is turning the page on his previous practice.²⁴ "I wanted to speculate about where personal computing with AI could go," Cheng has explained: "[‘The Chalice Study’] really couldn't be a multi-agent simulation . . . without sacrificing narrative beats."²⁵ Perhaps we will always need the director's mask as a guide for such human-centered speculation. But it will be the emissaries who show us the pathways beyond.

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- 22 Ian Cheng, "Life after BOB Animated Short: 'The Chalice Study,'" Metis Suns, March 26, 2023, YouTube video, 50:15, accessed July 10, 2024, <https://youtu.be/y8o-gtpLf5A?si=8giN1l9-Vlmj6rYp>.
- 23 Olya Karlovich, "Insight: Ian Cheng's 'Life after BOB, The Chalice Study' at LAS," CLOT, August 9, 2022, accessed July 10, 2024, <https://clotmag.com/news/insight-ian-chengs-life-after-bob-the-chalice-study-at-halle-am-berghain>.
- 24 Or at least not to the same degree: some of the background characters in the film are bots.
- 25 Ian Cheng, email message to author, September 6, 2023.

To Err Is Generative: The Flaw as Flow in Prompt-Based Animation

“A process of dissolution is a process of creation,” reads the postscript of Sujin Kim’s *Dissolution* (2023), an experimental animation achieved partially through the implementation of neural style transfer, a machine learning–based technique for image stylization.¹ According to the film’s summary, its title “serves as a metaphor for the interconnectedness between the individual’s psychological turmoil and the unpredictability of our unruly era.”² The concept of dissolution is also a fitting allusion to short’s production process. Kim’s directorial approach harnesses AI’s distortions, leveraging the unconventional, arbitrary fluctuations of algorithmically generated imagery to create distinctive morphing effects.

Kim’s piece is a rarity in the early wave of AI-generated animation, most examples of which have been deemed “overhyped flops.”³ As I’ve argued elsewhere, the production methods behind this emerging form of animated content are not only ethically and legally questionable but also prone to

1 Sujin Kim, “Reimagining Animation Making through Style Transfer,” *SIGGRAPH Asia 2023 Art Papers* (December 2023): 5, <https://doi.org/10.1145/3610591.361643>.

2 Sujin Kim, “Dissolution (2023) Animation Short,” accessed October 13, 2023, <https://www.sujinart.com/animation/dissolution-2023>.

3 Cecilia D’Anastasio, “Algorithms Can’t Replace Hollywood Yet, Just Ask AI Seinfeld,” *Bloomberg*, November 17, 2023, accessed November 17, 2023, <https://www.bloomberg.com/news/articles/2023-11-17/twitch-youtube-ai-shows-are-largely-unwatched>.

Mihaela Mihailova, “To Err Is Generative: The Flaw as Flow in Prompt-Based Animation,” *JCMS* 64, no. 1 (Fall 2024): 189–195.

producing low-quality work.⁴ And yet, works such as *Dissolution* suggest that, amid the deluge of derivative pieces, digital artists are beginning to mine machine learning processes for new, generative (pun intended) workflows and visual approaches. Setting aside discussions of copyright and authorship, this essay will focus on re-evaluating the aesthetics of prompt-based animation and its growing corpus of imperfect creations in order to consider their embrace of disarray as central to both the AI-assisted creative process and the resulting aesthetic.

My analysis is partially inspired by Jennifer O'Meara and Cáit Murphy's study of the distorted, often unsettling images produced by AI text-to-image generator DALL-E Mini in 2022, which were embraced by social media users, revealing how "the flaws inherent [in this technology] have been welcomed as a means for making digital art."⁵ My case studies similarly lean into the unpredictability and randomness of AI-generated imagery, revealing a fascination with the imperfect dialogue between creative intent and algorithmic process that drives AI-assisted filmmaking. While it might be tempting to dismiss text-to-image software's calculated mess of visual output as the growing pains of new technology, this essay seeks to understand how contemporary artists draw upon and make meaning out of AI animation's digital discord.

In 2022, heavy metal band Disturbed released their *Bad Man* music video, created by Tristan Holmes with the aid of the popular generative AI program Midjourney.⁶ Drummer Mike Wengren has described the anti-war lyrics as "heavily influenced" by the invasion of Ukraine, yet he clarifies that "there's a *long* list of people that could fit that description right there."⁷ The video thus adheres to the band's interpretation of warmongering as an omnipresent rather than localized threat, inspiring director Tristan Holmes to seek "images that match the song's sense of total aggression but also universal anti-war cry."⁸

Given this desire for universality, Midjourney is an apt choice due to its tendency to produce the most common interpretation of a concept. This reductive quality enhances the video's presentation of warfare as a universal constant in the contemporary geopolitical and media landscape. During *Bad Man*'s three-minute runtime, algorithmic approximations of war in its totality are imperfectly rendered and stylistically disparate, yet instantly recognizable. Screaming political leaders, tank invasions, bloodied faces, devastated cities, and mushroom clouds flicker and pulsate so quickly that they blur

4 Mihaela Mihailova, "Automated Animation: Where Craft Goes to AI," *Film Quarterly Quorum*, April 5, 2023, accessed April 5, 2023, <https://filmquarterly.org/2023/04/05/automated-animation-where-craft-goes-to-ai/>.

5 Jennifer O'Meara and Cáit Murphy, "Aberrant AI Creations: Co-creating Surrealist Body Horror Using the DALL-E Mini Text-to-Image Generator," *Convergence: The International Journal of Research into New Media Technologies* 29, no. 4 (2023): 3, <https://doi.org/10.1177/13548565231185865>.

6 Disturbed, "Disturbed—Bad Man [Official Music Video]," November 18, 2022, YouTube video, 3:22, accessed October 13, 2023, <https://youtu.be/fpUpVznI4Yc>.

7 "Disturbed's New Song 'Bad Man' Was 'Heavily Influenced' by 'Situation in Ukraine,'" Blabbermouth.net, November 14, 2022, accessed October 13, 2023, <https://blabbermouth.net/news/disturbeds-new-song-bad-man-was-heavily-influenced-by-situation-in-ukraine> (italics in the original).

8 Disturbed, "Disturbed—Bad Man [Behind the Scenes]," November 21, 2022, YouTube video, 3:46, accessed October 13, 2023, <https://youtu.be/ZsAaDUPvVk8>.

together in a striking digital cacophony. The sensory overload—viewers are bombarded with rapid-fire sequences of chaotically composed devastation—mimics the similarly relentless and overstimulating stream of war-related news contemporary media consumers experience. Here, Midjourney’s large-scale algorithmic erasure of context and specificity appears both disconcertingly effortless (unlike traditional animation) and staggeringly irreversible. The sheer quantity of images the video cycles through speaks to the normalization and trivialization of global armed conflict, reduced to labeled image datasets to be drawn upon by the AI. At the same time, the creative decision not to edit the flaws in character and landscape design or smooth over shot transitions (referred to by Holmes as the video’s “jaggedness” and “messiness”) leverages the uncanny aura of AI-generated errors to hint at algorithmic-era terror (in both the existential and military sense) and technology as mutually constitutive.⁹ The imagery’s grotesque, distorted nature not only animates the unbridled violence and aggression foregrounded in *Bad Man* but stands as an uncomfortable reminder that machine learning is a common feature of both prompt-based media and contemporary warfare (such as AI-assisted drone strikes), each of which explode the very contours of human life (see Figure 1).¹⁰



Figure 1. Fused together into a single algorithmic monstrosity, two synthetic soldiers scream out in anguish in Disturbed’s music video *Bad Man* (Tristan Holmes and Midjourney, 2022).

9 Disturbed—Bad Man [Behind the Scenes].

10 Phillips Payson O’Brien, “The Real AI Weapons Are Drones, Not Nukes,” *The Atlantic*, February 1, 2024, accessed February 10, 2024, <https://www.theatlantic.com/ideas/archive/2024/02/artificial-intelligence-war-autonomous-weapons/677306/>.

Bad Man leverages algorithmic art's capacity for sensory onslaught through the sheer quantity and dissonant flow of filters, styles, and thematic variations on the same prompt given to a text-to-image generator. Sagans's 2022 music video *Coherence* draws on a similar aesthetic in order to animate its protagonist's search for identity and belonging in a new city. Sagans, an anonymous collective of musicians, graphic designers, and researchers, created most of the shots in this cyberpunk short through a text-to-video algorithm. Their workflow relied on a range of software: Unreal Engine 5's MetaHuman Creator to generate the character, Live Link Face app to animate her facial expressions, and Quixel to build the environments she passes through.¹¹ Despite being modeled after the iconic cityscape of Katsuhiro Otomo's 1988 classic *Akira*, the end result is an image scramble rather than an homage. The nameless protagonist is herself a chimeric amalgamation constantly cycling through a multitude of ready-made avatars. She journeys through a glitchy urban simulation in which patterns, perspectives, and outlines seem recognizable yet disconcertingly *off*. As the animation fluctuates between visual tropes commonly associated with Japan (a cherry blossom tree, for instance) and a jumbled mess of unidentifiable urban structures, the resulting lack of the titular coherence renders the AI model's attempt to re-create the familiar cinematic trappings of cyberpunk architecture, such as giant holograms, gaudy neon signs, omnipresent video screens, and towering skyscrapers, uncanny in its cacophonous, uneven execution.¹²

The creative goal of the video, according to Sagans, is to have the viewer feel "overwhelmed and overstimulated—questioning the place of the human artist versus machine."¹³ Getting lost in the infinite and infinitely shifting environment of *Coherence* is indeed a disorienting experience thanks to the piece's disregard for conventional spatial cues, design and compositional consistency, and the fundamentals of animation timing. Faced with the challenge of navigating and making sense of an algorithmically constructed city whose layout breaks basic landscape design principles, protagonist and viewer alike find themselves perceptually and experientially unmoored, rethinking their role in this emerging aesthetic and ontological regime.

Kristen Lillvis has argued that distortion in music videos "tell[s] tales about subjectivity in terms of the individual's relationship with their surroundings, . . . reflects the technology of the time and often provides insight into anxieties at that moment in history."¹⁴ While these observations resonate with the functions of AI-generated distortions in the spectacularly flawed cityscapes of *Coherence*, the video marks a key shift in the history of this aesthetic approach that is concurrent with and contingent on an ongoing

11 "Words, Camera, Action: Creating an AI Music Video with Unreal Engine 5," *Unreal Engine*, July 26, 2022, accessed October 13, 2023, <https://www.unrealengine.com/en-US/spotlights/words-camera-action-creating-an-ai-music-video-with-unreal-engine-5>.

12 Sagans, "Sagans—Coherence," June 3, 2022, YouTube video, 4:30, accessed October 13, 2023, <https://youtu.be/kASqM5HTvFY>.

13 "Participants 2022: Sagans," *AI Song Contest*, accessed October 13, 2023, <https://www.aisongcontest.com/participants-2022/sagans>.

14 Kristen Lillvis, "Music Video Distortion and Posthuman Technogenesis," in *More than Illustrated Music: Aesthetics of Hybrid Media between Pop, Art and Video*, ed. Kathrin Dreckmann and Elfi Vomberg (New York: Bloomsbury Academic, 2023), 154.

transformation of the role of the artist in the synthetic media creative process. In the context of AI-assisted production, distortions are no longer the result of direct directorial intervention, but the product of the imperfect, random interplay between the artist's creative intent (expressed via prompting) and the image generator's specific capabilities, stylistic tendencies, and restrictions.

Coherence and *Bad Man* thus exemplify an emerging form of partially automated filmmaking I call *delimited animation* in a simultaneous nod to the various constraints of AI image generation and its reliance on prompting (a delimiter separates distinct sections of a text prompt). Delimited animation introduces the challenges, compromises, and opportunities involved in partially ceding control over the creative process to artificial intelligence. It raises questions about future definitions of animation labor, craft, and authorship, inviting a closer look into possible continuities and points of rupture between synthetic media and older moving image traditions.

Kim's *Dissolution* tackles such questions by illustrating how, in the words of its director, "the fusion of style transfer with established film editing techniques not only explores uncharted territories in visual representation but also elevates the conveyance of artistic messages to new heights."¹⁵ In a paper detailing her process, Kim describes the short as a "seamless blend" of AI-generated animation based on text input, hand-drawn animation, 3D animation, and live videos.¹⁶ And yet the intervention of AI in this work is decidedly *seamful*. Algorithmic animation's distinctive fluctuations, flickers, and visual flaws shape the style and rhythm of the animation, particularly in its most abstract sequences, which resemble cubist collages produced via time-lapse edits of distortion errors.¹⁷ By collapsing characters and environments together into a kaleidoscopic grid of oscillating shapes, Kim draws on machine learning's tendency to make uniform all elements via the datafication of artistic conventions and gestures. Through these techniques, Kim foregrounds the film's central concern with "a ceaseless wave of dissolution and transition between personal and societal images."¹⁸ At the same time, by replacing the gradual transition typical of conventional dissolves with continuously morphing algorithmic imagery, she gestures toward new possibilities for experimenting with morphing effects and shot transitions in AI-driven animation.¹⁹

By examining animated works whose character design, movement, and layout are imperfect in ways directly tied to the current functions and limitations of prompt-based animation, my analysis has offered a glimpse into what can be achieved when AI-generated animation's errors and quirks are treated as a feature rather than a bug. In such early experiments, notably conducted by artists rather than amateurs, the animated flaw emerges as conducive to—rather than disruptive of—animation flow. But the advent of digital discord as the calling card of this burgeoning mode of animation practice merits

15 Kim, "Reimagining Animation Making," 5.

16 Kim, 5.

17 Kim, "Dissolution (2023)."

18 Kim.

19 Kim, "Reimagining Animation Making," 5.

further speculation about AI's links to older forms of animated disruptions and its impact on digital animation's future trajectories. To this end, I offer three preliminary observations.

First, it is tempting to read delimited animation as the latest (re-)incarnation of glitch art. As Rosa Menkman has argued, "glitch artists make use of the accident to 'disfigure' flow, image and information, or they exploit the void—a lack of information that creates space for deciphering or interpreting the process of creating (new kinds of) meaning."²⁰ But the similarities between glitch art and animated disruption may, at least at this stage, end here. Michael Betancourt points out that, as a critical media practice, the glitch is not a "purely formal experiment in technological failure," but rather "an interpretation where the disembodied technological instrumentalism of the digital . . . becomes apparent."²¹ The embrace of error in AI-generated art, however, is still primarily a formal and technological experiment. While its potential to question AI's underlying ideologies and operations is hinted at in these early works, animated disruption has yet to develop and sustain a distinct structural critique. In addition, machine learning's status as a black box technology further complicates any parallels with glitch art since, as Jakko Kemper explains, "with the growing environmental distribution of informational operations that elude perceptual awareness, . . . a significant share of possible interference is now closed off to consciousness."²² Kemper concludes that the contemporary (re)turn to imperfection in art "is perhaps more about dealing with our own shifting status in the face of our opaque technologies."²³ While this rings true, it raises further questions about AI and glitch art's relationship with each other. In a media environment where production processes are becoming less transparent to viewers and creators alike, are we witnessing the decline of the glitch as a media practice triggered by human intervention? Or do algorithm-dependent animation workflows hold the potential to usher in the glitch's emergence as a truly autonomous creative gesture?

Second, my close analysis of animated works incorporating AI-generated content reveals a common approach to thematizing AI models' tendency to randomly generate nonsensical or imperfect outputs called hallucinations.²⁴ In all three videos, visual distortion channels a range of anxieties, from individual searches for meaning to despair at current geopolitical situations. Each video also evokes anxieties about the "algorithmic replacement" of human creative labor with automated production processes through omnipresent traces of machine learning's interventions.²⁵ As O'Meara and Murphy

20 Rosa Menkman, *The Glitch Moment(um)* (Amsterdam: Institute of Network Cultures, 2011), 33.

21 Michael Betancourt, "Critical Glitches and Glitch Art," *H2 Journal* 19 (2014), accessed October 13, 2023, <https://www.h2-journal.org/n19/betancourt.html>.

22 Jakko Kemper, "Glitch, the Post-digital Aesthetic of Failure, and Twenty-First-Century Media," *European Journal of Cultural Studies* 26, no. 1 (2023): 58, <https://doi.org/10.1177/13675494211060537>.

23 Kemper, 60.

24 Austin Carr, "AI Hallucinations Are a Boon to Creatives," *Bloomberg*, January 4, 2024, accessed January 17, 2024, <https://www.bloomberg.com/news/articles/2024-01-04/the-ai-hallucinations-plaguing-chatbots-can-have-utility>.

25 O'Meara and Murphy, "Aberrant AI Creations," 3.

have noted, the first text-to-image generators were released during a period of “various collective anxieties, such as the threat of nuclear war in Ukraine, the lingering impact of the COVID-19 pandemic, and the continuing effects of global warming, which seem to be reflected in [AI art] trends.”²⁶ But in addition to setting the tone for the creative expression of contemporary anxieties, AI-generated works are increasingly contributing to these very anxieties, as evidenced by the centrality of AI in recent high-profile labor negotiations in Hollywood and other creative industries.²⁷ Given generative AI’s status as a key battleground in the ideological struggle over the parameters of creative authorship, will prompt-based animation be able to surmount its early associations with climates of fear? Or will it remain synonymous with digital dissonance, an aesthetic shorthand for the early algorithmic age and its discontents?

Third, the allure of AI lies in the myth of new artistic frontiers, but its final destination may turn out to be a Potemkin village. Algorithmic distortions are fascinating because they reveal that what is familiar to the human eye seems random to the machine. As Steven Levy has noted, artists are exploring generative systems because the latter “don’t necessarily think like humans, [so] their flights of statistical fancy can be valuable tools to spur creativity.”²⁸ However, in the resulting works, the line between intentional creative work and iterative algorithmic pastiche is ultimately blurred by the opacity of the workflow. In black box algorithmic processes, the efficiency of automation meets the mystique of computation, and the extent and nature of human artistic intervention becomes increasingly difficult to quantify and evaluate. Is algorithmic animation an act of compilation and curation rather than traditional directorial intent? Or is it, simply, a matter of going with the flow?

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26 O’Meara and Murphy, 3.

27 Keith Johnston, Jay Pattisall, and Emily Collins, “Hollywood Strikes Sparking AI Negotiations in Every Creative Industry,” *Forbes*, October 6, 2023, accessed October 17, 2023, <https://www.forbes.com/sites/forrester/2023/10/06/hollywood-strikes-set-the-stage-for-ai-negotiations-in-each-creative-industry/>.

28 Steven Levy, “In Defense of AI Hallucinations,” *Wired*, January 5, 2024, accessed January 17, 2024, <https://www.wired.com/story/plaintext-in-defense-of-ai-hallucinations-chatgpt/>.

Tanine Allison

The Threat of the AI Actor

In advance of the SAG-AFTRA strike in 2023, actors and journalists worried publicly about the potential for AI to replace human performers with computer-generated copies.¹ Virtual versions of actors might be employed by studios in perpetuity, avoiding the very human problems of age, weight gain, and offscreen scandal. Such digital facsimiles could then be brought to life by AI programs trained on an actor's previous work.² Actor, filmmaker, and coder Justine Bateman, for instance, raised the possibility of AI generating an eighth season of her sitcom *Family Ties* (NBC, 1982–1989) after analyzing the extant seven seasons.³ From here, it is not a stretch to imagine a *Black Mirror*-like technological future in which AI generates scripts and then populates movies and TV shows with computer-generated replicas of working actors or newly minted digital personalities.⁴ In this essay, I discuss the roots of the angst surrounding the AI actor and address how AI has transformed

- 1 See, for instance, Andrew Webster, "Actors Say Hollywood Studios Want Their AI Replicas—for Free, Forever," *The Verge*, July 13, 2023, accessed July 17, 2024, <https://www.theverge.com/2023/7/13/23794224/sag-aftra-actors-strike-ai-image-rights>.
- 2 Kevin Collier, "Actors vs. AI: Strike Brings Focus to Emerging Use of Advanced Tech," *NBC News*, July 14, 2023, accessed July 17, 2024, <https://www.nbcnews.com/tech/tech-news/hollywood-actor-sag-aftra-ai-artificial-intelligence-strike-rcna94191>.
- 3 Justine Bateman, "SAG Actors: I Want to Talk about AI . . .," *Twitter*, May 13, 2023, accessed July 17, 2024, available at <https://threadreaderapp.com/thread/1657476895972413440.html>.
- 4 The season 6 *Black Mirror* episode "Joan Is Awful" narrates a similar story in which a woman's real life is dramatized in a television show by actress Salma Hayek, who (within the world of the show) had been digitally scanned and animated by AI. *Black Mirror*, season 6, episode 1, "Joan Is Awful," directed by Ally Pankiw, written by Charlie Brooker, aired June 15, 2023, on Netflix.

Tanine Allison, "The Threat of the AI Actor," *JCMS* 64, no. 1 (Fall 2024): 196–201.

visual effects (VFX), particularly those processes that construct digital characters. By investigating how machine learning has reshaped a specific visual effect—digital de-aging—I explore how AI may exacerbate bias and inequity in Hollywood, in this case by multiplying opportunities for aging white male actors while reducing prospects for everyone else.

Industry insiders have been warning about the threat of the AI actor since the 1990s. The rapidly advancing digital VFX of that decade—in projects like *Terminator 2: Judgment Day* (James Cameron, 1991) and *Jurassic Park* (Steven Spielberg, 1993)—led to increased anxiety around digitally generated performance. Terms like “synthespian” and “cyberstar” described purely computer-generated personalities who could work around the clock with neither breaks nor requests for higher salaries.⁵ The uproar died down in the early 2000s, as early synthespians like Aki Ross, star of the ill-fated computer-generated imagery (CGI) blockbuster *Final Fantasy: The Spirits Within* (Hironobu Sakaguchi, 2001), were maligned as “uncanny” and “eerie.”⁶ In the following decade, the film industry deliberately worked against such associations by celebrating the human actors who used motion capture to create digital characters, such as Andy Serkis playing Gollum in Peter Jackson’s *Lord of the Rings* trilogy (2001–2003).⁷ Yet the fear of the synthespian never fully subsided and is now resurfacing, as new algorithms have the potential to create and animate digital characters at a rate and scale previously made impossible by the high cost and human labor needed to produce such computer-generated performances.

AI in various forms has already been in use in Hollywood for many years. Over the last decade, companies like ScriptBook and Cinelytic have offered computer programs that analyze screenplays and crunch market data to advise studios on which projects to greenlight and which stars to cast.⁸ Well before that, in 2001, the VFX team behind the *Lord of the Rings* films developed the crowd simulation software Massive, which uses artificial intelligence to enable individual digital characters to respond autonomously to their surroundings, as in a crowd of thousands of orcs.⁹ As Massive revolutionized digital VFX production in the early 2000s, spawning multitudes of zombies, soldiers, and robots, so has machine learning transformed

5 Barbara Creed, “The Cyberstar: Digital Pleasures and the End of the Unconscious,” *Screen* 41, no. 1 (Spring 2000): 79–86, <https://doi.org/10.1093/screen/41.1.79>. See also Lisa Bode, *Making Believe: Screen Performance and Special Effects in Popular Cinema* (New Brunswick, NJ: Rutgers University Press, 2017), 7–10.

6 Jessica Aldred, “From Synthespian to Avatar: Re-framing the Digital Human in *Final Fantasy* and *The Polar Express*,” *Mediascape* (Winter 2011), accessed July 17, 2024, http://clients.jordanjennings.com/Mediascape/HTML/Winter2011_Avatar.html.

7 Tanine Allison, “More than a Man in a Monkey Suit: Andy Serkis, Motion Capture, and Digital Realism,” *Quarterly Review of Film and Video* 28, no. 4 (2011): 325–341, <https://doi.org/10.1080/10509208.2010.500947>.

8 James Vincent, “Hollywood Is Quietly Using AI to Help Decide Which Movies to Make,” *The Verge*, May 28, 2019, accessed July 17, 2024, <https://www.theverge.com/2019/5/28/18637135/hollywood-ai-film-decision-script-analysis-data-machine-learning>.

9 Ian Failes, “Massive’s Stephen Regelous on Future AI, Competition and a Massive App?,” *vfxblog*, August 7, 2016, accessed July 17, 2024, <https://vfxblog.com/2016/08/07/massives-stephen-regelous-on-future-ai-competition-and-a-massive-app/>.

the industry within the last few years. Machine learning accelerates the shift from labor-intensive effects that rely on human decision-making and manual adjustments toward the kind of automation that Massive initially made possible twenty years ago. Newer AI algorithms promise to automate repetitive and time-consuming tasks formerly carried out by human VFX workers, such as rotoscoping, tracking, compositing, and image clean-up (e.g., removing rigs, seams, wires, or visual noise).¹⁰

Many of the uses of machine learning in VFX, such as better rotoscoping or compositing tools, are invisible to spectators, with one notable exception—digital de-aging. Since the first overt use of the process to shave twenty years off Patrick Stewart and Ian McKellen in *X-Men: The Last Stand* (Brett Ratner, 2006), digital de-aging has become a standard VFX technique in Hollywood storytelling. More recently, productions have used AI to automate and improve the de-aging process. The Disney+ series *The Book of Boba Fett* (2021–2022) added machine learning to their typical methods to create a younger, digital version of Luke Skywalker. Although the resulting simulation looks remarkably like a young Mark Hamill, Hamill himself was not involved in the performance. Instead, the likeness was created, in part, by an algorithm trained to detect and reproduce patterns found in thousands of images of Hamill from the original *Star Wars* films and other period source material (see Figure 1). Even Hamill's voice was digitally simulated.¹¹ While Hamill gave Disney permission to re-create his younger self for the series (and was likely paid a large sum), this example highlights the potential danger posed by AI to well-known actors, who may worry that they will be replaced by digital replicas or that their computer-generated doubles will be used without permission or payment.¹²

Up-and-coming actors face a different challenge with the emergence of AI. With shorter careers and less name or face recognition, they are unlikely to be digitally reproduced in leading roles or de-aged for narrative purposes. Instead, they may experience the scenario SAG-AFTRA warned of in their 2023 strike—namely, to be paid one day's wages for digital scanning so that companies can use their likeness in any number of films, television series, or video games without further compensation.¹³ In contrast, established and recognizable actors like Mark Hamill can extend their careers into advanced

10 Trevor Hogg, "AI, Machine and Deep Learning: Filling Today's Need for Speed and Iteration," *VFX Voice*, April 12, 2021, accessed July 17, 2024, <https://www.vfxvoice.com/ai-machine-and-deep-learning-filling-todays-need-for-speed-and-iteration/>.

11 Jordan Williams, "How Mark Hamill Was De-aged for Young Luke Skywalker in *Mandalorian*," *ScreenRant*, updated April 28, 2022, accessed July 17, 2024, <https://screenrant.com/mandalorian-luke-mark-hamill-deaged-technology-deepfake-explained/>.

12 Neither Lucasfilm nor Hamill have revealed the details of his contract, but considering that Hamill reportedly was paid one to three million dollars for a thirty-second cameo in *Star Wars: The Force Awakens* (far higher than the main cast), he was likely well compensated for the use of his likeness in *The Book of Boba Fett*. See Temi Adebawale, "Here's How *Star Wars* Has Impacted Mark Hamill's Net Worth," *Men's Health*, December 21, 2019, sec. Entertainment, accessed July 17, 2024, <https://www.menshealth.com/entertainment/a30247002/mark-hamill-net-worth/>.

13 Webster, "Actors."



Figure 1. Mark Hamill was not involved in the creation of a digitally de-aged version of Luke Skywalker for *The Book of Boba Fett* series (Lucasfilm, 2021).

age and even beyond death as digitally generated posthumous performances become more feasible. This disparity suggests that although machine learning makes such digital duplications easier and more convenient, it will not increase the diversity of the actors represented. Instead, machine learning appears to be following Hollywood trends of privileging white, male stars.

Lack of racial and gender diversity is already an entrenched part of computer-aided performances, especially in relation to digital de-aging.¹⁴ Although there are many complex reasons for this, one factor is that, even without the use of AI, VFX teams need a considerable amount of reference footage to create a realistic younger version of an actor. Therefore, the majority of the stars who have been digitally de-aged thus far in American film and television have had multi-decade careers, producing many thousands of reference images and hours of footage at different ages. Examples include Brad Pitt, Jeff Bridges, Robert Downey Jr., Kurt Russell, Johnny Depp, Nicolas Cage, and Harrison Ford. The list of actors who have been de-aged in more than one film keeps growing, including Arnold Schwarzenegger, Patrick Stewart, Sylvester Stallone, Robert De Niro, Michael Douglas, and Willem Dafoe, among others. Of course, these names are uniformly white and male. For the first ten years of acknowledged digital de-aging, nearly every instance featured a white man. Although some white women and men of color have been de-aged in recent years, such as Dwayne “The Rock” Johnson in *Central Intelligence* (Rawson Marshall Thurber, 2016), Will Smith in *Gemini Man* (Ang Lee, 2019), and Samuel L. Jackson in *Captain Marvel* (Anna Boden and Ryan Fleck, 2019), about 70 percent of de-aging roles have gone to white men, according to my calculations.¹⁵

14 Tanine Allison, “Race and the Digital Face: Facial (Mis)Recognition in *Gemini Man*,” *Convergence: The International Journal of Research into New Media Technologies* 27, no. 4 (August 2021): 999–1017, <https://doi.org/10.1177/13548565211031041>.

15 To obtain this figure, I compiled a list of American films in which digital de-aging techniques are used to create younger characters as part of the plot (including flashbacks and fantastical scenarios like cloning), and then I sorted this list by race and gender. I did not include films with so-called beauty work or other forms of invisible de-aging, a more common set of techniques, especially for women, that are typically disavowed by the VFX industry and the studios.

The whiteness and maleness of these stars are not incidental to their casting or to the process itself. For decades, studios have perpetuated the myth that only white male-led films can be successful at the box office.¹⁶ Women and actors of color have not been given the same opportunities and therefore have not produced sufficient reference data for VFX artists to re-create their younger selves. The digital de-aging in Martin Scorsese's *The Irishman* (2019) is illustrative. In the film, digital VFX allowed three Italian American men in their seventies to play characters many decades their junior. Robert De Niro, Al Pacino, and Joe Pesci each had vast archives of previous screen appearances that artists could reference. De-aging in this case enabled a story of white men coming to grips with the impact of their life choices and their historical and political legacy over a long period of time. But this process also prompts viewers to contemplate the legacy of aging stars. In *The Irishman* and other recent films, digital de-aging infuses well-worn stories of white male power—and their leading men—with new vitality.

Machine learning has the potential to produce ever more realistic imagery for such stories, but the political potential of the process remains uncertain. The so-called deepfakes created by machine learning algorithms have their roots in nonconsensual pornography; the term “deepfake” stems from the Reddit handle of a user who imposed the faces of prominent celebrities onto the bodies of actresses in pornography.¹⁷ While deepfakes are now used for a much wider array of purposes, including digital de-aging, their origins cast doubt on their future role in more progressive representations. Like all forms of machine learning, deepfakes rely on large training data sets made up of historical examples; therefore, deepfakes tend to perpetuate the same biases of the original source material, such as the extensive canon of Hollywood. Indeed, Drew Ayers finds that some deepfake YouTube videos illustrate the “persistence of the hegemonic power of the white male hardbody,” producing “a mode of white, masculine identity that is essentially exchangeable and transactional.”¹⁸

As remixes of existing Hollywood properties, deepfakes may not be as accurate at creating de-aged or digitally generated versions of demographic groups beyond white men. Already, we have seen that many generative AI processes betray biases against dark-skinned individuals.¹⁹ A 2023 Bloomberg study revealed that Stable Diffusion, a machine learning–based AI, produced

16 Stacy L. Smith et al., *The Ticket to Inclusion: Gender & Race/Ethnicity of Leads and Financial Performance Across 1,200 Popular Films*, University of Southern California Annenberg Inclusion Initiative, February 2020, accessed July 17, 2024, <https://assets.uscannenberg.org/docs/aii-2020-02-05-ticket-to-inclusion.pdf>.

17 Eunsong Kim, “On the Depth of Fakeness,” in *Deep Fakes: Algorithms and Society*, by Michael Filmowicz (London: Routledge, 2022), 53, <https://doi.org/10.4324/9781003173397-3>.

18 Drew Ayers, “The Limits of Transactional Identity: Whiteness and Embodiment in Digital Facial Replacement,” *Convergence: The International Journal of Research into New Media Technologies* 27, no. 4 (2021): 1018–1037, <https://doi.org/10.1177/13548565211027810>.

19 Joy Buolamwini, “When the Robot Doesn’t See Dark Skin,” *New York Times*, June 21, 2018, sec. Opinion, accessed July 17, 2024, <https://www.nytimes.com/2018/06/21/opinion/facial-analysis-technology-bias.html>; and Ruha Benjamin, *Race after Technology: Abolitionist Tools for the New Jim Code* (Cambridge: Polity, 2019).

images of higher-paid professionals like architects and CEOs overwhelmingly as light-skinned men, while lower-paid workers like teachers and fast-food workers typically appeared as darker-skinned women.²⁰ Black artists have claimed that AI image generators routinely distort the facial features and hairstyles of Black women.²¹

As digital de-aging and other forms of computer graphics integrate machine learning into their processes, the film industry must grapple with the ways that AI may not only repeat but exacerbate discrimination against women and people of color within Hollywood. Histories of bias underlie AI training data sets, and Hollywood's casting practices already favor de-aged versions of older white male actors over a new crop of younger, more diverse actors. But the threat of the AI actor is not limited to the replacement of human actors. If allowed to repeat the biased representations of the past, the AI actor jeopardizes the equity and inclusiveness of the entire industry.

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20 Leonardo Nicoletti and Dina Bass, "Humans Are Biased. Generative AI Is Even Worse," *Bloomberg*, June 9, 2023, accessed July 17, 2024, <https://www.bloomberg.com/graphics/2023-generative-ai-bias/>.

21 Zachary Small, "Black Artists Say A.I. Shows Bias, with Algorithms Erasing Their History," *New York Times*, July 4, 2023, sec. Arts, accessed July 17, 2024, <https://www.nytimes.com/2023/07/04/arts/design/black-artists-bias-ai.html>.

Joshua Glick

The Synthetic Real: AI-Documentary Connections

Artificial intelligence (AI)-enabled film may seem to exist in an alternative media ecology to that of documentary. AI is often more closely tied to big budget fiction features and TV series, making headlines as a new frontier for fantasy and sci-fi VFX work as well as *the* contentious issue in Hollywood's 2023 WGA and SAG-AFTRA contract negotiations.

However, documentarians, in collaboration with computational artists, animators, and data scientists, have been employing AI in highly visible and hotly contested ways. Filmmakers look to AI as a tool to expand nonfiction art. At the same time, applications of the technology have inspired debate both within and beyond the documentary community about AI's capacity to distract, confuse, and manipulate.¹ Three particular uses have attracted the most attention: AI-enabled (a.k.a. synthetic) resurrection, digital face replacement, and archival restoration or, as many would argue, *reinvention*. The following case studies reveal the ethical stakes surrounding the integration of AI into documentary craft as well as its implications for the trust filmmakers aim to establish with viewers about the veracity of their claims.

An early, high-profile example of bringing a film's protagonist back from the dead is the vocal ventriloquism in *Roadrunner: A Film About Anthony Bourdain* (Morgan Neville, 2021). For a brief moment, we hear a seemingly impossible passage of voice-over: Bourdain, who tragically took his own life

¹ "Utilizing AI for Documentary Production—with Basil Shadid and Philip Shane," The D-Word, April 23, 2023, YouTube video, 2:04:00, accessed February 15, 2024, <https://youtu.be/9dP3mYZ4FR8>.

Joshua Glick, "The Synthetic Real: AI-Documentary Connections," *JCMS* 64, no. 1 (Fall 2024): 202–207.

years before production began, reads an email he wrote to his confidant, the artist David Choe, about navigating societal pressures to be “happy.” There is nothing in the film that signals to spectators that AI trained on recordings of Bourdain’s voice was used to generate the thoughtful statement. Additionally, Ottavia Busia, Bourdain’s ex-wife, disputes the claim that she had granted Neville permission to use AI in this way. Stoking the flames of discontent, Neville dismissed any notion of regret, telling *The New Yorker* that “we can have a documentary-ethics panel about it later.”² Critics noted how Neville’s brazen attempt to bracket ethics from craft only foregrounded the importance of consent and disclosure as critical to the ways in which filmmakers cultivate good faith in their projects.

Learning from the fallout, other filmmakers have taken a more transparent track. For the vocal synthesis of Andy Warhol in *The Andy Warhol Diaries* (2022), director Andrew Rossi was careful to secure permission from the Warhol Foundation and include a disclaimer at the beginning of the documentary alerting viewers to the use of the technology. In partnership with Resemble AI and the actor Bill Irwin, Rossi simulated Warhol for the voice-over. His lines were taken from the late artist’s actual diaries and were presented as a series of ruminations shared over the phone to his friend and collaborator, Pat Hackett.

For *Gerry Anderson: A Life Uncharted* (2022), director Benjamin Field worked closely with his subject’s son. Field tapped into twenty-five hours of unheard audio by the TV auteur and innovative puppeteer (originally taped for biographers) to create a life-like audio simulation of Gerry Anderson. He then synced the recording with the performance of a body double, whose face was digitally modified to more clearly resemble the late artist. AI Anderson appears within a mock television set, as if he was an interviewee in his own biopic.³

The Andy Warhol Diaries and *Gerry Anderson* use AI as a clever solution to the absence of their protagonists, re-animating the deceased artists to serve as inviting narrative guides for the audience. Still, the technology ultimately functions as an alluring vessel for the streamlined delivery of information, demonstrating the expectations and the limits of mainstream documentary convention. The drive for biographical legibility, a crucial component of the Hollywood docu-portrait, takes precedence over thematic and formal explorations. AI Warhol’s statements might have deviated from the diary text to reflect in evocative ways on the artist’s own expressed desire “to be a machine” along with his musings on the nature of mediation and the fabrication of celebrity.⁴ The apparitional Anderson might have been put in dialogue with the electrified marionettes he became so famous for on

2 Helen Rosner, “The Ethics of a Deepfake Anthony Bourdain Voice,” *New Yorker*, July 17, 2021, accessed July 25, 2024, <https://www.newyorker.com/culture/annals-of-gastronomy/the-ethics-of-a-deepfake-anthony-bourdain-voice>.

3 Robert Shepherd, “A Real Fake Story,” *Definition*, November 23, 2022, accessed July 25, 2024, <https://definitionmagazine.com/features/a-real-fake-story/>.

4 Andy Warhol, quoted in “Art: Pop Art—Cult of the Commonplace,” *Time*, May 3, 1963, accessed July 25, 2024, <https://content.time.com/time/subscriber/article/0,33009,828186,00.html>.

Thunderbirds (1965–1966), further elucidating his fondness for puppetry and the strange affective power of the art form.

The AI-enabled reimaging of archival nonfiction has been an area of passionate interest among amateur makers, hobbyists, and professional artists alike.⁵ For example, YouTuber Denis Shiryaev has attracted millions of views with his uprezzed treatment of *L'arrivée d'un train en gare de La Ciotat* (*Arrival of a Train at La Ciotat*, Lumière Brothers, 1895) and *A Trip Down Market Street* (Miles Brothers, 1906). In addition to colorizing the images, Shiryaev used machine learning tools to interpolate new digital frames where there was loss or damage in the original footage, resulting in formerly jittery, darkened, and scratchy film looking sharp and smooth.⁶

Such interventions offer an intriguing take on old film and, as some scholars have noted, provide a gateway to the world of early cinema. However, members of the archival community have been quick to note how actively adding things that weren't previously there rather than aiming to "restore" a film can be confusing to spectators.⁷ The AI treatment of the footage, combined with the fact that these films circulate freely in de-contextualized fashion online, obscure the ability of viewers to discern the original film as a material artifact that was made within a particular moment and has experienced wear over time.⁸

The Lord of the Rings director Peter Jackson brought these issues into a more focused public spotlight with his theatrically released *They Shall Not Grow Old* (2018). The Imperial War Museum invited Jackson to review one hundred hours of silent 16mm footage of British troops taken during World War I. His team retimed the footage from thirteen to twenty-four frames per second, colorized the images, and added a period soundtrack that included speech based on what forensic lip-readers could decipher. The interpolation of missing frames in the revamped film resulted in the digital generation of trees, houses, people, and architecture to fill in the visual field of the footage.

The film's immersive and visceral qualities no doubt contributed to its mass appeal. However, Jackson's claims that *They Shall Not Grow Old* constitutes a time machine point to the mythic confidence that filmmakers have often placed in new technology as a tool of intimate transport. It's a view that obfuscates the mediating role of the camera and the treatment of the footage. In the case of Jackson's epic, the hype around innovative equipment over-emphasizes the campaign to authentically simulate the look and feel of

5 AI has also been used in metadata initiatives to make nonfiction archival collections more accessible; the Computational Linguistics Applications for Multimedia Services (CLAMS) is one example.

6 Hugo Ljungbäck, "Artificial Intelligence, Film Restoration, and Early Cinema: Notes from AMIA 2022," Domitor, September 3, 2023, accessed July 25, 2024, <https://domitor.org/artificial-intelligence-film-restoration-and-early-cinema-notes-from-amia-2022/>.

7 The International Federation of Film Archives defines "restoration" as an interpretive process of returning a film back to an original state. Resources of the Technical Commission, International Federation of Film Archives, accessed April 7, 2024, <https://www.fiafnet.org/pages/E-Resources/Technical-Commission-Resources.html>.

8 Deniz Tortum, "AI-Restoration in the Film Archive," *Immerse*, September 7, 2022, accessed July 25, 2024, <https://immerse.news/ai-restoration-in-the-film-archive-604c6f65216a>.

the past, while de-emphasizing larger questions of historical understanding, much in the way that attention to period decor and costume dominated publicity for past cycles of TV docudrama.

The narratives that emerge in *They Shall Not Grow Old* re-present, but do not significantly challenge, commonplace accounts of the Great War. The film centers young white men struggling through a harrowing experience with a sense of endeavor and resolve. Women and people of color are relegated to the margins or remain beyond the frame, along with the war's broader geopolitical context.⁹

Jackson also took an interventionist approach in his eight-hour Disney+ production *The Beatles: Get Back* (2021) but pursued a different process and outcome. The director's Wētā FX team combed through sixty hours of footage and 150 hours of audio from the twenty-one days the band spent at Twickenham and Apple Studios. The sessions led to the Beatles' final album, *Let It Be*.¹⁰ Jackson de-mixed the recordings through machine learning, allowing him to isolate particular instruments, ambient noise, singing, and individual voices within group conversation. We see and hear four artists struggling to reinvigorate their rapport for enough time to create the album and put on one last live performance.

Jackson's curation of sounds also allows for a novel form of listening. Viewers can luxuriate in the songs' discrete elements and get a sharper sense of how they come together. Paul McCartney's endless strumming transforms into the beginnings of "Get Back" with the help of Ringo Starr's percussive backing. Billy Preston's spirited electric piano gives the band a palpable lift when they rehearse "Don't Let Me Down." Any sense of a story arc is less compelling than how the film foregrounds *dialogue*—across guitars, drums, and voices—that was crucial to *Let It Be* and the band's music more generally.¹¹

In human rights documentaries, filmmakers have largely looked to AI to protect vulnerable subjects. *Welcome to Chechnya* (David France, 2020) is noteworthy for its ethically grounded AI workflow. It explores an underground network of activists who arrange safe passage out of the country for oppressed members of the LGBTQ community. France, in collaboration with VFX supervisor Ryan Laney, considered different approaches to making at-risk participants anonymous, such as shadow, blur, or rotoscoping. They

9 Santanu Das et al., "AHR Roundtable: Reanimating the Great War on the Screen: Peter Jackson's *They Shall Not Grow Old*," *American Historical Review* 124, no. 5 (December 2019): 1769–1797, <https://academic.oup.com/ahr/issue/124/5>.

10 Lane Brown, "How Peter Jackson Broke Up the Beatles and Used AI to Make *Revolver* Better Than Ever," *Vulture*, November 4, 2022, accessed July 25, 2024, <https://www.vulture.com/2022/11/the-beatles-revolver-super-deluxe-peter-jackson-get-back.html>.

11 Peter Jackson's WingNut Films used AI technology to isolate John Lennon's voice from his demo tape of "Now and Then." Instrumental and vocal tracks by Paul McCartney and Ringo Starr and previously recorded guitar by George Harrison were added to make the song an ensemble production. Jackson also directed the music video, compiling rare outtakes, filmed performances, and home movies. Madison Bloom, "Peter Jackson Directs New Video for the Beatles' Final Song 'Now and Then,'" *Pitchfork*, November 3, 2023, accessed July 25, 2024, <https://pitchfork.com/news/peter-jackson-directs-new-video-for-the-beatles-final-song-now-and-then-watch/>; and Peter Jackson, "The Beatles—Now and Then (Official Music Video)," posted November 3, 2023, YouTube video, 4:35, accessed April 8, 2024, <https://youtu.be/Opxhh9Oh3rg>.

opted for digital faces, which at once concealed the subjects' identity and allowed them to retain a human appearance and communicate with viewers. Volunteer activists in New York lent their likenesses to the project, as Laney drew on their facial attribute data to create composite faces that functioned as true-to-life masks for the film's protagonists.

Laney's company, Teus Media, expanded on this practice for his two-part, BBC-backed *Hong Kong's Fight for Freedom* (Toby Paton, 2022). The vérité-style documentary portrays (and protects the identities of) young activists on the front lines of the 2019 pro-democracy protests in Hong Kong. Jennifer Ngo's *Faceless* (2021) examines a similar topic but involves participants bearing their own faces to the camera. Laney scrambled the relationship of measurements between specific points on their faces so that a biometric scan would be unable to reveal their identities.¹² More recently, directors Sophie Compton and Reuben Hamlyn created digital veils for *Another Body* (2023), a documentary about a college student who discovers that one of her peers has stolen her likeness for deepfake pornography. *Another Body* follows her search for justice and powerfully critiques the lack of regulation and legal recourse surrounding AI, especially as it impacts everyday citizens.

The news outlet *Semafor* used a mix of live-action and AI-generated images to ground wartime atrocities in the personal experience of individuals. The online video *An Eyewitness Account of Russian Soldiers Targeting Civilians in Ukraine*, which appeared as part of the series *Witness*, visualizes the massacre in Bucha. The video exhibits a different kind of social justice engagement with AI, one that aims to depict a psycho-geography of atrocity and loss. In the video, resident Tetiana Sichkar's firsthand recollection of her mother's death at the hands of soldiers is paired with a dynamic flow of images. Tetiana's interview testimony and contemporary observational footage of the war-ravaged streets are interwoven with AI animations that relate to the time and place of each traumatic memory. The abstract visuals morph in and out of focus. The dreamscape suggests a palimpsest of emotions and offers an unsettling alternative to more traditional forms of restaging or re-creation.

One of the most incisive uses of AI in documentary is in projects that critically comment on the technology itself and interrogate the fiction-nonfiction divide. The deepfake installation *In Event of Moon Disaster* (Halsey Burgund and Francesca Panetta, 2019) constitutes an artful warning about the persuasive power of synthetic media and how it can extend a much longer tradition of mass media manipulation.¹³ The project's central video represents the successful Apollo 11 moon landing as a catastrophe. A late 1960s-era TV set, situated in a period living room, plays a fake newscast composed of archival NASA film and network public affairs broadcasts. The

12 "Deepfakery," roundtable series featuring Ryan Laney, a partnership between the MIT Co-Creation Studio, Open Documentary Lab, and the human rights organization Witness, September 8, 2020, accessed July 25, 2024, <https://www.facebook.com/WITNESS/videos/763761537503944>.

13 *In Event of Moon Disaster* has been shown at film festivals and museums around the world and is on display at the MIT Museum. The author of this article was the education producer for the project.

vessel appears to crash-land onto the lunar surface. A synthetic Richard Nixon then delivers the speech that was, in fact, written for him in case the mission failed. A final *reveal* component of the installation and companion website takes the viewer behind the scenes of how the project was created, demonstrating how vulnerable our information landscape truly is. Even events for which there is an overabundance of audiovisual evidence (like the moon landing) can be the subject of reinvention and distortion.

Operating in a more personal and domestic register, Sam Lawton worked with RunwayML and DALL-E 2 to reimagine old family photos in his short video *Expanded Childhood* (2023). The effect extends the scene beyond the frame, rendering visible an offscreen world and populating it with people, animals, furniture, and other natural or human-made elements. Taking the form of a fast-moving slideshow, we first see the original photo, then the AI-enabled version. The soundtrack includes a strained recording of an interview Lawton conducted with his father about the images. The audio conveys the elder's cognitive dissonance as the integration of the photos within a larger environment inspires a sense of familiarity, confusion, and disbelief. *Expanded Childhood* invites audiences to contemplate the slipperiness of memory and the ways media constitute unstable evidence.

As the rate of technological change continues apace, it is clear that AI will remain relevant for documentarians in the industry mainstream and at the edges of the art form. The growing footprint of AI is forcing filmmakers, funders, and a larger viewing public to reflect on the ethical protocols and ideological motivations that shape documentary practice. AI doesn't diminish the ontological status or cultural power of documentary. Instead, it intensifies the need to think critically about the way films cultivate their authority, establish trust with viewers, and advance truth claims.

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