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14. **Artificial imagination:
15. Industry attitudes on the
16. impact of AI on the visual
17. effects process**
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27. **ABSTRACT**

28. *The integration of artificial intelligence (AI) into the visual effects (VFX) industry*
29. *has significant implications for creativity, workflow efficiency and ethical consider-*
30. *ations. AI offers benefits in automating labour-intensive tasks and enhancing crea-*
31. *tive processes, yet it raises concerns about intellectual property, job displacement*
32. *and the overall impact on artistic integrity. Through semi-structured interviews*
33. *with nine experienced VFX artists, the study captures current attitudes towards*
34. *AI and its potential to reshape the industry. The findings reveal a complex inter-*
35. *play of optimism for technological advancements and apprehension about the ethi-*
36. *cal and practical challenges posed by AI. This pilot study provides a foundational*
37.

KEYWORDS

VFX
creativity
workflow
ethical implications
machine learning
emerging technologies

understanding of VFX artists' perceptions of AI, highlighting the need for ongoing dialogue and careful integration of these emerging technologies.

INTRODUCTION

To date, much of the research on artificial intelligence (AI) in creative industries has focused on how the technology can aid in the marketing and promotion of creative products (Anantrasirichai and Bull 2022; Campbell et al. 2022), its capacity to streamline administrative tasks to free up individuals to engage in creative work (Amankwah-Amoah et al. 2024; Anantrasirichai and Bull 2022; Matthews et al. 2023; Moura et al. 2023; Pearson 2022) and its usefulness in generating creative content (Anantrasirichai and Bull 2022; Lee 2022; Matthews et al. 2023). In the screen production industry, AI has had both 'small and significant' impacts, influencing image and graphics creation, 'object recognition during photography, animation, special effects generation, and editing' (Chow 2020: 194). AI technologies contribute to 'pre-production budget estimation, script writing, casting, special effects production, post-production editing, image restoration' (Li 2022: 1), and publicity development. These advancements aim to reduce costs amid industry turmoil caused by changing audience habits, fast-moving trends, project-based work and staff casualization (Caves 2003; Curtin and Vanderhoef 2015; Hesmondhalgh and Baker 2010; Nairn and Matthews 2020).

Notwithstanding the advertised value of AI technologies to screen production, it has been met with apprehension and concern due to its as-yet unrealized impacts on creative labour (Bhattacharya 2023; Chow 2020; Matthews et al. 2023). In the 2023 union strikes, both the Screen Actors Guild-American Federation of Television and Radio Artists (SAG-AFTRA) and Writers Guild of America (WGA) raised concerns over the integration of AI into screen production, fearing that it would threaten employment sustainability, undermine creative autonomy and lead to the exploitation of creative workers by supplanting portions of their labour with AI-generated content (Merchant 2023). Media coverage of these strikes has highlighted AI's potential to impact various areas of screen production, reflecting broader public concerns about the development and implementation of these technologies (Beckett and Kari 2023; Cho 2024; Maddus 2023; Sahota 2024; Slatter 2023).

Despite the prominence of these discourses in the public sphere and a growing body of academic literature on AI in creative industries, there is a lack of scholarly understanding of how AI integration affects the perceptions of visual effects (VFX) artists. VFX artists and companies often embrace new technological advancements due to their reliance on computational creativity, but the complexity of their workflows, use of integrated proprietary software platforms and concerns about copyright attribution have slowed their widespread deployment. This research aims to address this gap by presenting the findings of a pilot study in which the research team interviewed nine experienced VFX artists to capture their initial attitudes towards recent AI developments and their predictions on how AI might influence their work.

THE VFX INDUSTRY

Dinur defines VFX as 'digital manipulations and enhancements of footage, primarily during the post-production stage of filmmaking' (2023: 7), although the planning and execution of VFX begin in the pre-production and production

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1. stages (Rüling and Duymedjian 2014). VFX encompass a wide range of tech-
 2. niques, from creating elements that do not exist in reality to enhancing or
 3. altering existing shots (Venkatasawmy 2012). It is not uncommon for a VFX
 4. artist to develop digital assets based on sketches and abstractions that inspire
 5. the creative elements of a shot. For example, Rüling and Duymedjian discuss
 6. how the VFX artist may use ‘the surface structure of fish bones to create a
 7. “sinister-looking DNA” (Martin Hill, Prometheus) or ‘wildlife documentaries
 8. to try to perfect the behaviors and movements of computer-generated birds’
 9. (2014: 103). These effects are essential in producing the aesthetically pleas-
 10. ing visuals seen in modern cinema, seamlessly blending with live-action foot-
 11. age for a cohesive experience (Spelthann and Haunschild 2011). VFX artists
 12. frequently engage in practices such as enhancing shot elements (e.g., adding
 13. flames, changing sky colour), incorporating computer graphics (e.g., objects,
 14. clouds, debris), extending specific shot elements (e.g., multiplying bridge
 15. lanes, enlarging armies), recreating and replacing elements (e.g., actor faces,
 16. object surfaces), and removing unwanted items (e.g., electrical wires, cars,
 17. passers-by) (Rüling and Duymedjian 2014: 104). The aim of VFX is usually to
 18. generate artificial elements that integrate with real-world footage, enhancing
 19. the overall believability of the scene, with realism and verisimilitude among
 20. key markers of successful VFX activity (Dinur 2023; Giralt 2017; Rüling and
 21. Duymedjian 2014). Therefore, the meticulous work of VFX artists involves
 22. combining computer-generated elements with live-action shots (Spelthann
 23. and Haunschild 2011), ensuring that every visual aspect aligns with the direc-
 24. tor’s vision while maintaining a high level of realism, and often this will lead
 25. to the use and development of proprietary software that can be repurposed for
 26. future VFX projects (Rüling and Duymedjian 2014).

27. VFX have significantly transformed Hollywood production workflows,
 28. becoming as essential as ‘cinematography, editing, and costume design’
 29. (Curtin 2016: 679). Rooted in early cinematic traditions like Georges Méliès’
 30. films and magic lantern shows (Haslem 2019), VFX initially substituted expen-
 31. sive or impractical physical effects. Advances in digital technology now enable
 32. filmmakers to create intricate, immersive worlds beyond traditional techniques
 33. (Rüling and Duymedjian 2014; Venkatasawmy 2012). In VFX-heavy blockbust-
 34. ers, VFX can consume up to 40 per cent of production costs and dominate
 35. the film’s runtime; for example, 122 out of 156 minutes of *The Revenant* were
 36. crafted by VFX artists (Giralt 2017). Hollywood increasingly relies on VFX to
 37. market films globally and streamline complex production processes (Giralt
 38. 2017; Venkatasawmy 2012).

39. Despite significant advancements in VFX over the past three decades, the
 40. industry faced challenges before AI technologies. VFX production is marked
 41. by constrained creativity, with artists innovating within strict script, studio and
 42. directorial parameters (Rüling and Duymedjian 2014). The process involves
 43. collaboration among specialized experts under tight deadlines and budgets,
 44. often across multiple jurisdictions and time zones (Curtin and Vanderhoef
 45. 2015). Financial pressures are intensified by the competitive nature of the
 46. industry, with over five hundred firms worldwide vying for contracts, lead-
 47. ing to bidding wars and bankruptcies (Curtin 2016). For instance, Rhythm
 48. and Hues went bankrupt and announced layoffs just days after winning the
 49. Academy Award for best visual effects for *Life of Pi* (Curtin and Vanderhoef
 50. 2015). VFX organizations struggle to maintain profitability due to studios
 51. spreading work globally for cost savings and tax benefits (Curtin and
 52. Vanderhoef 2015; Jones 2023).

This industrial malaise trickles down to VFX artists. The types of contracts created between VFX organizations and studios often require that VFX companies engage in unanticipated additional labour, which, as Jones attests, means ‘these companies usually have to cover any costs that arise thanks to do-overs or unexpected re-iterations, despite these changes being externally imposed, and sometimes the result of creative indecision’ (2023: 50). VFX artists work long hours – often without benefits or long-term job security – with companies frequently hiring freelance staff on a project basis and terminating their employment upon project completion (Curtin and Vanderhoef 2015). Consequently, VFX work is often seen as invisible labour because the evidence of its influence on screen production is not discernible by audiences which can undermine the integrity and value of the work of these artists (Jones 2023). The absence of union representation, then, leaves VFX workers vulnerable to exploitation and unrealistic demands, further complicating their work environment, and given the studios’ clear desire to save on costs, particularly when VFX work is costly, the use of AI becomes an attractive proposition that could further exacerbate the challenges experienced by these creative workers.

AI, MACHINE LEARNING AND THE SCREEN PRODUCTION INDUSTRY

In screen production, AI and machine learning (ML) are used to create and fine-tune films. AI enables computers to mimic human behaviour and make decisions to solve complex tasks with minimal human intervention (Janiesch et al. 2021). In contrast, ML, a subset of AI, involves techniques that allow systems to learn patterns from data, understand their environment and make decisions based on prior knowledge (Chow 2020; Janiesch et al. 2021). While AI simulates human intelligence broadly, ML focuses on improving system performance through experience and data-driven learning. ML empowers AI agents to adapt and learn from large datasets, making them crucial for tasks requiring adaptability and learning (Chow 2020; Janiesch et al. 2021).

In the VFX industry, AI has streamlined labour-intensive processes and enhanced creative capabilities for decades (Giardina 2023a). AI technologies used by companies like Disney and Marvel have assisted in tasks such as de-ageing actors and creating lifelike digital characters. For instance, in *Shang-Chi and the Legend of the Ten Rings*, AI was used to replace stunt doubles’ faces with those of actors during combat scenes by developing an ‘identikit’ trained on various facial features (Slatter 2023: 36; Pacillo 2021). Similarly, in *The Irishman*, AI de-aged actors using historical images without motion capture equipment (Chow 2020). AI also automates tasks like object removal, colourization, super-resolution, and inpainting, allowing VFX artists to focus on creative work (Giardina 2023b; Kleiman et al. 2019; Mok 2023; Pearson 2022; Sahota 2023). Companies like Disney, Industrial Light & Magic and Pixar use AI to develop denoisers that improve image quality and reduce noise, enhancing rendering efficiency (Dahlberg et al. 2019). AI also helps VFX artists generate visuals to aid communication among VFX pipeline groups, creating a uniform project vision (Slatter 2023).

It is incorrect, however, to say AI alone was responsible for advancements like the identikit in *Shang-Chi and the Legend of the Ten Rings*. The Australian Institute of Machine Learning and Rising Sun Pictures developed this technology by training five principal ML models using about 30,000 face images and over 4 million training iterations. These models were used for 51 face

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1. replacements in six key scenes (Brown 2021). This process, involving ML and
 2. deepfakes, required significant human oversight and intervention. Conflating
 3. AI with Generative AI can misrepresent the extensive human effort involved.
 4. Highlighting AI without acknowledging rigorous training and manual inter-
 5. vention risks underestimating human contributions. Thus, it is essential to
 6. distinguish between AI applications and the necessary human expertise
 7. (Brown 2021).

8. Industry discourses in Hollywood surrounding the use of AI grapple
 9. with the complex ambivalences of the new technology. On the one hand,
 10. AI-assisted tools boost the capabilities of these creative workers and improve
 11. their productivity by automating labour-intensive tasks (Giardina 2023a;
 12. Slatter 2023), but on the other hand, there are concerns that the integration
 13. of AI will further undermine already-tenuous conditions of creative integ-
 14. rity and job security. A study surveying 300 entertainment industry leaders
 15. found that '75% of respondents indicated that GenAI tools, software, and/
 16. or models had supported the elimination, reduction, or consolidation of
 17. jobs in their business division' (CVLECONOMICS 2024: 5) and that VFX
 18. was particularly vulnerable because those adopting AI were often using it
 19. in postproduction (Cho 2024; CVLECONOMICS 2024). VFX artists are also
 20. concerned by the capacity of AI technology to be trained on images they
 21. developed without compensation or credit, further heralding their redun-
 22. dancy (Asher-Schapiro 2024). Yet, the replacement of VFX artists might not
 23. be a fait accompli. Audiences have expressed disappointment and apprehen-
 24. sion towards AI film content, rebelling against Disney television series *Prom*
 25. *Pact* and *Secret Invasion* because of their poor AI executions that displaced
 26. workers and aesthetic credibility (CVLECONOMICS 2024; Entwistle 2023).
 27. The suggestion here is that the role of AI in VFX and screen production might
 28. be a threat, but it has some ways to go before making artists obsolete, if it
 29. does so at all, because as Pearson attests 'the maximum benefit from AI can
 30. be derived when it augments, rather than replaces, human creativity' (2022:
 31. 2). We expect that the views of the VFX artists interviewed for this pilot study
 32. will help to build out the positions raised here on the value and challenges
 33. posed by AI technologies.

34. **METHOD**

35. Due to limited scholarly understanding of AI in VFX, the research team
 36. conducted a pilot study to gauge initial attitudes towards recent AI devel-
 37. opments and their impact on VFX work. This pilot study, using participants
 38. from the primary researcher's network, aimed to test interview questions
 39. and research direction. Nine semi-structured online interviews, averaging 30
 40. minutes each, were conducted with VFX workers experienced in Hollywood
 41. blockbusters.¹ Given Hollywood's outsourcing practices for cheaper labour
 42. and tax incentives (Curtin and Vanderhoef 2015), the artists were glob-
 43. ally distributed. Participants, with 6 months to 27 years of experience, were
 44. familiar with AI's potential impact on their work. For confidentiality, pseu-
 45. donyms were used in the data analysis. Semi-structured interviews were
 46. chosen for their ability to capture the unique perspectives of participants on
 47. social phenomena (Adeoye-Olatunde and Olenik 2021). The researcher is also
 48. afforded the opportunity to probe the participant on specific responses, eluci-
 49. dating insights that help respond to the research purpose (Monday 2019). The
 50. semi-structured interviews were recorded and transcribed using Otter.ai and
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1. The interviews were carried over video conferencing by the principal author (A. D. Narayan) based in New Zealand. The VFX Artists themselves were globally distributed. Through the article we have provided pseudonyms for any direct quotes from the artists themselves.

the primary researcher then cleaned up the transcripts before sharing them with the wider research team. During the interviewing and cleaning process, the primary researcher undertook a preliminary analysis of the data, relying on inductive and deductive approaches to develop initial themes that would help validate the findings of the AI thematic analysis completed by ChatGPT version 4o.

AI-driven qualitative synthesis

The AI-driven qualitative synthesis (AIDQS) methodology combines advanced AI tools with traditional qualitative analysis techniques to systematically analyse and synthesize interview data. This approach leverages ChatGPT Pro and a Notion database platform to facilitate an in-depth thematic analysis, ensuring a comprehensive understanding of complex qualitative data. This methodology aligns with the principles outlined by Richard E. Boyatzis (1998) in *Transforming Qualitative Information*, which emphasizes the systematic and rigorous approach to thematic analysis.

Step 1: Data collection and cleaning

The initial phase of AIDQS involves transcribing audio interviews into text using an AI transcription service, which provides highly accurate transcriptions. These transcripts are then manually reviewed to correct errors, standardize technical terms and ensure overall coherence. This cleaning process is crucial for maintaining the integrity of the data and mirrors Boyatzis's (1998) emphasis on the importance of accurate data preparation as the foundation for reliable thematic analysis.

Step 2: Thematic analysis with ChatGPT version 4o

The cleaned transcripts are analysed using ChatGPT Pro in several phases. Initially, each transcript is coded to identify significant data points, organized into a table with columns for the identifier, codes, themes, sub-themes and direct quotes (Boyatzis 1998). Next, additional columns are added for enhanced analysis. Direct quotes are paraphrased for clarity, key snippets are highlighted and tags are assigned to each quote, following Boyatzis's (1998) method of refining codes and developing themes. A 'Thematic Context' column is added to synthesize information into short paragraphs summarizing the theme, sub-theme, paraphrase, snippet and tags. Finally, concise keywords or phrases encapsulating the core idea are generated for each theme and added to the table for quick reference.

Step 3: Data integration and overarching theme extraction

Once the thematic tables for individual interviews are completed, they are combined into a comprehensive data sheet. This master sheet undergoes a review using ChatGPT version 4o to identify overarching themes. Recurring patterns and common elements are identified across the combined data, and six overarching themes are defined to encapsulate the entire dataset. Each specific theme is mapped to one of the overarching themes, creating a structured framework for analysis. This process aligns with Boyatzis's (1998) methodology for identifying patterns and themes across multiple sources of qualitative data, ensuring a systematic and thorough thematic analysis.

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Step 4: The data field: Aggregating and sharing thematic data

Following the thematic analysis, the qualitative data is aggregated into a comprehensive data field using the application Notion. This data field compiles all thematic analysis results, including themes, sub-themes, direct quotes, paraphrases, snippets, tags, thematic contexts and keywords, into a structured data sheet. The data field, created using the application Notion, serves as a meticulously organized central repository for qualitative data analysis. Each column in the datasheet represents a specific element of the analysis process, allowing research team members to access, review and interact with the data field. Notion's functionality supports various modes of data interrogation, including filtering, keyword searching and exploring thematic connections, which enhances collaborative analysis and discussion. By aggregating the data in a structured and searchable database format, the data field facilitates efficient interrogation of themes, sub-themes and associated quotes by team members, consolidating all thematic insights in one accessible location.

This functionality deepens qualitative data understanding, allowing nuanced insights and well-informed conclusions. The data field forms the basis for writing research findings, ensuring all thematic elements are integrated. By enhancing collaboration, team members can collectively refine the analysis, incorporating diverse perspectives for a comprehensive interpretation. This approach aligns with Boyatzis's (1998) emphasis on systematic qualitative data analysis for deeper insights and reliable conclusions.

Theme 1: AI in creative and technical applications

The first theme of *Creative and Technical Applications* reflected diverse perspectives on the integration and impact of AI in the VFX industry. Participants discussed both the advantages and limitations of AI technologies, revealing a complex interplay between enhanced efficiency and creative challenges, particularly in relation to processes such as concept art, rotoscoping, coding, Neural Radiance Field (NERF) generation, simulation and rendering.

Participants viewed AI as a valuable tool for generating initial ideas and concepts by providing a starting point for creative projects. However, there was widespread caution about over-reliance on AI. While AI offered novel and diverse concepts, it was crucial for artists to maintain their personal creativity and artistic voice. Jordan described AI as a 'creative buddy' that helped spark ideas and provide visual inspiration, but they also emphasized the importance of maintaining personal creativity. Riley, a veteran supervisor and producer in the industry, also emphasized the importance of maintaining the integrity of the creative process, which AI-generated references often lack:

When dealing with directors and producers who come in with AI-generated references, I try to have an open dialogue about the limitations of these tools. But a huge benefit of working with someone like a concept artist is that they can help you navigate that vision. Does your vision make sense? Does it make logical sense? And do all the pieces fit together? This is something AI can't do. Everything either looks exactly alike, or it looks nothing alike. There's no middle ground.

Riley's thoughts indicate that while AI can handle the initial stages of work, human expertise is still required to refine and perfect the results

reinforcing the perception that the quality of the technology was deemed ineffectual, at this stage, for creating content that is commercially and aesthetically viable (Matthews et al. 2023). These views echo Pearson's (2022) position that AI should work in tandem with creative people rather than supplant them.

One of the most significant benefits highlighted was the ability of AI tools to streamline and automate repetitive tasks, thereby improving overall workflow efficiency. Cameron discussed how AI is utilized for mundane tasks such as denoising and procedural generation, which saves time and resources stating: 'In my day-to-day it's more about using it for mundane tasks like denoising or some procedural generation stuff', which, according to scholars, seems to be a standard approach adopted by users who perceive the value of AI in addressing administrative or cumbersome uncreative tasks (Amankwah-Amoah et al. 2024; Anantrasirichai and Bull 2022; Matthews et al. 2023; Moura et al. 2023; Pearson 2022). Similarly, the use of AI for rotoscoping tasks was noted as a substantial time-saver but it still required some manual clean-up. 'We tried using CopyCat [AI tool] for that and it did speed things up. But it wasn't perfect. We still had to go in and clean up a lot'.

Although there were obvious efficiency gains associated with AI use, participants expressed concerns about AI's ability to handle more nuanced and creative tasks with a reliance on AI for creative work seen as potentially detrimental to the development of artistic skills. For example, participants who were employed as technical directors developing tools for studio pipelines, noted that AI assisted by providing support for troubleshooting and optimizing workflows. Morgan explained that while they used AI like ChatGPT for problem-solving and coding assistance, the answers were sometimes inaccurate, leading to a need for verification and manual intervention. Similarly, participants also noted AI's role in simulation within VFX is emphasized by its ability to handle complex calculations and optimize processes but as Taylor noted, AI-generated shadow renderings of characters often created unnatural movements, which did not align with the artistic vision of the project: 'It was supposed to be more efficient but ended up creating these kind of unnatural movements that didn't really match the vibe we were going for'. Such an experience highlights that there are benefits to AI, but equally the limitations are notable. For these participants, existing AI tools are unable to replicate the nuanced and detailed work that human artists excel at and more specifically, were unable to fully grasp the subtleties required for realistic production. The inability of the technology to mimic exactly the skills and talents of VFX artists remains a significant barrier to its broader adoption for creative tasks, a fact emphasized by Taylor when they remark that '[u]nderstanding the why behind certain choices, the creative decision making, that's something I haven't really seen AI effectively do'.

Despite some human intervention needing to be incorporated as part of using AI, Cameron did feel that the technology could achieve remarkable results especially when it came to saving time on extensive manual work. The ability of the technology to generate crowd scenes was particularly commendable.

We used a tool that we had internally that took some sprite libraries of the characters we made that could generate these crowds automatically, adjusting their movements and interactions in a realistic way. It saved us a huge amount of time and resources, especially for the far-away shots.

1. Additionally, NERFs represent a promising development in VFX, enabling
 2. the creation of detailed 3D representations of real-world scenes from photo-
 3. graphs. This is achieved by training a neural network on a set of 2D images.
 4. Jamie highlighted the use of NERFs in virtual production, where they signif-
 5. icantly reduce the time and resources needed to create complex outdoor
 6. scenes compared to traditional modelling or photogrammetry. They noted
 7. that while NERFs require high-quality photos and substantial computational
 8. power, they offer a level of detail and realism that enhances virtual production
 9. environments.

10. Participants expressed cautious optimism about the future integration of
 11. AI into their technical workflows. They envisioned a future where AI tools
 12. are more seamlessly integrated into workflows, enhancing productivity and
 13. enabling new creative possibilities. However, achieving this vision requires
 14. addressing several challenges, including the need for better training data,
 15. more intuitive AI tools and ongoing dialogue between technology developers
 16. and the creative community.

17. **Theme 2: Ethical and legal**

18. The second theme, *Ethical and Legal consideration*, captures the views of inter-
 19. viewees on the potential intellectual property (IP) and wider authorship
 20. concerns associated with relying on content generated by AI.

21. The issue of IP rights and creative integrity emerged as a critical
 22. concern. Participants expressed uncertainty about who owns AI-generated
 23. content. Avery raised the issue of IP rights, asking: ‘If an AI tool contrib-
 24. utes to a project, does the company that owns the AI get a stake in the
 25. IP?’ Avery’s perspective has been echoed amongst individuals working in
 26. the screen production industry and wider creative industries where copy-
 27. right and IP are necessary for gaining profits and maintaining a competi-
 28. tive advantage (Caves 2003). The murky views over authorship and
 29. copyright are increasingly commonplace. For example, much like Avery,
 30. Alexis mentioned that

31. One of the biggest ethical considerations is authorship and creative
 32. integrity. Like, when you use AI to generate content, who really owns
 33. that work? It’s crucial to ensure that artists are credited for their creative
 34. input and not just sidelined by AI.

35. Such questions raised by Avery and Alexis reflect ongoing points of conten-
 36. tion that ultimately dissuade users from readily deploying AI technologies
 37. in their work, especially if it ensures that larger organizations continue to
 38. dominate over small enterprises in creative industries (Cunningham 2005).

39. The legal implications of using AI tools, particularly those trained on
 40. potentially copyrighted material, further complicate the issue. Riley recounted
 41. an instance where AI-generated outputs resembled existing works too closely,
 42. raising significant legal and ethical questions:

43. We were considering Stability for generating character designs.
 44. However, when we realized all the drama with Midjourney, we decided
 45. against using the tool and instead worked with concept artists to create
 46. original designs. It was a tough decision because of the time constraints
 47. and finances, but it was the right one legally.

Opening themselves up to accusations of copyright infringement, especially when VFX organizations are resource-poor and may struggle to finance a legal battle, becomes a major deterrent to using AI tools (Nairn and Gumbley 2018). Additionally, Riley's point aligns with a number of issues raised by VFX artists who are concerned about the training data currently being used by OpenAI that is perceived as exploitive because the authors of the training data are not adequately being compensated (Asher-Schapiro 2024). In essence, the participants felt there was too much risk in using AI, especially when they were not sure about where the data was sourced. Therefore, the AI tools could be useful for creative inspiration, but generated content was unlikely to make it into the final product.

Another layer of ethical and legal consideration involves the handling of data and maintaining confidentiality. Participants noted the risks associated with using AI tools that require access to large datasets, which may include sensitive or proprietary information. Cameron pointed out the security concerns related to cloud-based AI tools:

Confidentiality is another issue. When using AI, especially cloud-based tools, there's always a risk of data breaches. [REDACTED] gets really protective about external access like most places do. Our IT guys get pissed off if we begin to access cloud-based tools because it's a huge security risk.

These ethical and legal concerns perhaps account for the general trepidation amongst the participants to openly embrace AI technology, especially when they were contracting with studios that had strict protocols and tight non-disclosure agreements. The positives of AI did not appear to outweigh the threat of legal action and the potential loss of clients perturbed by the incorporation of AI in creative practice.

The integration of AI in VFX presents a complex interplay of ethical and legal considerations. While AI tools offer significant efficiency gains, they also pose challenges related to job displacement, IP rights, data security, and maintaining creative integrity. Participants emphasize the importance of transparency, clear guidelines and a balanced approach to harness the benefits of AI while safeguarding the human elements essential to creative work.

Theme 3: Challenges and limitations

The final theme identified from the data was *Challenges and Limitations*. Despite limited optimism about the creative possibilities and practical advantages of AI workflow integration, participants also noted several technical, creative and ethical limitations with current technologies that lead them to be apprehensive about adopting AI.

Participants were generally hesitant towards nascent technologies such as OpenAI's Sora (a text-to-video model that can generate quality videos from text prompts – see OpenAI n.d.) given the lack of publicly available information about the new technology and expressed doubts about the production readiness of the technologies. Morgan noted these technologies were likely to improve dramatically over coming years, but insisted that they were not, in their current, form ready for widespread workflow integration:

1. I think it's a good gimmick. I think it's quite hyped. I mean, the idea is
 2. great. But you cannot really compare it to something that you get from
 3. real artists working in the industry, because it's not really production
 4. ready [...] I guess in the next couple of years, it will get better and better
 5. and better. But at the moment, it's still not very production ready. Not
 6. 100% production ready. Definitely not.
 7.

8. Similar sentiments were reflected across a number of interviews, with other
 9. participants acknowledging both the rapid evolution of these technologies
 10. and their practical limitations in current forms, which would likely hinder,
 11. rather than aid VFX production. The perception also seemed to be that the
 12. work of the VFX artist was superior to the technology, signifying the belief
 13. amongst the participants that they retained value in the production process.

14. Leaving aside questions of technological readiness, participants noted
 15. the complexity of integrating new tools into existing VFX production pipe-
 16. lines that rely upon workers employing a constellation of software platforms
 17. and tools that require specialist training and calibrated workflow manage-
 18. ment. Jordan described the challenge posed by institutional inertia within VFX
 19. companies saying 'VFX is very entrenched. It's something that, you know, the
 20. pipelines haven't changed in many, many years, the software is slow to change
 21. the way people do things are slow to change'. Taylor and Jamie both shared
 22. these concerns, noting the question of interoperability between hypothetical
 23. AI-integrated tools and existing programme suites. Their views align with the
 24. prevailing view that the VFX industry is amongst the first willing to embrace
 25. new technologies but is inevitably stilted by the confines of propriety expecta-
 26. tions and the established structures of control (Montgomery 2023; Chabanova
 27. 2022).

28. Alexis made similar concerns about the heightened learning curve of
 29. AI-integrated tools but saw this integrative challenge less as an obstacle to
 30. integration and more as a threat to job security:

31. here's the big question of job displacement and ensuring that AI tools
 32. enhance rather than replace human creativity. Plus, there's the learn-
 33. ing curve. We'll need to keep updating our skills to stay relevant and
 34. make the most of these advancements. So it's exciting, but it's also a
 35. bit of a balancing act, making sure we use these tools responsibly and
 36. effectively.
 37.

38. For Alexis, the improperly managed integration of AI-integrated tools risked
 39. exacerbating already cumbersome processes of continuing professional
 40. development need to remain up-to-date with new technologies required for
 41. production workflows. Furthermore, Alexis' position alludes to the already
 42. fraught experiences of VFX artists who regularly struggle with maintain-
 43. ing consistent employment in a precarious and competitive industry (Curtin
 44. 2016) and captures the feelings of many people in the wider screen production
 45. industry concerned about displacement in favour of technologies that can aid
 46. cost-cutting measures (Cho 2024; CVLECONOMICS 2024).

47. Leaving aside concerns about practical implementation, participants were
 48. alarmed by the possibility that the tool would undermine creative stand-
 49. ards within the industry. Avery expressed concern that the mass deployment
 50. of Generative AI tools risked 'creating more generic, less inspired work' that
 51. hollowed out creative decision-making:
 52.

Sora is an interesting development, but it also proves my concerns about AI in our industry. It promises to streamline workflows and enhance productivity, but I worry about the human cost. Tools like Sora might make certain jobs obsolete, pushing skilled artists out of work. There's also the fear that over-reliance on such tools could diminish the quality of our work, making it more mechanical and less creative.

Given creative people are emotionally and personally tied to their work and see aesthetic standards as a marker of their creative worth, it was not unsurprising to see that Avery was concerned by the technology's capacity to undermine creative potential (Nairn 2022). Furthermore, these questions on creative recognition and autonomy fed into general ethical concerns about the technology. When asked about the ethics of AI integration, three participants emphasized the risk of these tools reducing job security or taking human jobs, while six highlighted issues surrounding authorship, originality and creativity. Although individual participants described risks surrounding implicit algorithmic bias and the technological opacity of individual models and datasets, these concerns about AI's deleterious effects on industrial creativity were a dominant concern across the majority of interviews.

CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

The purpose of this pilot study was to explore the attitudes of VFX artists to the potential and current integration of AI into the screen industry. Not unsurprisingly, our interviewees acknowledged the value AI could have in eliminating mundane tasks, enhancing creativity and streamlining workflows, aligning with the prevailing views held by scholars exploring AI in the creative industries (Amankwah-Amoah et al. 2024; Anantrasirichai and Bull 2022; Matthews et al. 2023; Moura et al. 2023; Pearson 2022) and more specifically, the screen industry (Chow 2020; Li 2022). Yet, for all the hype that surrounds AI and its potential, our interviewees were quick to highlight that, despite not conforming to techno-pessimistic discourses on AI's catastrophic impacts, this new technology is not without challenges and a myriad of ethical, legal and moral issues. That is, although they were optimistic about its technical and creative implications, they were particularly perturbed by the possibility of AI causing copyright infringement, which could adversely impact the quality of the product, but also cause reputational damage and incur financial costs to people in an industry, which is already under-resourced and highly competitive. Therefore, VFX artists and the organizations they contract with cannot afford to risk relying on AI only for it to threaten their profits and opportunities for future projects. Such trepidation around copyright and IP is an ongoing concern with scholars and industry personnel alike regularly citing the cultural biases and ambiguity of training data as reasons for creative industries to be reluctant to completely embrace AI technologies (Asher-Schapiro 2024; Chesterman 2024; Vartiainen and Tedre 2023).

Furthermore, our interviewees, much like those working in other creative fields (Bhattacharya 2023; Chow 2020; Matthews et al. 2023), were adamant that AI technologies were, at least currently, unable to replace human expertise and creativity. In fact, our VFX professionals pointed out that while AI can assist with certain tasks (e.g. rotoscoping), it often requires significant manual intervention to achieve the desired quality. The defence of their creativity and expertise was expected given that creative people's identities

1. become intertwined with their work as they become emotionally and person-
 2. ally invested in its success (Nairn 2022), yet that defence could also hinge on
 3. a psychological resistance to change among artists who fear that their roles
 4. may be diminished or replaced by AI. It could also simply be a response to the
 5. uncertainty posed by AI, especially in regard to its impact on job security and
 6. the creative integrity of their work (Chow 2020; Beckett and Kari 2023).

7. Given that VFX artists are usually among those inclined towards adopt-
 8. ing emerging technologies (Chabanova 2022; McCullaugh 2023; Montgomery
 9. 2023), the hesitancy our interviewees expressed about incorporating AI was
 10. somewhat unexpected. They clearly did not believe that AI could be seam-
 11. lessly integrated into current workflow processes without major disruption
 12. and risk, which seemed to suggest that the rhetoric that constructs AI as a
 13. means of improving efficiency and costs was akin to technological determin-
 14. ist ideology rather than having true applicability to VFX work processes. In
 15. essence, VFX artists express concern that the rapid evolution of AI technol-
 16. ogy may outpace their ability to effectively integrate and utilize these tools,
 17. particularly in an industry constrained by legal, ethical and financial limita-
 18. tions. Their views suggest that more focus needs to be placed on understand-
 19. ing the practicalities and needs of the industry in order for AI integration to be
 20. fruitful and worthwhile to these artists, rather than assuming that generic AI
 21. tools can be deployed into nuanced creative processes. Without such consid-
 22. erations of the trappings of VFX work, whether they are non-disclosure agree-
 23. ments to tight proprietary software regulations, the AI would, as Chabanova
 24. (2022) notes, actually create greater pressures. McCullaugh (2023) posits that
 25. such pressures would be met by resistance. Our interviewees were not resist-
 26. ant but certainly typified a cautious mindset.

27. The thoughts of our interviewees were deeply influenced by the constraints
 28. of the globalized neo-liberal economy governing VFX work. Eight out of the
 29. nine participants were employed by VFX studios outside the United States,
 30. relying heavily on Hollywood contracts for their commercial survival. Over the
 31. past three decades, the labour of VFX artists has become increasingly crucial
 32. in Hollywood production workflows, yet it remains largely excluded from the
 33. unionized protections that safeguard workers in the United States (Curtin and
 34. Vanderhoef 2015). The small size of these non-union VFX houses and their
 35. isolation from the broader Hollywood system exacerbate their power imbalance
 36. with studio producers, who actively seek tax concessions and reduced
 37. labour costs in other jurisdictions if conditions are not favourable (Caldwell
 38. 2008). These challenging business conditions and the precarious position
 39. within a highly globalized labour economy often drive studios to rapidly invest
 40. in new technologies, such as AI, rather than making equivalent investments
 41. in their staff (Caldwell 2008, Curtin and Vanderhoef 2015). Consequently, our
 42. participants expressed concern that the adoption of AI would be inevitable
 43. rather than optional, potentially leading to disempowerment and marginaliza-
 44. tion if VFX artists are not adequately prepared for the change.

45. Our pilot study also trialled the AIDQS method of thematic analysis where
 46. ChatGPT 4o was used to clean and synthesize the transcripts, forming codes and
 47. themes that were then assessed and interpreted by the research team. Although
 48. the development of the AIDQS method required fine-tuning the prompt engi-
 49. neering and iterations of the data to ensure the transcripts were being appro-
 50. priately and authentically analysed, we believe that such a process proved
 51. advantageous in reducing the possibilities of bias and subjectivities that accom-
 52. pany qualitative research approaches (Braun and Clarke 2023). The AIDQS

is replicable and although it may need some adjusting (e.g. altering prompts) when applied to other textual data, we believe it is a worthwhile means for aiding human interpretation of data. Furthermore, we are confident in its application, because the system was trained to deal exclusively with our data, reducing the potential for the incorporation of hallucinations (or faux data).

This article has presented the findings of our pilot study into attitudes to emerging AI technologies within the VFX industry to better understand the optimism, concerns and applications of these technologies in practice. Reflecting this pilot stage, the sample size is small and concentrated on VFX artists involved in labour-intensive components of production. Researchers, senior managers and executives were not present in our participant sample. Participation was also limited by non-disclosure agreements, which prevented participants from discussing sensitive internal decision-making within their organizations. Therefore, future research will look to include more participants from the global VFX industry and to extend the interviewing to those whose roles in VFX extend beyond being artists.

Additionally, the research captures the views of VFX artists at a time when the full picture of what AI can achieve has yet to be constructed. Thus, we believe this study has the potential to evolve into a longitudinal study of the discourses around AI within the VFX industry to trace how attitudes and applications of these technologies shift over time. These pilot interviews were conducted across April and May 2024 – two months after the first public display of OpenAI's Sora platform (in February 2024) and less than six months after the conclusion of the 2023 SAG-AFTRA strikes. At the time of writing, these technologies are still in their nascency and have not yet been widely incorporated into production workflows, but nevertheless, informed the questions being posed to participants. Extending this study longitudinally would allow us to measure the tangible impacts of these technologies while also exploring how the tone of these discourses evolves over time.

Finally, this study focuses exclusively on the VFX industry and does not engage with participants from adjacent creative industries. Beyond studies of how AI technologies impact industry-specific industries, future studies could explore how these technologies impact the interactions between different production departments. This holistic understanding of AI's impacts on inter-departmental collaboration will take time to form as the slow-moving apparatus of the Hollywood studio system adjusts to new technological conditions but will provide the clearest possible sense of AI's systemic impacts.

ETHICS STATEMENT

All participants (or a parent or legal guardian, in the case of children under sixteen) gave written informed consent to participate in the study and publish the results. Ethical approval was granted by AUT Ethics Committee, approval number 24/29.

REFERENCES

- Adeoye-Olatunde, Omolola A. and Olenik, Nicole L. (2021), 'Research and scholarly methods: Semi-structured interviews', *Journal of the American College of Clinical Pharmacy*, 2:10, pp. 1358–67.
- Amankwah-Amoah, Joseph, Abdalla, Samar, Mogaji, Emmanuel, Elbanna, Amanya and Dwivedi, Yogesh K. (2024), 'The impending disruption of

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49.
50.
51.
52.

1. creative industries by generative AI: Opportunities, challenges, and
2. research agenda', *International Journal of Information Management*, 79, p.
3. 102759.
4. Anantrasirichai, Nantheera and Bull, David (2022), 'Artificial intelligence in
5. the creative industries: A review', *Artificial Intelligence Review*, 55:1, pp.
6. 589–656.
7. Asher-Schapiro, Avi (2024), 'Hollywood animation, VFX union fight AI job cut
8. threat', *Context*, 9 April, <https://www.context.news/ai/hollywood-animation-vfx-unions-fight-ai-job-cut-threat>. Accessed 23 April 2024.
9. Beckett, Lois and Paul, Kari (2023), "Bargaining for our very existence": Why
10. the battle over AI is being fought in Hollywood', *The Guardian*, 22 July,
11. <https://www.theguardian.com/technology/2023/jul/22/sag-aftra-wga-strike-artificial-intelligence>. Accessed 23 April 2024.
12. Bhattacharya, Subhendu (2023), 'Hollywood protest against artificial inte-
13. lligence application in creative work', *International Journal of Research in*
14. *Engineering, Science and Management*, 6:10, pp. 62–64.
15. Boyatzis, Richard E. (1998), *Transforming Qualitative Information: Thematic*
16. *Analysis and Code Development*, London: Sage Publications.
17. Braun, Virginia and Clarke, Victoria (2023), 'Toward good practice in thematic
18. analysis: Avoiding common problems and be(com)ing a knowing research-
19. er', *International Journal of Transgender Health*, 24:1, pp. 1–6.
20. Brown, Kelly (2021), 'The marvels of AI change the face of film', The University
21. of Adelaide Newsroom, 21 October, <https://www.adelaide.edu.au/newsroom/news/list/2021/10/22/the-marvels-of-ai-change-the-face-of-film>.
22. Accessed 18 June 2023.
23. Caldwell, John T. (2008), *Production Culture: Industrial Reflexivity and Critical*
24. *Practice in Film and Television*, Durham, NC: Duke University Press.
25. Campbell, Colin, Plangger, Kirk, Sands, Sean, Kietzmann, Jan and Bates,
26. Kenneth (2022), 'How deepfakes and artificial intelligence could reshape
27. the advertising industry: The coming reality of AI fakes and their poten-
28. tial impact on consumer behavior', *Journal of Advertising Research*, 62:3, pp.
29. 241–51.
30. Caves, Richard E. (2003), *Creative Industries: Contracts Between Art and*
31. *Commerce*, Cambridge, MA: Harvard University Press.
32. Chabanova, Anastasia (2022), 'VFX – A new frontier: The impact of inno-
33. vative technology on visual effects', Ph.D. thesis, London: University of
34. Westminster, <https://doi.org/10.34737/VZX94>.
35. Chesterman, Simon (2024), 'Good models borrow, great models steal:
36. Intellectual property rights and generative AI', *Policy and Society*, online
37. first, pp. 1–15.
38. Cho, Winston (2024), 'The Hollywood jobs most at risk from AI'. *The Hollywood*
39. *Reporter*, 30 January, <https://www.hollywoodreporter.com/business/business-news/ai-hollywood-workers-job-cuts-1235811009/>. Accessed 23
40. April 2024.
41. Chow, Pei-Sze (2020), 'Ghost in the (Hollywood) machine: Emergent appli-
42. cations of artificial intelligence in the film industry', *European Journal of*
43. *Media Studies*, 9:1, pp. 193–214.
44. Cunningham, Stuart (2005), 'Creative enterprises', in J. Hartley (ed.), *Creative*
45. *Industries*, Malden, MA: Blackwell, pp. 282–98.
46. Curtin, Michael (2016), 'Regulating the global infrastructure of film labor
47. exploitation', *International Journal of Cultural Policy*, 22:5, pp. 673–85.
- 48.
- 49.
- 50.
- 51.
- 52.

- Curtin, Michael and Vanderhoef, John (2015), 'A vanishing piece of the Pi: The globalization of visual effects labor', *Television & New Media*, 16:3, pp. 219–39. 1.
- CVLECONOMICS (2024), 'Future unscripted: The impact of generative artificial intelligence on entertainment industry jobs', United States of America: Animation Guild, 12 January, <https://animationguild.org/wp-content/uploads/2024/01/Future-Unscripted-The-Impact-of-Generative-Artificial-Intelligence-on-Entertainment-Industry-Jobs-pages-1.pdf>. Accessed 23 April 2024. 2.
- Dahlberg, Henrik, Adler, David and Newlin, Jeremy (2019), 'Machine-learning denoising in feature film production', in *SIGGRAPH 2019 Conference*, Los Angeles, CA, 28 July–1 August, Los Angeles, CA: Association for Computing Machinery, pp. 1–2, <https://history.siggraph.org/learning/machine-learning-denoising-in-feature-film-production-by-dahlberg-adler-and-newlin/>. 3.
- Dinur, Eran (2023), *The Filmmaker's Guide to Visual Effects: The Art and Technique of VFX for Directors, Producers, Editors, and Cinematographers*, New York: Taylor & Francis. 4.
- Entwistle, Brady (2023), 'Disney+ movie's AI actors called out with more flaws by VFX artists', *Screen Rant*, 13 November, <https://screenrant.com/prom-pact-movie-ai-actors-vfx-artists-response/>. Accessed 23 April 2024. 5.
- Giardina, Carolyn (2023a), 'Responsible AI? Some Hollywood VFX pros see the upside', *The Hollywood Reporter*, 24 August, <https://www.hollywoodreporter.com/business/digital/hollywood-vfx-community-artificial-intelligence-1235572043/>. Accessed 23 April 2024. 6.
- Giardina, Carolyn (2023b), 'Generative AI is "not the replace the human aspect of getting a performance", asserts digital domain CTO', *The Hollywood Reporter*, 16 October, <https://www.hollywoodreporter.com/movies/movie-news/smp-te-generative-ai-actors-digital-domain-cto-1235619559/>. Accessed 23 April 2024. 7.
- Giralt, Gabriel F. (2017), 'The interchangeability of VFX and live action and its implications for realism', *Journal of Film and Video*, 69:1, pp. 3–17. 8.
- Haslem, Wendy (2019), *From Méliès to New Media: Spectral Projections*, Bristol: Intellect. 9.
- Hesmondhalgh, David and Baker, Sarah (2010), 'A very complicated version of freedom: Conditions and experiences of creative labour in three cultural industries', *Poetics*, 38:1, pp. 4–20. 10.
- Janiesch, Christian, Zschech, Patrick and Heinrich, Kai (2021), 'Machine learning and deep learning', *Electronic Markets*, 31:3, pp. 685–95. 11.
- Jones, Nick (2023), 'Far from Houdini: The "magic" of the VFX breakdown', *Animation*, 18:1, pp. 42–58. 12.
- Kleiman, Yanir, Pabst, Simon and Nagle, Patrick (2019), 'Boosting VFX production with deep learning', in *SIGGRAPH 2019 Conference*, Los Angeles, CA, 28 July–1 August, pp. 1–2, <https://dl.acm.org/doi/abs/10.1145/3306307.3328208>. Accessed 27 April 2024. 13.
- Lee, Hye-Kyung (2022), 'Rethinking creativity: Creative industries, AI and everyday creativity', *Media, Culture & Society*, 44:3, pp. 601–12. 14.
- Li, Yaxing (2022), 'Research on the application of artificial intelligence in the film industry', *SHS Web of Conferences*, 144, pp. 1–6. 15.
- Maddus, Gene (2023), 'AI companies praise SAG-AFTRA and WGA contracts: They've done a great job', *Variety*, 29 November, <https://variety.com/2023/biz/news/ai-companies-balanced-approach-wga-sag-aftra-1235813309/>. Accessed 23 April 2024. 16.

1. Matthews, Justin, Fastnedge, Daniel and Nairn, Angelique (2023), 'The future
2. of advertising campaigns: The role of AI-generated images in advertising
3. creative', *Journal of Pervasive Media*, 8:1, pp. 29–49.
4. McCullaugh, Jim (2023), '2023 global perspective: Thought leaders on the
5. VFX and animation superhighway', *VFX Voice*, 3 January, <https://www.vfxvoice.com/2023-global-perspective-thought-leaders-on-the-vfx-and-animation-superhighway>. Accessed 29 May 2024.
- 6.
- 7.
8. Merchant, Brian (2023), 'Column: The writer's strike was the first workplace
9. battle between humans and AI. The humans won', *Los Angeles Times*, 25
10. September, <https://www.latimes.com/business/technology/story/2023-09-25/column-sag-aftra-strike-writers-victory-humans-over-ai>. Accessed 23
11. April 2024.
- 12.
13. Mok, Aaron (2023), 'AI is coming for Hollywood. "It's amazing to see the
14. sophistication of the images", one of Christopher Nolan's VFX guy says',
15. *Business Insider*, 26 July, <https://www.businessinsider.com/vfx-ai-generative-change-visual-effects-industry-jobs-excitement-growth-2023-7>.
16. Accessed 23 April 2024.
- 17.
18. Monday, Titus Utibe (2019), 'Impacts of interview as research instrument of
19. data collection in social sciences', *Journal of Digital Science*, 1:1, pp. 14–24.
20. Montgomery, Piers (2023), 'AI in VFX: The power of NeRFs and industry AI
21. innovations', *Visualskies*, 30 June, <https://visualskies.com/future-technology/ai-in-vfx>. Accessed 29 May 2024.
- 22.
23. Moura, Francisco Tigre, Castrucci, Chiara and Hindley, Clare (2023), 'Artificial
24. intelligence creates art? An experimental investigation of value and creati-
25. vity perceptions', *Journal of Creative Behavior*, 57:4, pp. 534–49.
26. Nairn, Angelique (2022), 'The me you see: The creative identity as constructed
27. in music documentaries', *Australasian Journal of Popular Culture*, 11:1, pp.
28. 9–26.
29. Nairn, Angelique and Gumbley, Sarah (2018), 'Creative entrepreneuria-
30. lism: The use of social media as a promotional tool for fiction writers',
31. *International Journal of Cultural and Creative Industries*, 5:2, pp. 26–43.
32. Nairn, Angelique and Matthews, Justin (2020), 'Drama at Disney: A themat-
33. ic analysis of creative worker identity negotiation and identification
34. in the documentary *Waking Sleeping Beauty*', *IAFOR Journal of Media,*
35. *Communication & Film*, 7:1, pp. 5–22.
36. OpenAI (n.d.), 'Creating video from text', OpenAI, <https://openai.com/index/sora/>. Accessed 23 April 2024.
- 37.
38. Pacillo, Lara (2021), 'Marvel's latest blockbuster features SA's artificial inte-
39. lligence', *Glam Adelaide*, 25 October, <https://glamadelaide.com.au/university-of-adelaide-and-sas-rising-sun-pictures-feature-in-lastest-marvel-film/>. Accessed 23 April 2024.
- 40.
- 41.
42. Pearson, Andrew (2022), 'The rise of creAltives: Using AI to enable and speed
43. up the creative process', *Journal of AI, Robotics & Workplace Automation*, 2:2,
44. pp. 1–14.
45. Rülting, Charles-Clemens and Duymedjia, Raffi (2014), 'Digital bricolage:
46. Resources and coordination in the production of digital visual effects',
47. *Technological Forecasting & Social Change*, 8, pp. 98–110.
48. Sahota, Neil (2024), 'The AI takeover in cinema: How movie studios use
49. artificial intelligence', *Forbes*, 8 March, <https://www.forbes.com/sites/neilsahota/2024/03/08/the-ai-takeover-in-cinema-how-movie-studios-use-artificial-intelligence/?sh=7c09a2d14a3f>. Accessed 23 April 2024.
- 50.
- 51.
52. Slatter, Sean (2023), 'Arti-visual intelligence', *Inside Film: IFFX*, 212, pp. 36–37.

- Spelthann, Volker and Haunschild, Axel (2011), 'Organizational creativity in heterarchies: The case of VFX production', *Creativity and Innovation Management*, 20:2, pp. 100–07.
- Vartiainen, Henrikka and Tedre, Matti (2023), 'Using artificial intelligence in craft education: Crafting with text-to-image generative models', *Digital Creativity*, 34:1, pp. 1–21.
- Venkatasawmy, Rama (2012), 'The evolution of VFX-intensive filmmaking in the 20th century Hollywood cinema: An historical overview', *TMC Academic Journal*, 6:2, pp. 17–31.

FURTHER READING

- McCarthy, John, Minsky, Marvin, Rochester, Nathaniel and Shannon, Claude E. (1955), 'A proposal for the Dartmouth summer research project on artificial intelligence', Stanford University, 31 August, <http://www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html>. Accessed 20 February 2023.

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33. A. D. Narayan, Duncan Caillard, Justin Matthews and Angelique Nairn have
 34. asserted their right under the Copyright, Designs and Patents Act, 1988, to
 35. be identified as the authors of this work in the format that was submitted to
 36. Intellect Ltd.
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