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ARTIFICIAL INTELLIGENCE: A NEW TREND IN VISUAL EFFECTS (VFX)

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ABSTRACT

Stories have been told by humans for many years. Stories that are written down or spoken can be imagined to a certain level, but visual effects (VFX) are needed to make an imagined story come to life through motion. When using Visual Effects (VFX) in a movie or other digital media, one can create or change the background, add actors, characters, or creatures, remove or cover objects and change the actors themselves.

In fact, there has been a noticeable advancement in the field of visual effects (VFX) due to artificial intelligence (AI), indicating a new trend in the sector. By streamlining procedures, offering insightful data, and opening up previously unexplored possibilities, artificial intelligence (AI) has the potential to completely transform a number of industries.

Although there are adjustments and fears associated with artificial intelligence's integration into the visual effects (VFX) industry, the effect on employment is a complicated matter that needs to be carefully considered. Even so, worries about job displacement are legitimate.

Looking to the future, Artificial Intelligence (AI) development is growing. Automated Rotoscoping and Masking, Facial Recognition and Animation (Deepfakes), Scene Reconstruction and Enhancement, Realistic CGI Characters, Content Creation and Augmentation, Predictive Analytics for Production Planning, Deep Learning for Image Processing, Real-time VFX, Customized Content Creation has brought significant advancements to the VFX industry.

This study explores the potential uses of Artificial Intelligence (AI) in the field of Visual Effects. How difficult or complex tasks will be completed in a different way to reduce production time and increase effectiveness or cost-effectiveness, with the possibility that the majority of the current visual effects workflows may eventually be replaced. Will it be possible for people outside of the Visual Effects industry to produce high-caliber film effects in the future if AI technology becomes more widely available? This investigation poses the following query: How will artificial intelligence affect the visual effects sector?

Keywords: Artificial Intelligence, CGI, VFX, Cinematic, Technology, Filmmaking, Indian Cinema, Digital Media

1. INTRODUCTION

In the field of visual effects (VFX), artificial intelligence has become a revolutionary trend thatis redefining how VFX artists create realistic and immersive imagery for movies, TV shows, and other media. AI tools for creating 2D images have advanced significantly over the past year, utilising platforms like Midjourney, Dall-e, and Lexica. AI has the potential to push the limits of creativity and realism in visual storytelling as it develops, ushering in a new era of innovation and opportunity for the VFX industry. The impact of artificial intelligence on the visual effects industry is covered in this research paper, Artificial Intelligence: A New Trend in Visual Effects (VFX).

2. LITERATURE REVIEW

Adee, S. (2020) explained that anyone in the world can be seamlessly inserted into a video or photo they never actually took part in thanks to deepfake technology. Machine learning is the primary component of deepfakes, enabling them to be produced at a lower costand much faster rate. An artist would first train a neural network on hours of real video footageof the subject to give it a realistic "understanding" of how the subject looks from various perspectives and in various lighting conditions before creating a deepfake video of the subject.The person would then be superimposed onto a different actor using computer graphics techniques combined with the trained network.

Anderson, M. (n.d.) (2019) analyzed new machine learning approaches are graduallyinvading the CGI workflows that have become established and that the industry might be aboutto witness a new "disruptive event." Techniques like Deepfakes, Environment and object generation, rotoscoping, machine learning and motion capture will change the phases of industry.

Failes, I. (2019) Artificial intelligence (A.I.) refers to the new generation of intelligentsoftware solutions in visual effects, computer graphics, and animation that rely on A.I.techniques. The terms machine learning, deep learning, and A.I. can be used interchangeably."Machine learning is making big inroads in accelerating all sorts of slow processes in visual effects," says Darren Hendler of Digital Domain. In the upcoming years, we should expect to see machine learning hair systems, muscle systems, and other systems. I truly believe that all of these machine learning capabilities will be useful in the future as extra tools for VFX artiststo refocus their skills on the finer points for even better final products.

Kaufman, D. (2019) According to Lyster, ILM is collaborating with Disney Researchto use artificial intelligence to reduce noise in ray-traced images, which will reduce CPU and render time. It will also look into methods for semi-automated face recognition and replacement, which could be a significant advancement. You can instruct the computer to automatically rotoscope while also searching for people.

Hodge, S. (2018) summarized Rotobot is able to calculate the approximate number of frames in which a class appears. You could also use this for green screen/blue screen garbage mattes. This could be computed automatically ahead of time for a series of images using chroma key.

Alexander, J. (2015) Director James Wan of Furious 7 chose to work with one of the top digital effects companies to digitally incorporate Paul Walker into the final scene of the film after Walker passed away in a horrific vehicle accident two years prior. The end result wasan incredible 350 computer-generated images of the actor combined with far-off views of his brother to finish the storyline of his Brian O'Connor character in the franchise.

Curtin, M., & Vanderhoef, J. (2015) On big-budget feature film releases, digital visual effects (VFX) now account for one-third of the entire production budget. Additionally, they account for a sizeable and expanding portion of the production budgets for ads and television shows. Nevertheless, despite VFX's growing prominence, this area of the media industry has been in turmoil for more than ten years. This turmoil is evident in the frequent waves of bankruptcies and layoffs that have occurred, most notably Rhythm & Hues, the company that won the 2013 Oscar for VFX in Life of Pi. The VFX industry's increasingly globalised mode of production was examined in this essay. They demonstrated the effects of the VFX industry's particular practices and protocols on labourers and labor-organizing initiatives by critically analysing them.

3. OBJECTIVES OF STUDY

1. To study the trend of Artificial Intelligence and technology in Visual Effects
2. To analyze the impact of Artificial Intelligence on Visual Effects Industry

4. RESEARCH METHODOLOGY

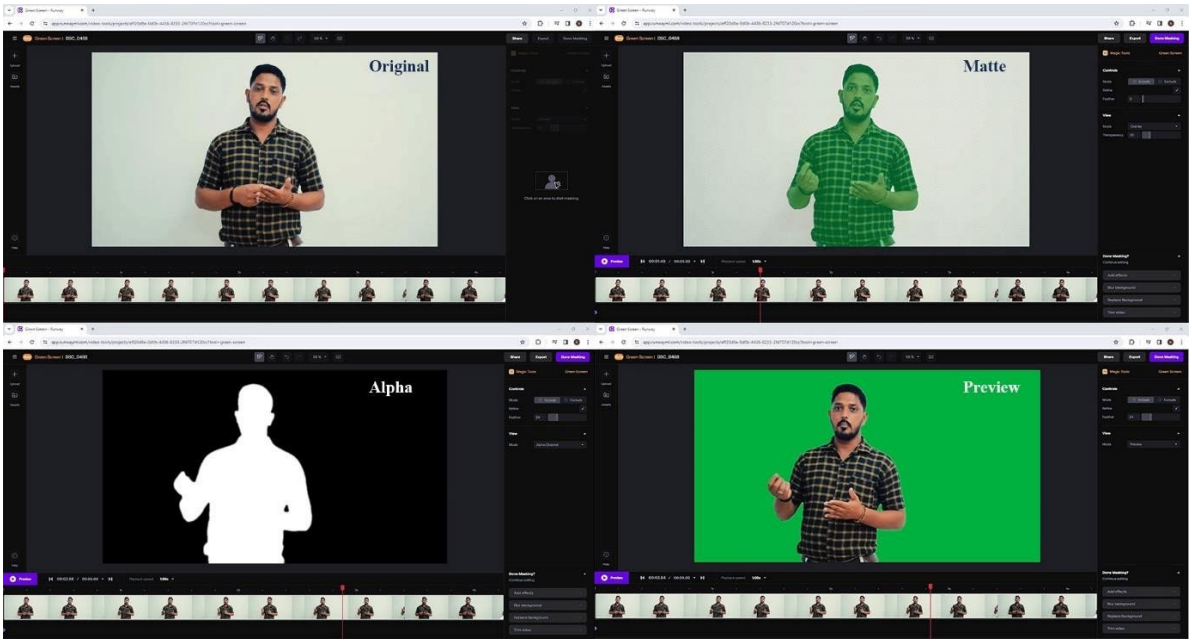
The objective of the current study is to gain more knowledge about the relationship between Artificial Intelligence (AI) and Visual Effects (VFX), including the potential for AI toeventually replace Visual Effects (VFX) artists in the industry as well as the positive and negative effects AI may have on VFX. Consequently, the researcher has amassed dataregarding these inquiries from an assortment of publications, periodicals, articles, and webpages. The present research has been conducted through secondary data analysis. Both descriptive (using already-existing data and analysing it to create a critical opinion) and analytical (finding facts) research have been employed.

5. ANALYSIS & INTERPRETATION

A. AI TREND AND TECHNOLOGY IN VIUAL EFFECTS

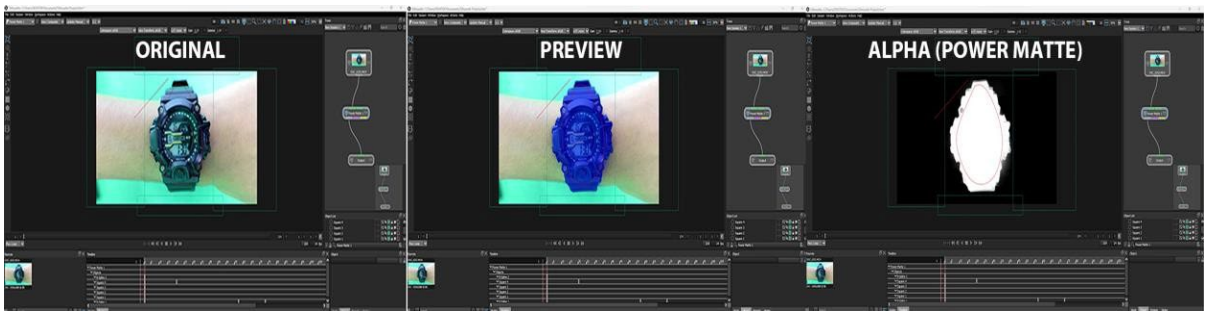
AI Autonomous Rotoscoping: Since 1917, rotoscoping has been used in animation and visual effects to produce mattes that are then composited over a background with live- action elements. These days, most rotoscoping is done digitally with applications like Nuke, Silhouette, and After Effects. As technology develops, it's utilised for colour grading, rig removal, computer-generated elements, set extensions, and reflection removal. By automatingthe labor-intensive process of rotoscoping, which artists manually trace in each frame, artificial intelligence has completely transformed the visual effects industry. In the modern era, a personcan create digital video content to the best of their ability using a variety of AI tools. If you know even a little bit about this, you can use websites like Runway to automate rotation.

Figure 1: AI Autonomous Rotoscoping



The video Below was captured captured at 50 frames per second with 1920 x 1080 pixels as the resolution. This footage was imported into the Runway online platformto verify AI rotoscoping, and with just one click, the footage's alpha was generated. Professional satisfaction in this process won't be that high because there will be someflicker in the precise roto that needs to be manually adjusted. Social media platforms canbenefit from the creation of digital video content.Figure 1: AI Autonomous Rotoscoping Source – Image generates by Researcher from Runway With features for excellent mattes and masks, Silhouette is a rotoscoping, compositing,and visual effects software. An interactive AI tool for image matting that calculates transparency value is called Power Matte.

Figure 2: Silhouette software AI Power matte



Source – Image generates by Researcher from Silhouette

The video above was captured at a frame rate of 29 frames per second with a resolution of 1920by 1080. This footage was imported into the Silhouette software to check the AI Power matte.A power matte node was applied to the footage, and then basic roto prep was done to separate

the foreground from the background and create an alpha matte. When it comes to output, rotoscoping is a laborious process that must be carried out frame by frame. However, with thehelp of AI autonoums tools, this work is becoming somewhat easier, though it will still requiremanual adjustments to achieve a perfect result. In a similar vein, AI copycat automation nodesare also present in nuclear software.

Deepfakes: A Reddit user invented the media modification technique known as"deepfakes" in 2017 by replacing the faces of pornographic performers with actresses using Google's open-source deeplearning library. Using AI networks, this technology can replace non-participating individuals in captured images or videos. As Paul Walker from Fast & Furious 7 shows, artificial intelligence (AI) machine learning is frequently used in movies fordeepfakes, which replace character faces more affordably than more conventional techniques like computer-generated imagery.

Figure 3: AI Deepfake

Source – Image generates by Researcher from Akool

This video above was captured at 25 frames per second with 1920 x 1080 pixels as the resolution. This video was imported into the Akool online platform to verify AI Deepfake, andwith just one click, the Deepfake video was created. Despite the fact that all of these platformsmake the claim to be open source, using these apps requires payment and credit. Severalplatforms, including faceswap, faceswapper.ai, and DeepFaceLab 2.0, are mentioned here.

Deepfake's futuristic approach suggests that Double Role can benefit from this technique. Motion Control, Rotoscoping, Match Moving, Compositing, and Colour Grading are employedin Double Role technique, which is a time-consuming process. Many complicated processes can be made simpler if deepfake technique is developed more effectively, such as match moving.

Image Reconstruction and Enhancement: A software or application known as an AI photo restorer uses artificial intelligence algorithms to improve and repair old or damaged photos. Typically, these tools use a variety of techniques, including batch processing, automatic restoration, colorization, noise reduction, scratch and dust removal, and detail enhancement. The Content-Aware Fill function in Adobe Photoshop, Remini, and other internet services arewell-known AI photo restoration tools.

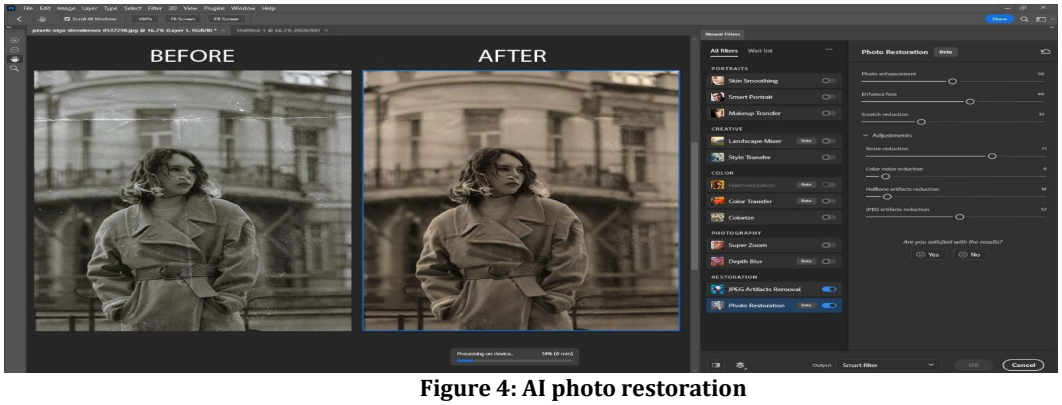


Figure 4: AI photo restoration

Source – Image generates by Researcher from Photoshop

Figure 5: AI photo restoration

Source – Image generates by Researcher from Photoshop

the above images generated In Adobe Photoshop version 2023, "Neural Filters" is a feature that leverages artificial intelligence (AI) and machine learning technology to perform various image editing tasks. Neural Filters can be used to apply effects, enhancements, and adjustmentsto images with more precision and control than traditional editing tools.

Realistic CGI Characters: The need for 3D models has increased due to the boom in 3D interactive content, particularly in the gaming, movie, and XR sectors. While inexperienced creators have difficulty using sophisticated tools like Blender or Maya, expert creators must endure long production times. A solution is necessary to close this gap, which is exacerbated by complexity and cost barriers. Solutions for tasks like 3D modelling, facial expression and animation, rigging and animation, texturing and shading, and facial animation are being offeredby AI. Realistic CGI character creation can be aided by a number of AI-driven tools and methods, which include:

- Meshy is a quick 3D generative AI that enables content producers to quickly turn text and pictures into engrossing 3D models. Meshy-1 offers three user- friendly modes.

Text to 3D	Image to 3D	Text to Texture

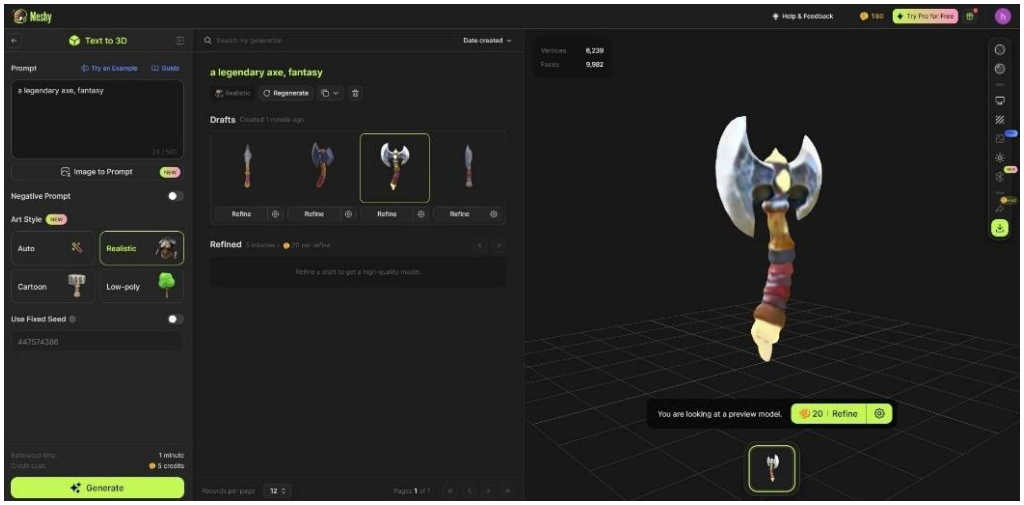


Figure 6: AI photo restoration

Source: Image generates by Researcher from Meshy

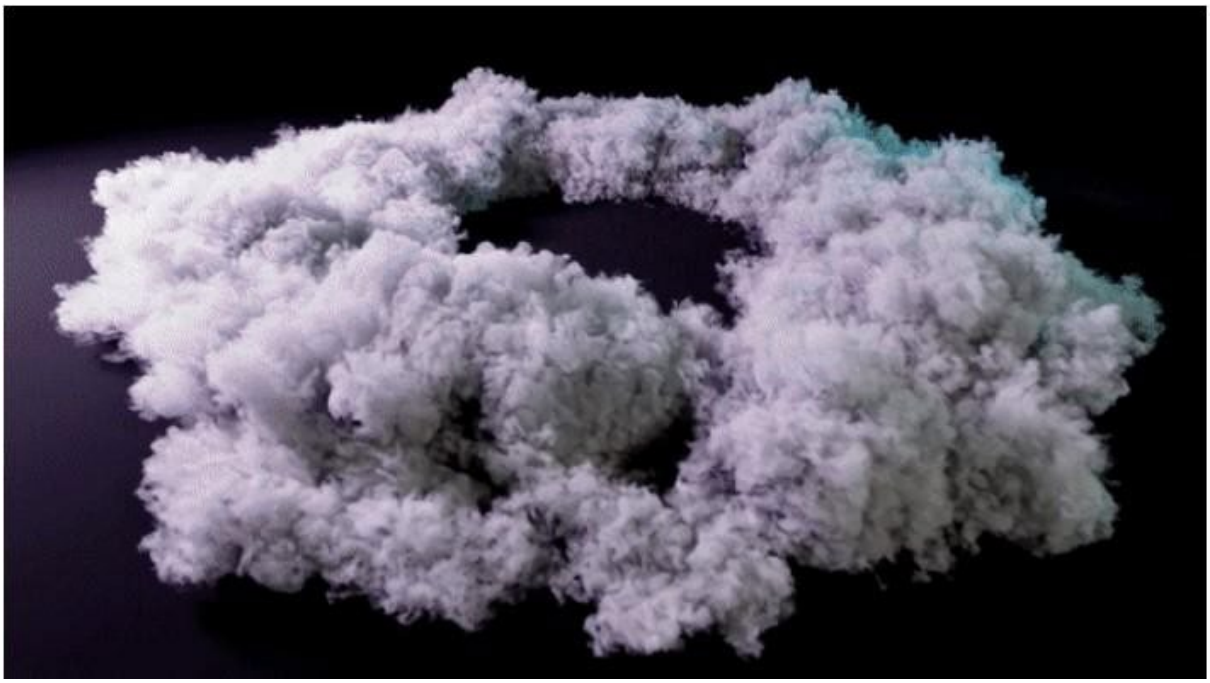
the above images generated in Meshy 3D AI Generator from Text to 3D by simply type “alegendary axe, fantasy”

- Generative Adversarial Networks (GANs): Using training data, GANs can produce realistic textures, facial features, and whole character designs.
- Deep Learning for Animation: Naturalistic animations and movements for computer-generated imagery (CGI)

characters can be produced with the help ofdeep learning models trained on motion capture data.

Real-Time VFX: Real-time visual effects are created in a variety of interactive mediathrough the use of several AI-driven tools and technologies. AI-powered physics simulation engines, like NVIDIA's PhysX, simulate realistic physics interactions in real-time by predicting the behaviour of dynamic objects through machine learning algorithms. With the help of these engines, game, VR, and AR developers can create immersive environments with realistic object interactions, fluid dynamics, and particleeffects.

Figure 7: AI-powered physics simulation engines



Source: https://developer.nvidia.com/physx-sdk

These illustrations demonstrate how artificial intelligence (AI) has the ability tomodify or eliminate labor-intensive and uninspired visual effects production processes,leaving behind a more dependable toolkit with the potential to significantly reduce labour and time requirements.

6. IMPACT OF ARTIFICIAL INTELLIGENCE ON VISUAL EFFECTS INDUSTRY

AI tools for creating 2D images have advanced significantly over the past year, utilising platforms like Dall-e, Midjourney, and Stable Diffusion. In a matter of seconds, these text-to-image AI tools convert text prompts into intricate imagery. Production companies are lookingahead to 2024 and see that the integration of visual effects (VFX) and artificial intelligence (AI) will play a significant role in the ongoing transformation of the film industry. We can anticipate that AI will play an even bigger part in visual effects as the field develops. Even though AI has already been used in some amazing ways, the journey is far from over. With artificial intelligence (AI) poised to transform the visual effects sector and produce morevisually spectacular and immersive film experiences, the future is full of exciting possibilities. But rather than taking the place of artists in VFX, AI's role is to provide them with more advanced tools.

In addition, AI will soon cause rendering to become faster and more effective. Technology is becoming more and more integrated into the film industry, and we have to recognise how much computing power it requires.

7. FINDINGS

1. Enhanced Efficiency: Artificial intelligence (AI) can help visual effects (VFX) companies optimise their workflows, cut down on the time needed to finish tasks, and ultimately boost efficiency. VFX artists' workloads can be lowered and time saved by using AI-powered software to automate processes rotoscoping.
2. Better Quality: AI technology can also make VFX better. Artificial intelligence (AI) can analyse and comprehend complex visual data using machine learning algorithms, then modify the image or video as necessary. VFX artists may

use this to produce effectsthat are more realistic and eye-catching.

3. Cost Reduction: VFX companies can experience long-term cost savings by implementing AI technology. VFX artists can concentrate on more intricate and creative work, leading to higher-quality output, by automating some tasks. AI-powered softwarecan also lessen the need for manual labour, which saves overhead for visual effects companies.
4. Job Losses: The possibility of job losses as AI takes over the VFX industry is one of the main worries. Artificial intelligence (AI) has the potential to completely replace some jobs while also making VFX artists' jobs easier. Software that can automate motion tracking or rotoscoping, for instance, can replace the need for certain VFX tasks.
5. Over-reliance on Technology: The possibility of an excessive reliance on technology isanother issue with AI taking over the visual effects sector. Artificial intelligence (AI) isa valuable tool, but it shouldn't completely replace human creativity. An over-relianceon AI may hinder innovation and hinder the creative process.
6. Lack of Human Touch: It can be challenging for AI to imitate the distinct viewpoint and artistic touch that VFX artists bring to their work. Artificial intelligence (AI) lacksthe human intuition and touch, even though it can assist in automating some processes.

8. RECOMMENDATIONS

VFX companies can fully realise the potential of this exciting technology while preserving thehuman touch that makes VFX so distinctive by striking a balance between AI and human creativity. How should VFX artists adapt in light of AI's quick development to preserve their value? The following viewpoints offer guidance on effectively adjusting to incorporate new technologies: AI as a tool to help creatives The fundamental human abilities of creativity, problem-solving, and teamwork must change such that AI is seen as a potent toolkit rather thana replacement.

Grow with the technology: Rather than being replaced by it, artists should actively learnnew AI-enabled workflows to optimise its benefits. Concentrate on higher-value tasks: By using AI to automate tasks of lesser complexity, more time can be allotted to high-level creativechallenges that can only be solved by humans. Use hybrid thinking: Innovation will come fromcombining the complementary advantages of data-driven AI with emotion-driven human intelligence. VFX artists can keep creating amazing visual experiences that resonate with people by actively defining their place in an AI-assisted future as opposed to fighting against change.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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