Democratizing Creative Participation and Collaboration in Virtual Film Productions with AI Visualizations

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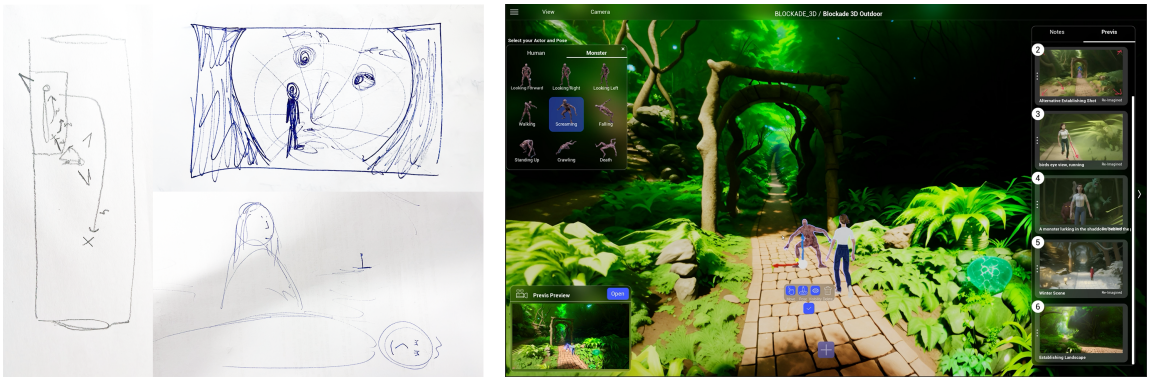

Fig. 1. Comparison of visual fidelity and clarity between traditional and AI-based visual communication aids. **Left:** Project sketches provided by a director questioned in our study; **Right:** Our tool that leverages AI-environments and accessible UI to provide previsulazations.

This paper explores how AI can enhance inter-human collaboration in creative workflows rather than merely automating tasks. In virtual film production, AI-generated visualizations democratize participation by improving interdisciplinary communication and breaking down hierarchical decision-making. Drawing on insights from industry professionals, we examine AI's role in previsualization and its implications for HCI. We argue that AI should function as an interactive system that fosters shared understanding and inclusive collaboration. Our research highlights AI's potential to increase accessibility in filmmaking, balancing standardization with creative freedom to support participatory and adaptive creative processes.

CCS Concepts: • **Computing methodologies** → **Artificial intelligence**; **Computer graphics**; • **Applied computing** → **Media arts**; • **Human-centered computing** → **Collaborative interaction**.

Additional Key Words and Phrases: Generative AI, democratization of filmmaking, virtual production, creative collaboration, previsualization, interdisciplinary communication, human-AI interaction, AI in media production, participatory filmmaking

1 Introduction

Filmmaking is inherently interdisciplinary, requiring collaboration across directors, cinematographers, VFX artists, and screenwriters. While previsualization has traditionally been dominated by technically skilled users, effective creative participation also relies on strong communication skills, as non-technical contributors must articulate creative intent to bridge disciplinary gaps. This has reinforced hierarchical structures, where only those with advanced artistic or technical expertise have been able to shape visual storytelling.

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Recent advancements in generative AI challenge this exclusivity by making visual development more accessible. While often framed as a human-AI collaboration tool, AI's impact on inter-human collaboration remains underexplored. This paper shifts focus from AI as a content generator to AI as a collaborative enabler, examining how AI tools facilitate interdisciplinary communication and democratize virtual film production (VP).

Insights from an earlier study on AI-generated environments in VP with 15 film industry professionals inspired this paper, revealing that beyond AI's role in creative workflows, its potential to facilitate inter-human collaboration was a recurring theme. Filmmakers emphasized the need for AI tools that enhance communication, align creative visions, and foster inclusivity in filmmaking. This paper examines how AI challenges hierarchical workflows, supports diverse creative voices, and creates more inclusive filmmaking processes. We explore how AI-generated visualizations function as shared creative references and raise key HCI questions on designing AI to support collaboration rather than automation, ensuring accessibility and human agency in creative workflows.

2 Background

2.1 Traditional Barriers to Creative Participation

Previsualization (previz) plays a crucial role in VP, a filmmaking approach that integrates digital elements with real scenarios in real-time. It allows filmmakers to visualize scenes before physical production, enhances decision-making and shot planning [7]. Concept development and previz traditionally involved complex 3D tools that are not specifically designed for the previs process, making it challenging for creative professionals without technical expertise to engage effectively in creative decision-making. This complexity has historically limited the involvement of screenwriters, producers, and independent filmmakers in the early stages of visual development[10, 12]. Previs tools are becoming increasingly more easy to use [11, 12] and with AI becoming capable of automated scene population with assets [22] and even generating 3D content via prompts [4, 9, 13, 19] could become even more accessible.

2.2 AI and Creative Workflows

Human-AI co-creation is an emerging paradigm shift, democratizing access to creative tools and reshaping how humans approach creative tasks [18]. This collaboration moves beyond viewing AI as a mere tool, recognizing it as a creative partner that augments human capabilities by enhancing creative output, improving efficiency, and automating repetitive tasks [18, 23]. AI fosters combinatorial, exploratory, and transformational creativity by offering diverse perspectives [8, 16]. Techniques such as differentiated search and prompt engineering enable AI models to explore broader solution spaces, assisting in ideation and allowing users to reinterpret their designs in novel contexts [2]. However, AI must be integrated thoughtfully to ensure it enhances, rather than diminishes, human creative motivation and agency [21].

As discussed above, generative AI is often framed as a human-like collaborator, but its more significant role is as a facilitator of collaboration between people. By generating visual references, AI serves as a common ground for discussion, reducing ambiguity and allowing creative teams to converge on shared ideas more efficiently. While the integration of AI in human-human collaborative ideation has been explored in a workshop by Shin et al. [17], this area remains largely underexplored, particularly regarding specific applications and tasks beyond initial ideation.

3 Observational Findings on Interdisciplinary Communication

This study emerged from a broader investigation into AI-generated environments VP that initially focused on technical quality. However, remarks from 15 film industry professionals (directors, screenwriters, producers, cinematographers,

VFX artists, and post-production experts) revealed how AI tools could enhance inter-human collaboration. A user-friendly prototype demonstrated that AI-generated visualizations allow each discipline to imagine scene composition and mood more concretely, reducing misunderstandings and supporting a shared creative vision.

While participants did not work in teams during the study, they discussed how AI could help align creative visions across disciplines, particularly among directors, cinematographers, and VFX artists, by providing a common visual reference. For example, a director noted that AI-generated environments could help them articulate scene compositions, course of action and moods much more effectively to their team than the rough hand-drawn sketches or verbal descriptions usually used (see Figure 1). AI-generated images could offer concrete visualizations, reducing misunderstandings and enabling more effective collaboration. This aligns with linguistic alignment concepts in creative collaboration, which help teams establish shared understanding [3, 5]. Several filmmakers emphasized that AI-generated visuals could serve as a starting point for creative dialogue, not fixed design choices, helping to refine artistic intent while maintaining flexibility in decision-making.

Participants also noted that AI-generated previsualization tools could enable screenwriters and producers to engage in previs, a stage where they are typically excluded due to a lack of technical training. Screenwriters especially liked the idea of being able to better convey what they had in mind during writing and even considered using AI visualization to support the writing process. This suggests a democratization of visual storytelling, allowing more voices to shape early-stage creative decisions. Additionally, AI has the potential to mediate unequal power dynamics [15] that hinder true co-creation by amplifying peripheral voices [6] and fostering social empathy [14, 20].

4 Discussion

4.1 Implications for HCI and AI-Tools for Filmmaking Collaboration

Our findings suggest that AI tools in filmmaking should be designed not just as content generators but as mediators in human collaboration, helping teams align creative visions. Future HCI research should explore AI interfaces that facilitate real-time, interactive collaboration, ensuring that AI-generated previsualization supports communication between disciplines rather than replacing human decision-making. Currently, AI tools cater primarily to technical roles such as VFX artists and cinematographers. However, a significant opportunity lies in redesigning AI to support low-tech participants—including screenwriters, producers, and independent creators. To make AI-generated content more useful across disciplines, tools could provide role-specific recommendations. Further research could investigate how AI-generated previs could be contextualized for different filmmaking roles, ensuring that AI acts as a collaborative aid rather than a rigid template. Additionally, AI-HCI design could incorporate new features to enhance interdisciplinary collaboration. Real-time multi-user editing, similar to collaborative writing tools, could allow multiple team members to interact with AI-generated visuals simultaneously. Annotation-based feedback mechanisms would enable teams to collectively refine creative intent, while iterative feedback loops could ensure AI adapts dynamically to the evolving needs of a project rather than providing a one-size-fits-all solution.

4.2 Impact on Filmmaking Workflows

Our findings highlight a shift in filmmaking workflows from hierarchical, top-down structures to more participatory processes where AI fosters earlier visual feedback loops and broader creative input. Traditionally, directors dictate the vision while other departments execute it, but AI tools could disrupt this model by integrating previsualization earlier in the process, during scriptwriting, pitch sessions, or moodboarding, so that screenwriters and producers can more

concretely shape ideas. This raises questions about how AI can support storyboarding, scene blocking, and composition without requiring advanced technical skills. By democratizing visualization, AI empowers a wider range of storytellers, ultimately making filmmaking more inclusive and participatory.

4.3 Addressing the Limitations of AI as a Mediator

While AI offers new opportunities for creative collaboration, it also presents potential risks and limitations. One key concern is the balance between standardization and creative freedom. Because AI-generated visuals are often trained on existing datasets, there is a risk of reinforcing familiar visual tropes and leading to aesthetic homogenization. Future research should explore how AI can be customized to support and create diverse artistic styles rather than defaulting to mainstream cinematic aesthetics. Additionally, ethical concerns arise in AI-assisted collaboration. If AI learns from dominant cinematic trends, whose creative vision is being amplified? Could AI unintentionally limit creative risk-taking by suggesting prevalent rather than experimental visual styles? Designing AI tools that acknowledge and adapt to different cultural aesthetics is crucial to ensuring inclusivity. Another potential issue is over-reliance on AI in decision-making. AI-generated content may become a default authority, discouraging filmmakers from experimenting beyond their first AI-generated option. Future AI tools should be designed to encourage iteration and creative exploration, ensuring that users remain in control of the decision-making process rather than passively accepting AI-generated outputs.
Moving toward real-world implementations, we must investigate how AI can best facilitate interdisciplinary collaboration in filmmaking. This includes studying AI-assisted teamwork in practical production environments, exploring how AI-generated previs can be tailored to different creative styles, and addressing ethical concerns related to authorship and aesthetic diversity. Advancing these areas will help refine AI tools to enhance creativity while ensuring artistic control remains in human hands.

5 Conclusion

AI is not merely an automation tool in filmmaking, but also a catalyst for expanding creative participation. By enhancing inter-human collaboration through visualization, AI fosters interdisciplinary dialogue, lowers technical barriers, and enables more voices to contribute to cinematic storytelling. Just as YouTube revolutionized content creation [1], AI in virtual film production has the potential to democratize filmmaking, empowering a new generation of storytellers who previously lacked access to industry-standard tools. By prioritizing iterative feedback, inclusivity, and human creative agency, AI can serve as an enabler of artistic expression rather than a constraint. Its thoughtful integration into film production will shape a future where creativity is not limited by technical expertise but instead supported by AI-driven collaboration and accessibility.

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