
A Survey of Generative AI in Visual Storytelling and Multimedia Content Creation

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Abstract

This survey paper explores the transformative potential of generative AI in visual storytelling and multimedia content creation, highlighting its capacity to autonomously generate and synthesize engaging narratives across various media formats. Central to this transformation are advanced models like Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and diffusion models, which facilitate the integration of multimodal elements in storytelling. The paper systematically organizes the exploration of these technologies, examining their applications in narrative and artistic creation, interactive and immersive storytelling, and their impact on sectors like education, gaming, and marketing. Despite the promising advancements, challenges such as biases, ethical concerns, and copyright issues persist, necessitating the development of comprehensive ethical and regulatory frameworks. The survey emphasizes the need for interdisciplinary collaboration to address these challenges and to harness the full potential of generative AI responsibly. Future directions include enhancing AI-assisted creativity, integrating AI into creative workflows, and developing robust moderation strategies to ensure the responsible use of AI technologies. By addressing these challenges, generative AI can significantly enhance creativity, operational efficiency, and engagement across diverse media formats, reshaping the landscape of storytelling.

1 Introduction

1.1 Overview of Generative AI in Storytelling

Generative AI is revolutionizing storytelling by enabling the creation of content across various media formats—text, images, and video—at unprecedented scales and reduced costs [1]. This shift is facilitated by advanced AI models such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), which integrate multimodal elements to produce coherent and engaging narratives [2]. These technologies enhance storytelling experiences, fostering user engagement through interactive and immersive narratives.

A key application of generative AI is automated visual story generation, which produces stories with illustrations that maintain coherence and emotional development [3]. The role of large language models emphasizes the significance of effective prompting for generating meaningful narratives [4]. Furthermore, advancements in text-to-image diffusion models address knowledge gaps, opening new avenues for text-to-image generation [5].

In educational contexts, generative AI provides tools that inspire creativity and facilitate rapid prototyping, enhancing problem-solving skills [6]. In journalism, it transforms content creation and dissemination practices, redefining traditional workflows [7]. Despite its creative potential, generative AI's reliance on existing data and human intentions often constrains its scope [8].

The evolution of generative AI in storytelling lowers barriers in fields like education and computational social science, offering accessible content creation tools [9]. The competition between human creators and generative AI on content platforms necessitates strategic considerations to leverage the benefits

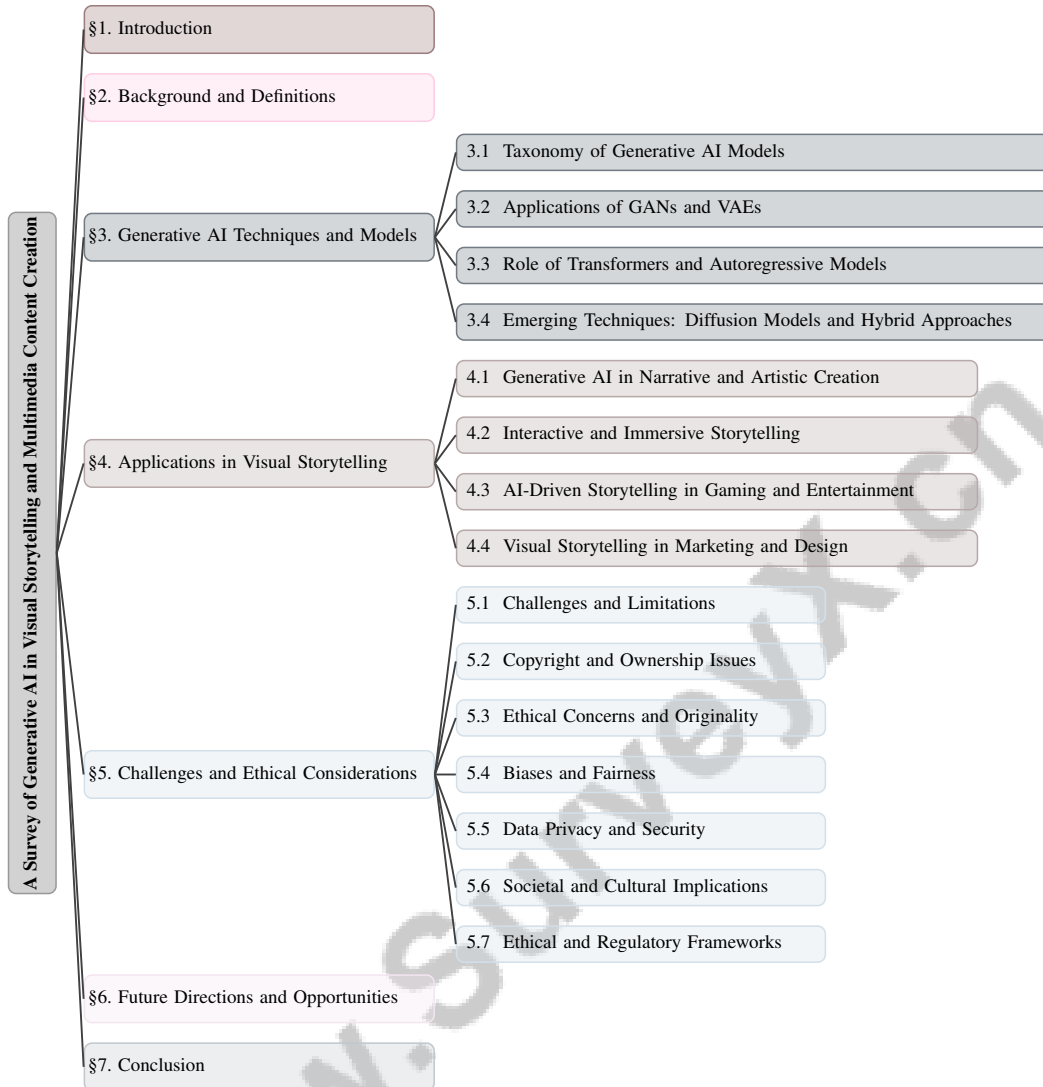


Figure 1: chapter structure

of these technologies while addressing associated challenges [10]. Generative AI thus presents unprecedented opportunities for creativity and engagement across diverse media formats, reshaping the future of storytelling.

1.2 Significance and Impact

Generative AI technologies are significantly altering storytelling and multimedia content creation, introducing new creative possibilities while prompting a reevaluation of existing paradigms. This technology reshapes supply and demand dynamics on content platforms, potentially leading to oversupply and information overload [1]. The transformative potential of generative AI enhances the creative process, allowing users to co-create visual stories that foster creativity and personalization, resulting in more engaging narratives [3].

The interaction with outputs from modern generative AI models involves aesthetic judgments similar to those used in interpreting artwork, indicating a profound impact on audience engagement with AI-generated content [11]. However, the rapid and cost-effective content generation capabilities of generative AI challenge human creators, necessitating strategic adaptations to maintain relevance in a changing creative landscape [10].

Concerns regarding the misuse of generative AI for manipulation, fraud, and harassment raise significant ethical and societal issues [12]. These challenges underscore the need for ongoing research to enhance model fairness and interpretability, ensuring responsible harnessing of generative AI's transformative potential [13]. The impact of generative AI on human capital and skill valuation raises critical questions as traditional creative roles evolve [14].

In education, generative AI tools can enhance learning experiences by improving efficiency and deepening understanding of programming concepts when integrated thoughtfully [15]. This integration must be managed carefully to address ethical concerns and uphold academic integrity. As generative AI democratizes access to computational tools, it empowers a broader range of individuals to engage in advanced research and creative endeavors, illustrating its extensive impact across various domains.

1.3 Structure of the Survey

This survey is systematically organized to provide a comprehensive exploration of generative AI in visual storytelling and multimedia content creation. The paper commences with an **Introduction**, outlining the transformative capabilities of generative AI technologies in storytelling and their significance across media formats. The subsequent section, **Background and Definitions**, delves into foundational concepts and the evolution of generative AI, clarifying key terms such as generative visual intelligence and narrative generation.

The section on **Generative AI Techniques and Models** examines various AI models and techniques used in generative storytelling, including a taxonomy of models, applications of GANs and VAEs, and the roles of transformers and autoregressive models. Emerging techniques like diffusion models and hybrid approaches are also discussed to highlight advancements in the field.

In **Applications in Visual Storytelling**, the survey investigates practical applications of generative AI in creating visual narratives, covering its use in narrative and artistic creation, interactive storytelling, and its influence in gaming and entertainment. The role of generative AI in marketing and design is explored, emphasizing its impact on visual storytelling.

The section on **Challenges and Ethical Considerations** addresses various challenges and ethical issues associated with AI-generated storytelling, including limitations of current technologies, copyright and ownership concerns, originality, biases and fairness, data privacy and security, societal implications, and the need for ethical frameworks.

Finally, the paper concludes with **Future Directions and Opportunities**, identifying potential developments and opportunities in generative AI for storytelling. This section discusses trends and innovations, frameworks for AI-assisted creativity, integration of AI in creative workflows, and strategies for addressing challenges and ethical concerns, providing a forward-looking perspective on the evolving landscape of generative AI in storytelling. The following sections are organized as shown in Figure 1.

2 Background and Definitions

2.1 Defining Generative AI and Key Concepts

Generative AI represents a transformative shift in content creation, autonomously generating creative outputs across text, images, and video through advanced models like Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and autoregressive models [13]. This technology disrupts traditional market dynamics by introducing infinite supply elasticity and influencing user utility, potentially leading to information overload [1]. In sectors such as gaming and marketing, narrative generation stands as a key application, exemplified by the Visual Story Co-creation Pipeline (VSP), which merges narrative generation with image creation based on user-defined keywords and emotions [3]. Effective prompt literacy is crucial, as user interactions with generative AI systems depend on precise prompt usage to achieve desired narrative outcomes [15].

Generative visual intelligence focuses on creating and manipulating visual content, particularly in contexts with limited real data, transforming education by generating customized educational materials and converting textual descriptions into high-quality visuals [11]. Despite its transformative potential, challenges remain in accurately interpreting and visualizing complex ideas [14]. The ethical and societal implications are significant, as generative AI blurs the distinction between

human creativity and AI-generated outputs, reflecting broader cultural conditions [11]. As generative AI reshapes educational practices, its outputs often lack genuine creativity and originality, being derivative of existing data, underscoring the need for ongoing research to enhance its creative potential while addressing ethical challenges [16]. The interplay between generative AI and human creativity continues to evolve, presenting both opportunities and challenges across diverse domains.

2.2 Technological Evolution and Advancements

Generative AI’s advancement in storytelling is marked by significant technological progress, broadening its applications across various media formats. The shift from symbolic planning to deep learning paradigms has been pivotal in developing models capable of generating high-quality content in art, music, and code [17]. This transition facilitates seamless storytelling integration with advanced AI technologies, notably in Augmented Reality (AR), where Artificial Intelligence-Generated Content (AIGC) crafts immersive narratives [18]. Key model types include VAEs, GANs, Transformers, and Autoregressive Models, each contributing uniquely to storytelling; GANs and VAEs are essential for producing high-quality visual content [19]. These models encode and decode complex data structures, integrating multimodal elements in narrative creation.

Recent developments include diffusion models, such as pixel space models like GLIDE and Imagen, and latent space models like Stable Diffusion and DALL-E 2, enhancing AI-generated narrative quality by addressing contextual relationships and event sparsity [20]. The evolution of prompting techniques highlights the importance of effective prompt engineering in generative AI art [4]. Challenges persist, such as computational difficulties in determining optimal strategies for human content creators in time-sensitive domains [10], potential diminishment of creative skills among developers, and biases in AI outputs [21]. The rapid evolution of text-to-image generation technology, coupled with models’ generalization capabilities and resilience to adversarial attacks, complicates the landscape.

Unrestricted content sharing on platforms like Civitai presents challenges in moderating abusive content, necessitating effective content moderation strategies [16]. As generative AI evolves, its storytelling applications are set to expand, offering novel opportunities for creative expression while requiring ethical considerations and strategic adaptations in implementation. Ongoing advancements promise further transformation of the storytelling landscape, enabling immersive, engaging, and culturally rich narratives.

3 Generative AI Techniques and Models

Category	Feature	Method
Taxonomy of Generative AI Models	Narrative Structuring User-Driven Storytelling Content Enhancement Strategies	PWF[22], C2PO[23] N/A[24] DCM[10]
Applications of GANs and VAEs	Visual Content Synthesis Presentation Enhancement Design Translation	I2P-GAN[25], ViT-Story[26] GenAI-VE[27] BiSECT[28]
Role of Transformers and Autoregressive Models	Narrative Structuring User-Centric Personalization	PANGeA[29], PM[30], E2E[31] ASVR[32]
Emerging Techniques: Diffusion Models and Hybrid Approaches	Legal and Ethical Considerations	SRS[33]

Table 1: This table provides a comprehensive overview of the taxonomy and applications of various generative AI models in storytelling. It categorizes models such as Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Transformers, and Diffusion Models, highlighting their unique features, methods, and applications in narrative creation. The table also emphasizes the emerging techniques and ethical considerations crucial for the effective integration of these models into creative processes.

Table 4 offers a structured comparison of key generative AI models, elucidating their distinctive features and contributions to storytelling. Exploring generative AI techniques and models necessitates an understanding of the frameworks that support their application in storytelling. This section provides a taxonomy of generative AI models, emphasizing their unique characteristics and contributions to narrative creation. By categorizing these models, we gain insights into how they facilitate the generation of compelling stories across various media formats, paving the way for a deeper examination of their functionalities and implications in creative expression. As illustrated in Figure 2, the hierarchical structure of generative AI techniques and models is categorized into key

models, applications, and emerging techniques. This taxonomy highlights the diverse capabilities of generative AI in storytelling, focusing on Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Transformers, and Diffusion Models. Table 1 systematically categorizes generative AI models, elucidating their roles and applications in storytelling across different media formats. It emphasizes their applications in content generation across various media formats and explores advanced methodologies like hybrid approaches for immersive narrative creation. The figure underscores the transformative potential of these models in enhancing human creativity and the importance of ethical considerations in AI-driven storytelling.

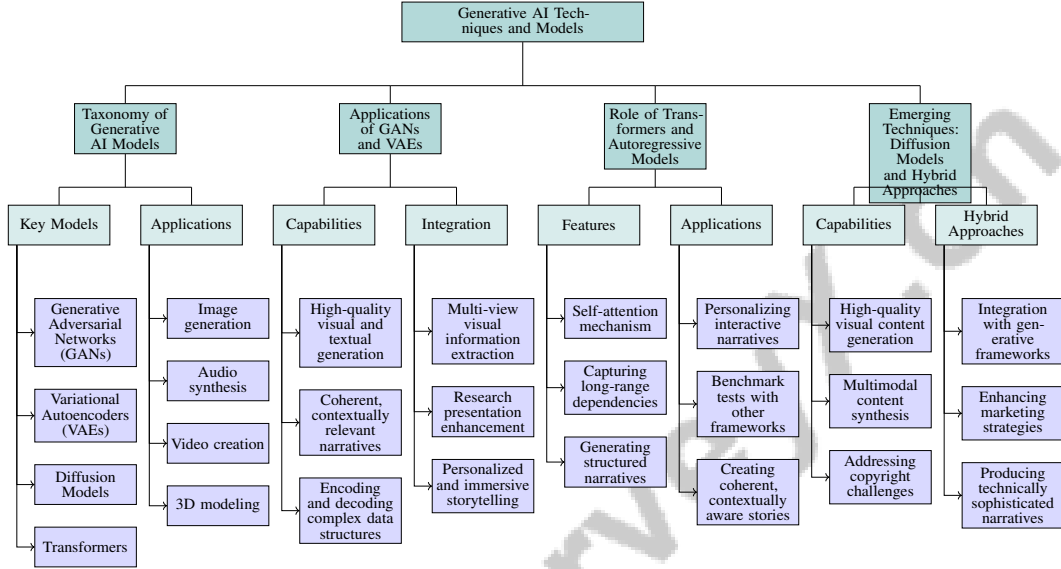


Figure 2: This figure illustrates the hierarchical structure of generative AI techniques and models, categorized into key models, applications, and emerging techniques. The taxonomy highlights the diverse capabilities of generative AI in storytelling, focusing on GANs, VAEs, Transformers, and Diffusion Models. It emphasizes their applications in content generation across various media formats and explores advanced methodologies like hybrid approaches for immersive narrative creation. The figure underscores the transformative potential of these models in enhancing human creativity and the importance of ethical considerations in AI-driven storytelling.

3.1 Taxonomy of Generative AI Models

Method Name	Model Types	Application Areas	Narrative Enhancement
PWF[22]	Transformers	Story Generation	Plot Infilling
PM[30]	Neural Narrative Model	Story Generation	Plot State Tracking
N/A[24]	Generative AI	Visual Storytelling	Interactive Co-creation
C2PO[23]	-	Narrative Generation	Plot Infilling
DCM[10]	-	Content Creation	Plot Infilling

Table 2: Overview of generative AI models and their application in narrative enhancement. The table categorizes various methods by model type, application area, and specific narrative enhancement techniques, illustrating the diverse strategies employed in AI-driven storytelling.

Table 2 provides a comprehensive taxonomy of generative AI models, highlighting their roles and contributions to narrative generation and enhancement. The taxonomy of generative AI models in storytelling encompasses a variety of frameworks and methodologies, each contributing uniquely to narrative creation. Key models include Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Diffusion Models, and Transformers, all distinguished by their capabilities in generating and enhancing storytelling content. These models support applications in image generation, audio synthesis, video creation, and 3D modeling, enriching visual storytelling [34].

GANs are recognized for producing high-quality visual content crucial for visual storytelling, generating realistic images that enhance narrative engagement [35]. VAEs excel in encoding and decoding

complex data structures, facilitating the creation of diverse story elements [36]. Diffusion models address challenges like contextual relationship modeling and event sparsity, improving the coherence and quality of narratives [20].

Transformers, particularly Large Language Models (LLMs), have transformed narrative generation through their proficiency in processing and generating text with fluency and contextual awareness. Hierarchical frameworks, such as the Plan-and-Write Framework (PWF), enhance narrative coherence by planning storylines before generation [22]. Neural narrative models like PLOT MACHINES dynamically track plot states and discourse structures, ensuring coherent stories from outlines [30].

Innovative methodologies like Metamorpheus allow users to co-create metaphorical visual stories based on dreams, highlighting the interactive dimensions of storytelling [24]. The adaptability of generative AI is further emphasized by design frameworks that assess its suitability for Augmented Reality (AR) applications [18].

The C2PO model illustrates the operationalization of causal relations in narrative generation through plot infilling, underscoring the significance of causal reasoning [23]. Furthermore, novel evaluation methods utilizing diverse decoding objectives, such as maximum mutual information, enhance narrative generation and provide insights into model performance [37].

This taxonomy highlights the diverse capabilities of generative AI models and the ongoing evolution of narrative creation, fostering innovative approaches to AI integration in storytelling. Frameworks categorizing generative AI models, including themes like 'Deepfakes' and 'NSFW content,' underscore the importance of ethical considerations in storytelling contexts [16]. As the content creation landscape evolves, strategic adaptations and algorithmic advancements are vital for human creators to optimize their strategies in response to generative AI's growing capabilities [10].

3.2 Applications of GANs and VAEs

Method Name	Generative Models	Multimodal Integration	Application Domains
BiSECT[28]	Sketch-to-design	Car Design Process	Creative Domains
I2P-GAN[25]	I2p-GAN	Visual-poetic Embedding	Poetry Generation
VIT-Story[26]	Vision Transformer	Coherent Narratives	Visual Storytelling
GenAI-VE[27]	Controlnet, IP Adapter	-	Academic Papers

Table 3: Overview of generative models and their applications in diverse domains, highlighting the integration of multimodal elements and the specific application areas. The table lists various methods, the generative models they employ, their approach to multimodal integration, and the domains in which they are applied, demonstrating the versatility and impact of these technologies.

Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs) are pivotal in generative AI, particularly for storytelling content creation. These models generate high-quality visual and textual elements that enhance storytelling across various media formats. For instance, GANs have been effectively utilized in creative domains to produce novel designs with minimal input, accelerating design processes and expanding creative possibilities [28].

GANs enable the generation of coherent, contextually relevant narratives. The I2P-GAN method employs multi-adversarial training to create poems from images, ensuring generated text aligns with visual content while maintaining stylistic quality [25]. This capability bridges visual stimuli and narrative expression, facilitating multimodal content synthesis.

VAEs contribute significantly to encoding and decoding complex data structures, essential for generating diverse story elements. By leveraging VAEs, creators can explore vast latent spaces to produce variations of story components, enriching the narrative landscape [38, 39].

The synergy of GANs and VAEs with advanced models enhances narrative coherence and relevance. For example, integrating multi-view visual information extraction with Mogrifier-LSTM significantly improves narrative coherence compared to existing methods [26]. This integration exemplifies the potential of combining generative models for superior storytelling outcomes.

Beyond visual and textual generation, GANs and VAEs enhance research presentation. GenAI can generate figures and LaTeX code, improving the presentation and accessibility of complex research data [27]. This application is particularly relevant in academic contexts where engaging visual representations are crucial for effective communication.

Advancements in GANs and VAEs, along with their integration into comprehensive generative frameworks, revolutionize storytelling by enhancing human creativity. Research shows that generative visual aids, particularly those produced by models like VQGAN, significantly improve the originality and visual appeal of narratives, demonstrating AI’s potential to foster innovative storytelling methods. As generative AI evolves, its applications in personalized and immersive storytelling experiences are expected to reshape marketing strategies and consumer engagement [40, 41, 42]. These models redefine narrative creation boundaries, offering new dimensions of creative expression.

As illustrated in Figure 3, the figure encapsulates the diverse applications of GANs and VAEs in storytelling enhancement, research presentation, and creative domains. It highlights how these models facilitate visual narratives, aid in academic presentations, and drive innovation in design and consumer engagement. The figure visually categorizes generative AI tools into domains such as visual, audio, and text, highlighting subcategories like image and video generators, voice and music generators, and text generators. This classification underscores the versatility of generative AI in content creation. Additionally, the comparison of image-to-image translation methods, including CycleGAN and U-GAT-IT, showcases the transformative power of these models in style transfer and facial attribute manipulation. A flowchart outlining the process of developing and deploying generative AI models emphasizes critical stages from problem definition to deployment and maintenance. Together, these examples showcase the profound impact and potential of GANs and VAEs in reshaping digital content generation [43, 44, 45]. Table 3 provides a comprehensive overview of various generative methods, illustrating their use of specific models and multimodal integration techniques across different application domains.

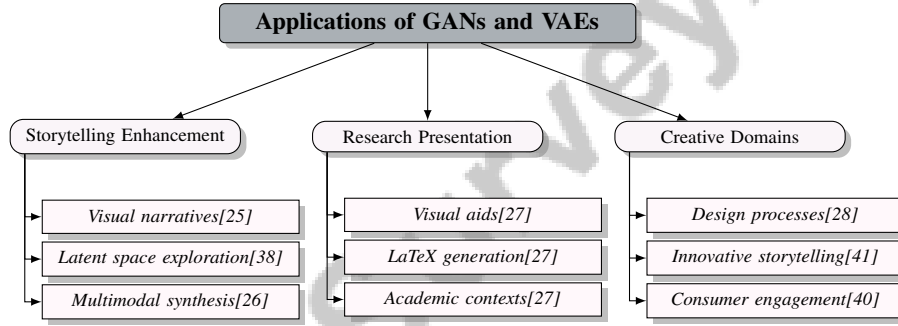


Figure 3: This figure illustrates the diverse applications of GANs and VAEs in storytelling enhancement, research presentation, and creative domains. It highlights how these models facilitate visual narratives, aid in academic presentations, and drive innovation in design and consumer engagement.

3.3 Role of Transformers and Autoregressive Models

Transformers and autoregressive models are integral to generative storytelling, providing sophisticated mechanisms for crafting coherent and engaging narratives across various media formats. The transformer architecture, characterized by its self-attention mechanism, excels in capturing long-range dependencies and contextual relationships, making it particularly effective for narrative tasks. The ViNTER method exemplifies this by integrating visual features with an emotion arc, generating emotionally resonant narratives [46].

Autoregressive models, which generate sequences by predicting the next element based on previous ones, maintain narrative coherence and progression. The PLOT MACHINES framework demonstrates the effectiveness of autoregressive models in dynamically integrating plot elements, ensuring semantic coherence and logical flow [30]. Similarly, the Event2Event model employs a recurrent multi-layer encoder-decoder network to predict successor events, showcasing autoregressive models’ capability to anticipate narrative developments [31].

The integration of transformers with procedural narrative generation is further exemplified by PANGeA, which leverages LLMs to create structured narratives in turn-based RPGs [29]. This structured approach generates intricate storylines that adapt to player interactions, enhancing interactivity and personalization. Anansi the Spider VR utilizes Gen-AI to personalize narratives within a virtual reality environment, demonstrating enhanced user engagement through generative AI’s integration with immersive technologies [32].

Transformers and autoregressive models also play a crucial role in personalizing interactive narratives, employing methods that leverage Q-networks and bipartite player simulation models to generate tailored narratives based on interactions [47]. This personalization is vital for creating engaging storytelling experiences that resonate with diverse audiences.

Benchmark tests of generative models, such as CLIP + BigGAN, CLIP + VQGAN, and CLIP + DALL-E, illustrate the potential of combining transformer-based architectures with other generative frameworks to enhance creative storytelling [41]. These combinations open new avenues for exploring generative AI's creative possibilities in narrative contexts.

The integration of transformers and autoregressive models into generative storytelling frameworks marks a significant advancement in narrative generation technology. This evolution enables the creation of stories that are coherent, contextually aware, and tailored to individual preferences, allowing for user-controlled elements such as storyline direction and emotional tone. By leveraging deep learning techniques, these frameworks facilitate complex narratives that maintain character consistency and plot coherence, enhancing user experience and engagement [48, 37, 49]. As these models evolve, they promise to transform storytelling, offering new opportunities for creative expression and audience engagement.

3.4 Emerging Techniques: Diffusion Models and Hybrid Approaches

Diffusion models and hybrid approaches in generative AI have expanded storytelling horizons, introducing innovative techniques for creating immersive narratives. Diffusion models, known for generating high-quality visual content, are transforming visual art creation by addressing technical challenges and artistic requirements [50]. These models progressively refine random noise into coherent images, enabling the generation of complex visual narratives that enhance storytelling experiences.

Integrating diffusion models with multimodal large language models (MLLMs) represents a significant advancement in unifying text and visual content generation, facilitating seamless blending of narrative elements across media formats. This integration is achieved through frameworks categorizing existing research into early-fusion and alignment architectures, allowing for cohesive synthesis of multimodal content [51]. By leveraging the strengths of diffusion models and MLLMs, hybrid approaches create visually compelling and contextually rich narratives.

Exploring diffusion models' applications reveals their role in enhancing the coherence and depth of AI-generated narratives. The categorization of generative modeling approaches provides a comprehensive understanding of diffusion models and their potential to revolutionize storytelling through intricate and dynamic visual elements [19]. This understanding is crucial for developing effective strategies that leverage diffusion models in narrative contexts.

Beyond technical capabilities, diffusion models address copyright and ownership challenges in AI-generated content. The Shapley Royalty Share Framework evaluates the utility of training data subsets, allocating royalties to copyright owners based on contributions, ensuring fair compensation and addressing legal concerns in the creative process [33]. This framework underscores the importance of ethical considerations in deploying diffusion models, particularly in content creation and distribution.

Hybrid approaches that merge diffusion models with various generative frameworks amplify AI storytelling capabilities, enabling immersive and personalized narratives that resonate with audiences. This evolution enhances marketing strategies, as seen in industry leaders like Google and Netflix, facilitating real-time, contextually relevant storytelling experiences across platforms. By leveraging generative AI strengths, these hybrid models produce narratives that engage consumers personally while addressing challenges related to idea traceability and factual accuracy in storytelling [52, 42, 53]. Integrating diverse modeling techniques offers new avenues for exploring generative AI's creative possibilities, producing narratives that are both technically sophisticated and artistically enriched. As these techniques evolve, they promise to redefine storytelling boundaries, presenting unprecedented opportunities for creative expression and audience engagement.

Feature	Generative Adversarial Networks (GANs)	Variational Autoencoders (VAEs)	Transformers
Content Type	Visual	Textual And Visual	Text
Key Strength	High-quality Generation	Encoding Complex Structures	Contextual Fluency
Application Domain	Design And Storytelling	Story Element Creation	Narrative Generation

Table 4: This table presents a comparative analysis of three prominent generative AI models: Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and Transformers. It highlights their respective content types, key strengths, and application domains in the context of storytelling. The comparison underscores the unique capabilities of each model in generating and enhancing narrative content across different media formats.

4 Applications in Visual Storytelling

Generative AI is revolutionizing visual storytelling by enhancing narrative and artistic creation, democratizing the creative process, and challenging traditional paradigms. This section explores the multifaceted contributions of generative AI to narrative and artistic creation.

4.1 Generative AI in Narrative and Artistic Creation

Generative AI significantly enhances narrative and artistic creation by providing innovative tools that lower content creation barriers, fostering diverse narratives, and reducing production costs [1]. Systems like MAGSS enrich children’s storytelling experiences by integrating text, audio, and visuals [54], while tools for generating, annotating, and debugging code streamline artistic workflows [55]. AI serves as a creative partner, augmenting human creativity through collaborative frameworks. Metamorpheus, for example, integrates text and imagery to produce emotionally resonant interactive stories [24], while AGENTS’ ROOM uses specialized agents to enhance narrative coherence and creativity [56]. In the artistic sphere, generative AI enables high-quality visual content creation, with advances in multimodal image synthesis allowing for diverse image generation [57]. Prompt engineering shapes artistic expression, emphasizing prompting as a cultural practice [4]. Benchmarks for evaluating generative models’ capabilities in surrealistic art push creative boundaries [5]. Generative AI also enhances urban exploration experiences, as seen with AIGT, which enriches user interactions with urban narratives [9]. Interactive elements in data-driven storytelling improve reader engagement, demonstrating AI’s potential to deepen audience connections [58]. The exploration of generative AI’s use by blind artists highlights the necessity for explainability, bridging human creativity and machine-generated art [59]. Generative AI continues to redefine narrative and artistic creation, offering new avenues for exploration and challenging traditional boundaries. It reduces design time, opening possibilities for rapid prototyping and creative experimentation, such as visualizing multiple car prototypes quickly [28].

4.2 Interactive and Immersive Storytelling

Generative AI advances interactive and immersive storytelling by enabling novel audience engagement through dynamic and personalized narratives. AI-driven technologies allow creators to craft adaptive storylines that respond to user interactions, enriching storytelling experiences [47]. Systems employing reinforcement learning and narrative planning generate tailored narratives based on user choices [47]. In immersive environments, generative AI creates rich, multi-sensory experiences by integrating visual, auditory, and textual elements, enhancing immersion and emotional resonance in virtual reality (VR) [32]. In gaming, AI-driven narrative engines dynamically adjust storylines based on player actions, ensuring unique experiences and fostering deeper narrative connections [29]. AI frameworks facilitate interactive narratives exploring complex themes, allowing users to engage with stories on a deeper level [46]. Generative AI in interactive storytelling enhances creative possibilities and offers audiences personalized experiences. As technologies evolve, they promise to transform storytelling by introducing data-driven narratives and structured story generation, fostering deeper audience engagement across media formats. Data visualization techniques promote dynamic interactions between text and visuals, while generative AI enables tailored narratives that resonate with individual consumers. Novel approaches to story planning and generation improve coherence and diversity in narratives, enriching storytelling in marketing, journalism, and graphic design [48, 58, 42, 22].

4.3 AI-Driven Storytelling in Gaming and Entertainment

AI integration in gaming and entertainment has revolutionized narrative crafting, offering unprecedented interactivity and personalization. AI-driven storytelling in gaming allows for dynamic narratives that adapt to player choices, enhancing immersion and engagement [47]. In entertainment, AI enables the production of tailored content that resonates with individual preferences. Sophisticated AI models analyze user data to generate personalized narratives, increasing audience satisfaction through contextually relevant content [29]. AI impacts content creation and delivery by facilitating the development of realistic virtual environments and characters, evident in character animation and dialogue generation, where AI produces lifelike interactions [46]. AI enables exploration of complex themes and narratives that challenge traditional storytelling boundaries. Automatic story generation techniques enhance creative expression and audience engagement, allowing for coherent, diverse, and personalized stories that resonate deeply with consumers. Leveraging hierarchical generation frameworks and large language models, AI crafts narratives that adapt to real-time feedback, transforming storytelling across various media, including marketing and social platforms [38, 22, 42, 48]. As AI technologies evolve, they promise to reshape gaming and entertainment, offering interactive, immersive, and personalized storytelling opportunities.

4.4 Visual Storytelling in Marketing and Design

Generative AI revolutionizes visual storytelling in marketing and design, providing innovative tools that enhance brand recognition, customer loyalty, and marketing effectiveness [60]. Integrating AI into visual content marketing allows for personalized narratives that resonate with target audiences, strengthening brand identity and fostering deeper consumer connections. Marketers leverage AI-driven models to create visually compelling content that effectively communicates brand values. In design, generative AI enhances creativity by utilizing advanced deep generative models to produce novel and realistic content, including text, images, and programming code based on user prompts. This technology streamlines the ideation process for designers, allowing individuals without extensive experience to generate compelling visuals while navigating copyright concerns [52, 61, 27]. AI's capability to generate diverse visual elements enables designers to explore creative possibilities, producing unique and aesthetically appealing designs essential for effective branding and advertising. Generative AI enhances the design process by facilitating rapid prototyping and iteration, allowing designers to experiment with various styles efficiently. It supports the generation of high-quality images and figures for projects, enriching the creative workflow and presentation of ideas. The integration of generative AI in design, particularly in Augmented Reality contexts, opens new avenues for dynamic content creation while addressing visual representation challenges [27, 18]. This flexibility accelerates design processes and improves the quality and relevance of visual content, aligning with marketing objectives and audience preferences. AI's role in visual storytelling extends to creating interactive and immersive experiences that engage consumers profoundly. By leveraging advancements in AI-generated visuals alongside augmented reality (AR) and virtual reality (VR), marketers can craft innovative campaigns that foster lasting brand connections. The integration of generative AI enhances visual content quality, enabling personalized storytelling and dynamic interactions that resonate deeply with consumers, transforming traditional marketing strategies into memorable experiences that drive loyalty and market share [62, 60, 42, 18]. As generative AI technology advances, its applications in marketing and design are set to broaden, unlocking innovative avenues for creative storytelling and enhanced audience engagement. This evolution includes real-time personalized narratives, immersive visual content, and AI-driven design tools that can reshape brand-consumer connections, ultimately transforming marketing strategies and fostering deeper emotional ties [27, 60, 42, 62]. The ability to generate high-quality, personalized visual content on-demand positions generative AI as a transformative force in marketing and design, driving innovation and enhancing visual storytelling effectiveness.

5 Challenges and Ethical Considerations

The integration of generative AI in storytelling presents significant challenges and ethical considerations, including biases, scalability issues, and implications for artistic authenticity. This section delves into these complexities, highlighting the limitations that must be addressed to ensure responsible AI-driven storytelling.

5.1 Challenges and Limitations

Generative AI in storytelling faces challenges impacting its reliability and effectiveness. A primary issue is the bias in AI-generated content, often stemming from training data, which can perpetuate cultural stereotypes and compromise narrative authenticity [13, 3]. The subjective nature of artistic evaluation complicates this, as variations in base images and prompts can significantly influence outcomes. Scalability and stability concerns arise from variability in content quality due to stochastic training processes, leading to inconsistencies and questioning AI-generated narratives' reliability [63]. The phenomenon of hallucination, where AI produces inaccurate information, poses problems in contexts requiring factual accuracy [12]. Economic implications, particularly for smaller organizations, further complicate the adoption of generative AI technologies [13].

Current generative AI methods struggle to produce genuinely novel outputs, limited by their training data [8]. This is especially evident in educational contexts, where generated content may not align with established standards, necessitating moderation [16]. AI-generated content often creates stereotypical representations and disconnects between images and actual places, complicating realistic storytelling [9]. Accessibility remains critical, particularly for blind artists, as existing systems may fail to meet their needs and inadvertently reinforce stereotypes about blindness. Balancing increased content supply and user satisfaction is challenging, as an oversupply of AI-generated content can lead to information overload and reduced engagement [1].

Addressing these challenges requires a comprehensive strategy prioritizing model robustness, data quality, and ethical guidelines encompassing copyright issues, research integrity, and responsible AI use across domains [27, 64, 65, 58, 66]. Confronting these issues can fully realize generative AI's transformative potential in narrative creation, paving the way for new avenues in creative expression and audience engagement.

5.2 Copyright and Ownership Issues

Generative AI in content creation introduces complex challenges related to copyright and ownership, primarily due to the intricate relationship between AI-generated works and intellectual property laws. A significant issue arises from using copyrighted materials in AI training, often without creators' explicit consent, leading to ethical dilemmas and threatening human artists' livelihoods [16]. This raises questions about the legitimacy of AI-generated content and its impact on artistic labor, as fair use boundaries in AI training remain ambiguous.

Debates regarding the eligibility of AI-generated content for copyright protection further complicate the legal landscape. Current laws struggle to encompass AI-generated works' nuances, resulting in uncertainties about ownership and fair compensation for creators whose works contribute to training datasets [15]. This legal ambiguity underscores the need for updated regulatory frameworks addressing generative AI technologies' unique challenges.

Beyond copyright concerns, the ethical implications of using training data in AI systems warrant careful consideration. Potential misuse of generated content could inadvertently cause harm, emphasizing the need for robust ethical frameworks safeguarding original creators' rights while ensuring responsible AI-generated content use [6]. Algorithmic bias in AI-generated content complicates the copyright landscape, as biased outputs may perpetuate stereotypes and limit narrative diversity.

Legal risks associated with generative AI tools encompass various intellectual property issues, particularly due to their reliance on copyrighted materials for training. This raises concerns about rightful attribution and ownership of AI-generated works, as copyright law complexities intersect with generative AI technology. The diverse landscape of generative AI—including text, image, and audio generation—presents unique challenges related to authorship, fair use, and liability. A multidisciplinary approach is needed to navigate these challenges, incorporating legal, ethical, and technological considerations to develop comprehensive solutions protecting creators' rights while promoting innovation in generative AI applications [27, 67, 65, 68, 69].

5.3 Ethical Concerns and Originality

Generative AI in storytelling raises ethical concerns about the originality and authenticity of AI-generated works. A primary ethical issue is the potential for AI systems to perpetuate biases present in training datasets, resulting in outputs that misrepresent target audiences and reinforce societal

stereotypes [13]. This is not merely technical; it reflects ethical dilemmas perpetuating colonial power dynamics and inequality [2]. Addressing these biases necessitates developing more inclusive datasets and robust ethical guidelines to ensure fair representation in AI-generated content.

Concerns about AI-generated content originality arise from its reliance on existing data to create new works, prompting questions about creative ownership and the extent to which outputs can be deemed original or merely derivative [15]. The reliance on features simplifying image generation can hinder creative prompting, complicating the originality discourse [11]. Furthermore, ethical concerns about students' low awareness of effectively utilizing AI tools impact the originality and engagement of their creative outputs [6].

In academic research, AI outputs' reliability and potential biases challenge research integrity [70]. Ethical considerations in AI-generated content use are underscored by the complexities of job loss and broader implications for creative industries [2]. Public opinion on copyright suggests users and data contributors are often viewed as authors of AI-generated images, challenging existing copyright frameworks overlooking these perspectives.

To address generative AI's ethical challenges in the creative industry, a dynamic model integrating ownership, rights, and attribution (ORA) is proposed. This model empowers creators to assert agency over their works and ensures fair compensation, considering copyright issues, such as fair use of training data and AI-generated content copyright eligibility. Insights from economic theories and cooperative game frameworks can facilitate equitable revenue distribution among copyright owners, enhancing AI model performance by providing access to high-quality training data [33, 69, 71, 65]. Recognizing human creators' contributions is essential for ensuring fair compensation in AI-generated content.

By proactively addressing ethical challenges such as copyright concerns, potential harmful content, and research integrity risks, stakeholders can leverage this technology's transformative capabilities. This approach enhances creative expression quality and diversity while ensuring compliance with evolving regulatory frameworks, safeguarding against potential misuse, and promoting responsible AI integration in creative and academic workflows [27, 64, 65, 72, 73]. Fostering a collaborative environment where AI serves as an active creative partner enhances creativity while upholding ethical standards.

5.4 Biases and Fairness

Examining biases and fairness in AI-generated storytelling is crucial due to significant societal implications. A central concern is propagating biases inherent in training data, perpetuating stereotypes and reinforcing existing power dynamics. This is particularly pronounced in digital neocolonialism, where generative AI's predominant use of Western languages marginalizes nondominant languages, limiting access to educational content for indigenous language speakers [74]. Such linguistic biases hinder inclusivity and exacerbate the digital divide, affecting AI-generated narratives' accessibility.

Challenges of distinguishing between human and AI contributions in creative works further complicate fairness discourse, particularly regarding copyright registration [75]. This ambiguity raises questions about authorship and equitable recognition of creators, necessitating a reevaluation of existing intellectual property frameworks to accommodate AI-generated content nuances. Frameworks like EKILA, dynamically linking ownership, rights, and attribution, underscore the importance of ensuring creators are recognized and compensated fairly for their contributions [76].

Despite advancements in detection methods and innovative protection techniques, separating detection and attribution as distinct problems remains a major limitation, hindering synthetic image verification's overall performance and understanding [77]. This separation complicates efforts to ensure fairness in AI-generated storytelling, challenging accurate attribution and content origin verification.

Moreover, generative AI's societal implications extend beyond biases to include misinformation and privacy issues, highlighting the need for comprehensive strategies to address these challenges [78]. Existing research strengths, including detection method advancements, offer promising avenues for enhancing intellectual property safeguarding in the digital landscape [65]. A multidisciplinary approach is essential to effectively address biases, fairness, and societal impact in AI-generated storytelling.

5.5 Data Privacy and Security

Generative AI in storytelling raises significant data privacy and security concerns, necessitating robust measures to safeguard sensitive information. As generative AI systems increasingly rely on vast datasets for training and operation, the risk of unauthorized personal data access becomes critical. Ensuring transparency in AI applications is paramount, fostering trust and accountability in AI technologies [79]. Transparency involves clearly communicating how data is collected, processed, and utilized in AI-driven storytelling applications, addressing potential privacy concerns.

Generative AI's potential to revolutionize personalized education underscores data security's importance, as educational applications often handle sensitive student information. Maintaining data privacy is essential to protect individuals from potential breaches and misuse [79]. This is particularly relevant in educational settings, where AI technologies' integration must be carefully managed to prevent personal data exposure and maintain educational resources' integrity.

Addressing data privacy concerns involves mitigating algorithmic bias, which can arise from datasets used to train AI models. Bias in AI systems affects generated content's fairness and inclusivity and poses risks to individuals' privacy whose data may be misrepresented or exploited [80]. Ensuring equitable access to AI-driven educational resources requires developing unbiased and secure AI systems respecting all users' privacy.

Data privacy and security challenges in generative AI applications highlight the need for comprehensive regulatory frameworks governing AI use in storytelling. These frameworks should prioritize safeguarding personal data, implementing robust measures to prevent unauthorized access, and promoting ethical AI application, particularly in research contexts. Guidance on navigating the complex regulatory landscape, ensuring copyright law compliance, and addressing concerns related to academic integrity and responsible AI use in educational settings is essential. Institutions should develop training and resources emphasizing these principles, fostering a responsible approach to AI technologies while enhancing research and educational outcomes [27, 65, 81, 64]. By prioritizing data privacy and security, stakeholders can harness generative AI's transformative potential while safeguarding individuals' rights and privacy in the storytelling process.

5.6 Societal and Cultural Implications

AI-generated storytelling's societal and cultural implications are profound, reshaping how narratives are created and consumed across cultural contexts. A primary concern is AI-generated content's ethical dimension, often lacking empirical evidence to support many ethical issues raised, such as non-human entities' impact [73]. AI's potential to democratize creativity is juxtaposed with the risk of exacerbating cognitive inequalities, challenging equitable access to creative tools and opportunities [14].

Cultural narratives shaped by generative AI are influenced by training datasets often lacking diversity, potentially perpetuating existing biases. This highlights the necessity for more inclusive datasets to ensure AI-generated stories reflect a broader spectrum of cultural experiences and values [20]. The prevalence of low-tech misuses of generative AI for financial gain, political manipulation, and harassment underscores the urgent need for effective governance and mitigation strategies to address these challenges [12].

AI-generated storytelling raises questions about narratives' authenticity and originality, as the line between human and machine creativity blurs. This ambiguity can lead to skepticism and negative sentiment towards AI involvement in creative processes, complicating AI-generated content's acceptance and integration into cultural narratives. Abusive content generated by AI further highlights the impact on community engagement and artistic innovation [16].

Navigating these societal and cultural challenges requires robust ethical frameworks to address AI integration in storytelling complexities. This entails cultivating a dialogue harmonizing technological innovation with cultural sensitivity, ensuring AI-generated content authentically represents and respects diverse societal values and identities. Leveraging advanced generative AI techniques, such as those used in large language models and multimodal composing, can enhance content creativity and contextual relevance while addressing ethical considerations and AI systems' limitations. This approach fosters idea generation reflecting varied societal perspectives and encourages thoughtful AI tool integration in creative and research practices across disciplines [52, 82, 83, 84]. Addressing these

issues allows stakeholders to harness generative AI’s transformative potential while safeguarding cultural narratives’ integrity and diversity.

5.7 Ethical and Regulatory Frameworks

Developing and implementing ethical and regulatory frameworks for AI-generated content are crucial to addressing generative AI’s complex challenges in storytelling and content creation. These frameworks must balance promoting innovation with protecting individual rights and societal values. A key component is establishing fair compensation models for creators whose works contribute to AI training datasets. The Shapley Royalty Share Framework, for instance, employs cooperative game theory to distribute royalties among copyright owners based on their contributions to AI-generated content, ensuring fair compensation and addressing legal concerns [33].

Education plays a pivotal role in generative AI technologies’ ethical deployment. Users must be educated about these technologies’ strengths and limitations, emphasizing robust evaluation metrics to assess AI-generated content’s impact and effectiveness [85]. Future work should refine educational approaches to include foundational AI concepts and ethical implications, particularly in K-12 settings, to prepare students for the evolving digital landscape [39]. Developing pedagogical strategies for teaching prompt literacy is essential to empower diverse learner groups to engage critically with AI tools and understand AI-generated content’s ethical dimensions [86].

Identifying misuse tactics in current research provides a foundation for understanding generative AI’s potential harms, guiding policy development and safety evaluations [12]. These insights are vital for crafting regulatory measures preventing AI technologies’ exploitation for malicious purposes, such as misinformation, harassment, and privacy violations. Ethical frameworks must also address biases inherent in AI systems, ensuring AI-generated narratives do not perpetuate stereotypes or reinforce existing power dynamics.

Establishing comprehensive ethical and regulatory frameworks is essential to ensure generative AI’s responsible and equitable use in storytelling. By cultivating a collaborative environment actively engaging stakeholders from diverse sectors, these frameworks can enhance transparency, accountability, and fairness in AI-generated content development and distribution. This collaborative approach promotes narrative creation integrity and ensures inclusivity by breaking down the complex storytelling process into manageable components, exemplified by the AGENTS’ ROOM framework, utilizing specialized agents to improve narrative quality. Furthermore, rigorous evaluation methodologies, including qualitative and quantitative assessments, can validate generative AI tools’ effectiveness, fostering trust and innovation in high-stakes applications like healthcare and scientific research [56, 87, 38].

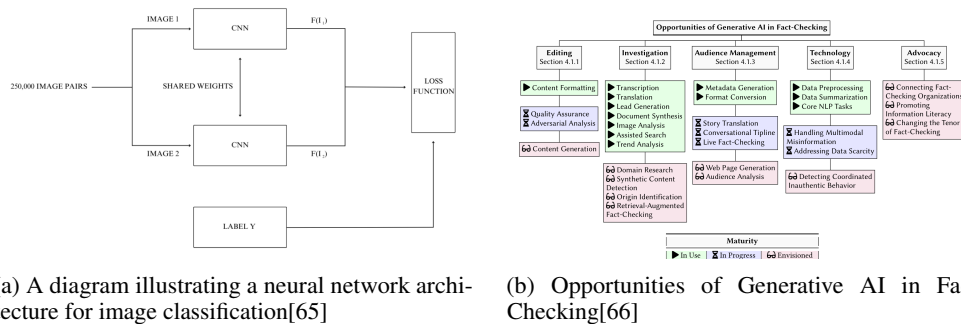


Figure 4: Examples of Ethical and Regulatory Frameworks

As shown in Figure 4, the realm of artificial intelligence is fraught with challenges and ethical considerations, particularly as it intersects with regulatory frameworks. The first diagram showcases a neural network architecture tailored for image classification, highlighting the complexities of handling vast datasets—250,000 image pairs—and the importance of maintaining ethical standards in data utilization and algorithmic transparency. The second image presents a flowchart on the opportunities generative AI offers in fact-checking, emphasizing the technology’s potential to enhance accuracy and accountability in information dissemination. This flowchart is meticulously organized into sections

such as Editing, Investigation, and Advocacy, each underscoring the necessity for ethical guidelines to govern AI's role in media and public engagement. Together, these examples underscore the critical need for robust ethical and regulatory frameworks to navigate the evolving challenges posed by AI technologies [65, 66].

6 Future Directions and Opportunities

6.1 Current Trends and Innovations

The evolving landscape of generative AI in storytelling is marked by emerging trends that redefine narrative creation across disciplines. Cross-disciplinary collaborations emphasize the need for ethical frameworks guiding AI's role in art and storytelling, fostering innovation while ensuring responsible deployment [1]. Generative AI tools are becoming more accessible, engaging broader audiences in art creation. Future research should empirically validate theoretical models and examine AI's long-term impact on labor markets and creative industries [9].

In education, generative AI tools are increasingly used to enhance creativity and learning. Future studies should develop pedagogical strategies for integrating these tools into curricula, addressing limitations, and exploring new educational trends [15]. Training programs for social scientists on programming skills and exploring open-source AI alternatives are also gaining interest [13].

Advancements in AI capabilities are driving innovative applications across domains, improving data transmission efficiency and perceptual quality. Future research should explore frameworks across various domains and refine models for enhanced creative output [14]. The dynamics of prompting with new generative models and their broader implications also warrant exploration [3].

Developing unified multi-modality frameworks that integrate text-to-image generation with other tasks is crucial, enhancing the coherence and richness of AI-generated narratives. Future research should explore hybrid methodologies leveraging different generative models to bolster AI's artistic capabilities [59]. Improvements may focus on emotion classifier accuracy, refining image generation, and sophisticated prompting techniques to improve narrative coherence [3].

As generative AI evolves, these trends and innovations expand possibilities for creativity and engagement, creating new opportunities for narrative creation across diverse media formats. Future research should aim to develop robust models, optimize resource utilization, and establish comprehensive ethical guidelines to navigate the societal impacts of generative AI [10]. Applying benchmarks to newer models like GPT-3 and investigating additional metrics for assessing narrative quality are essential for advancing the field.

6.2 Frameworks for AI-Assisted Creativity

Integrating AI into creative processes necessitates robust frameworks enhancing AI-assisted creativity, particularly in storytelling. Future research should prioritize adaptive communication strategies accommodating user feedback, improving the co-creative experience [88]. Such strategies foster a collaborative environment where AI acts as a creative partner, facilitating idea exchange and enhancing the creative process.

In educational contexts, developing comprehensive guidelines for ethical AI use is crucial to integrate AI tools in ways promoting student learning and equity [89]. Recognizing the importance of compatibility, trialability, and observability in adopting generative AI (GAI) technologies significantly impacts their effectiveness in education [90]. Institutions must proactively address these factors to maximize AI-assisted creativity benefits.

Exploring the psychological impacts of AI on students' learning and agency is critical. Future research should focus on strategies to mitigate overreliance on AI, ensuring students maintain agency and ownership over their creative processes [91]. Moreover, integrating generative AI with real-time data sources is essential to minimize inaccuracies and enhance AI systems' reliability in creative applications [52].

Developing new aesthetic frameworks specifically for evaluating generative AI outputs is a promising research area. These frameworks could provide insights into AI-generated content's implications for creativity and authorship, establishing new standards for evaluating AI-assisted creations' artistic

merit [11]. By exploring these dimensions, stakeholders can better understand AI's role in creative processes and develop strategies harnessing its potential while addressing ethical and practical challenges.

Investigating frameworks for AI-assisted creativity is critical for enhancing AI integration into storytelling and various creative fields. This exploration facilitates sophisticated generative models producing coherent narratives, supporting idea generation, and improving creative output quality by combining human creativity with AI's analytical capabilities. Addressing challenges related to narrative coherence and character consistency emphasizes AI's potential to eliminate human biases, leading to diverse and innovative storytelling techniques [52, 92, 48, 22]. By focusing on adaptive communication strategies, ethical guidelines, and new aesthetic frameworks, researchers and practitioners can foster environments supporting innovation, collaboration, and equitable access to creative tools.

6.3 Integration in Creative Workflows

Integrating generative AI into creative workflows signifies a transformative shift in storytelling conceptualization and execution. This integration is underscored by developing interfaces enhancing ideation and production capabilities, enabling creators to leverage AI's potential for generating novel ideas and refining narrative elements [93]. By incorporating AI technologies, creative professionals streamline workflows, fostering innovation in storytelling.

A key aspect of this integration is utilizing Large Multimodal Models (LMMs) to generate communication options aligned with user needs, enhancing the adaptability and relevance of creative outputs [94]. This approach improves AI-generated content alignment with audience expectations and supports personalized and engaging narratives, invaluable in storytelling.

The incorporation of AI in creative workflows is exemplified by systems like Metamorpheus, allowing users to creatively narrate their emotional experiences through dreams [24]. This interactive approach highlights AI's potential to facilitate complex emotional narrative expression, offering new storytelling dimensions resonating deeply with audiences.

Understanding AI's role across industries is crucial for its successful integration into creative workflows [95]. By examining the unique challenges and opportunities AI presents in various sectors, stakeholders can develop targeted strategies optimizing AI technologies in storytelling. This understanding fosters collaboration between AI researchers and domain experts, ensuring AI-driven solutions address specific needs and complexities of creative industries [36].

Future research should explore complex interactions among agents within AI systems, investigating how varying agent characteristics influence creative outcomes [96]. Such exploration could lead to sophisticated AI tools enhancing the creative process, offering new storytelling and narrative creation possibilities. By integrating AI into creative workflows, storytellers can harness technology's power to push narrative innovation boundaries, creating richer and more immersive experiences for audiences.

6.4 Addressing Challenges and Ethical Concerns

Addressing challenges and ethical concerns in AI-generated storytelling requires a multifaceted approach integrating legal, technological, and educational strategies. A critical area for future exploration is developing comprehensive moderation strategies to tackle issues associated with deepfakes and NSFW materials produced by AI [16]. These strategies should enhance the detection and regulation of inappropriate content, ensuring responsible and ethical generative AI technology use.

In education, developing curricula incorporating AI tools while safeguarding academic integrity and preventing overreliance on AI systems is essential. This process involves cultivating a nuanced understanding of artificial intelligence (AI) among students, particularly regarding its strengths and weaknesses. Students should be prompted to critically analyze AI-generated content and view these tools as enhancers of human creativity rather than substitutes. By leveraging generative AI's capabilities, such as generating images and textual ideas, students can enrich their creative expressions while being mindful of AI's limitations, such as the lack of traceability in idea generation. This approach encourages a hybrid creative process where AI serves as a collaborative partner, fostering

original thought and enhancing the quality of their work [52, 27, 83, 97, 98]. Additionally, educational initiatives should train individuals to recognize and mitigate biases inherent in AI systems, promoting fairness and inclusivity in AI-generated narratives.

Technological advancements should prioritize improving the quality and reliability of AI-generated content. This includes refining data generation processes and exploring novel applications of generative AI in communication systems to enhance narrative coherence and relevance. Integrating Large Language Models (LLMs) into creative workflows can significantly enhance the efficiency and adaptability of AI-driven tools in real-world applications, unlocking innovative storytelling possibilities. By leveraging LLMs' advanced capabilities to capture nuanced language and generate coherent narratives, creators can produce richer, more engaging stories that resonate emotionally with audiences. Additionally, LLMs can facilitate actionable insights from data, improving decision-making processes and enabling effective visual storytelling through the seamless alignment of textual and visual elements. This multifaceted approach streamlines the creative process and fosters new avenues for narrative exploration and audience engagement [38, 22, 13, 48, 99].

Legal frameworks must evolve to address generative AI's rapid advancements, ensuring copyright, authorship, and ethical considerations are adequately covered. Establishing regulatory measures that adapt to technological progress while safeguarding public interest is crucial for protecting creators' rights and fostering innovation. It is essential for these frameworks to comprehensively address the ethical implications of AI-generated content, ensuring narratives produced by AI maintain authenticity and diversity while aligning with broader societal values, as highlighted by recent discourse on the ethical risks associated with generative AI, including fairness, safety, and societal impact [52, 7, 73].

Longitudinal studies are essential for monitoring generative AI misuse patterns, yielding critical data that inform targeted and effective mitigation strategies. By analyzing misuse incidents over time, researchers can identify emerging tactics, motivations, and diverse ways generative AI is exploited across modalities—such as text, images, and audio—enhancing understanding of the risks associated with these technologies and guiding responsible usage in academia and education [40, 12, 100, 80]. By focusing on these strategies, stakeholders can create a robust framework that supports innovation while protecting individual rights and societal values, ensuring the responsible and ethical integration of AI into storytelling.

7 Conclusion

The exploration of generative AI in visual storytelling and multimedia content creation underscores its transformative potential across various sectors, enhancing both creativity and operational efficiency. By improving content creation processes and addressing ethical considerations, generative AI is poised to revolutionize industries [1]. The incorporation of Large Multimodal Models (LMMs) into narrative generation significantly enhances communication quality, aligning closely with human-created content while addressing personalization concerns. However, challenges remain, particularly in maintaining the quality of generative models amidst diverse online data, which necessitates careful dataset curation [3].

In educational contexts, generative AI shows promise in fostering self-directed learning, as exemplified by systems like MAGSS that generate high-quality multimodal stories, thereby providing engaging educational experiences for children [54]. While generative AI has the potential to enhance creativity by alleviating mundane tasks, it also poses risks such as skill degradation and reduced product diversity [8]. Furthermore, in urban exploration, generative AI facilitates playful rediscoveries of urban spaces, highlighting the role of familiarity in shaping user experiences [9].

The ongoing evolution of generative AI necessitates the formulation of new interpretive frameworks, as aesthetic judgments evolve in response to deeper societal changes [11]. Interdisciplinary collaboration is essential to address the unique challenges posed by generative AI, ensuring that its transformative capabilities are harnessed responsibly and ethically.

References

- [1] Yukun Zhang. The influence of generative ai on content platforms: Supply, demand, and welfare impacts in two-sided markets, 2024.
- [2] Jingyu Shi, Rahul Jain, Hyungjun Doh, Ryo Suzuki, and Karthik Ramani. An hci-centric survey and taxonomy of human-generative-ai interactions, 2024.
- [3] Yuetian Chen, Ruohua Li, Bowen Shi, Peiru Liu, and Mei Si. Visual story generation based on emotion and keywords, 2023.
- [4] Jon McCormack, Maria Teresa Llano, Stephen James Krol, and Nina Rajcic. No longer trending on artstation: Prompt analysis of generative ai art, 2024.
- [5] Elif Ayten, Shuai Wang, and Hjalmar Snoep. Surrealistic-like image generation with vision-language models, 2024.
- [6] Chiranjeevi Bura and Praveen Kumar Myakala. Advancing transformative education: Generative ai as a catalyst for equity and innovation, 2024.
- [7] Sachita Nishal and Nicholas Diakopoulos. Envisioning the applications and implications of generative ai for news media, 2024.
- [8] Ming-Hui Huang and Roland T. Rust. Automating creativity, 2024.
- [9] Peng-Kai Hung, Janet Yi-Ching Huang, Stephan Wensveen, and Rung-Huei Liang. Re.dis.cover place with generative ai: Exploring the experience and design of city wandering with image-to-image ai, 2024.
- [10] Seyed A. Esmaeili, Kshipra Bhawalkar, Zhe Feng, Di Wang, and Haifeng Xu. How to strategize human content creation in the era of genai?, 2024.
- [11] Jessica Hullman, Ari Holtzman, and Andrew Gelman. Artificial intelligence and aesthetic judgment, 2023.
- [12] Nahema Marchal, Rachel Xu, Rasmi Elasmr, Iason Gabriel, Beth Goldberg, and William Isaac. Generative ai misuse: A taxonomy of tactics and insights from real-world data, 2024.
- [13] Desta Haileselassie Hagos, Rick Battle, and Danda B. Rawat. Recent advances in generative ai and large language models: Current status, challenges, and perspectives, 2024.
- [14] Meiling Huang, Ming Jin, and Ning Li. Augmenting minds or automating skills: The differential role of human capital in generative ai's impact on creative tasks, 2024.
- [15] Christopher Bull and Ahmed Kharrufa. Generative ai assistants in software development education: A vision for integrating generative ai into educational practice, not instinctively defending against it, 2023.
- [16] Yiluo Wei, Yiming Zhu, Pan Hui, and Gareth Tyson. Exploring the use of abusive generative ai models on civitai, 2024.
- [17] Vinay Chamola, Gaurang Bansal, Tridib Kumar Das, Vikas Hassija, Naga Siva Sai Reddy, Jiacheng Wang, Sherali Zeadally, Amir Hussain, F. Richard Yu, Mohsen Guizani, and Dusit Niyato. Beyond reality: The pivotal role of generative ai in the metaverse, 2023.
- [18] Yongquan Hu, Dawen Zhang, Mingyue Yuan, Kaiqi Xian, Don Samitha Elvitigala, June Kim, Gelareh Mohammadi, Zhenchang Xing, Xiwei Xu, and Aaron Quigley. Investigating the design considerations for integrating text-to-image generative ai within augmented reality environments, 2024.
- [19] Gaurav Raut and Apoorv Singh. Generative ai in vision: A survey on models, metrics and applications, 2024.
- [20] Chenshuang Zhang, Chaoning Zhang, Mengchun Zhang, In So Kweon, and Junmo Kim. Text-to-image diffusion models in generative ai: A survey, 2024.

-
- [21] Victoria Jackson, Bogdan Vasilescu, Daniel Russo, Paul Ralph, Maliheh Izadi, Rafael Prik-ladnicki, Sarah D’Angelo, Sarah Inman, Anielle Lisboa, and Andre van der Hoek. Creativity, generative ai, and software development: A research agenda, 2024.
 - [22] Lili Yao, Nanyun Peng, Ralph Weischedel, Kevin Knight, Dongyan Zhao, and Rui Yan. Plan-and-write: Towards better automatic storytelling. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 33, pages 7378–7385, 2019.
 - [23] Prithviraj Ammanabrolu, Wesley Cheung, William Broniec, and Mark O. Riedl. Automated storytelling via causal, commonsense plot ordering, 2020.
 - [24] Qian Wan, Xin Feng, Yining Bei, Zhiqi Gao, and Zhicong Lu. Metamorpheus: Interactive, affective, and creative dream narration through metaphorical visual storytelling, 2024.
 - [25] Bei Liu, Jianlong Fu, Makoto P Kato, and Masatoshi Yoshikawa. Beyond narrative description: Generating poetry from images by multi-adversarial training. In *Proceedings of the 26th ACM international conference on Multimedia*, pages 783–791, 2018.
 - [26] Zainy M. Malakan, Ghulam Mubashar Hassan, and Ajmal Mian. Vision transformer based model for describing a set of images as a story, 2023.
 - [27] Niklas Pfützenreuter. Using generative ai to enhance the visuals of papers. In *Mensch und Computer 2024-Workshopband*, pages 10–18420. Gesellschaft für Informatik eV, 2024.
 - [28] Sreedhar Radhakrishnan, Varun Bharadwaj, Varun Manjunath, and Ramamoorthy Srinath. Creative intelligence—automating car design studio with generative adversarial networks (gan). In *International Cross-Domain Conference for Machine Learning and Knowledge Extraction*, pages 160–175. Springer, 2018.
 - [29] Steph Buongiorno, Lawrence Jake Klinkert, Tanishq Chawla, Zixin Zhuang, and Corey Clark. Pangea: Procedural artificial narrative using generative ai for turn-based video games, 2024.
 - [30] Hannah Rashkin, Asli Celikyilmaz, Yejin Choi, and Jianfeng Gao. Plotmachines: Outline-conditioned generation with dynamic plot state tracking. *arXiv preprint arXiv:2004.14967*, 2020.
 - [31] Lara Martin, Prithviraj Ammanabrolu, Xinyu Wang, William Hancock, Shruti Singh, Brent Harrison, and Mark Riedl. Event representations for automated story generation with deep neural nets. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 32, 2018.
 - [32] Ka Hei Carrie Lau, Bhada Yun, Samuel Saruba, Efe Bozkir, and Enkelejda Kasneci. Wrapped in anansi’s web: Unweaving the impacts of generative-ai personalization and vr immersion in oral storytelling, 2024.
 - [33] Jiachen T. Wang, Zhun Deng, Hiroaki Chiba-Okabe, Boaz Barak, and Weijie J. Su. An economic solution to copyright challenges of generative ai, 2024.
 - [34] Veera Vimpari, Annakaisa Kultima, Perttu Hämäläinen, and Christian Guckelsberger. "an adapt-or-die type of situation": Perception, adoption, and use of text-to-image-generation ai by game industry professionals, 2023.
 - [35] Nantheera Anantrasirichai and David Bull. Artificial intelligence in the creative industries: a review. *Artificial intelligence review*, 55(1):589–656, 2022.
 - [36] Sandeep Singh Sengar, Affan Bin Hasan, Sanjay Kumar, and Fiona Carroll. Generative artificial intelligence: a systematic review and applications. *Multimedia Tools and Applications*, pages 1–40, 2024.
 - [37] Alexandra DeLucia, Aaron Mueller, Xiang Lisa Li, and João Sedoc. Decoding methods for neural narrative generation, 2021.
 - [38] Vidya Setlur and Larry Birnbaum. Can nuanced language lead to more actionable insights? exploring the role of generative ai in analytical narrative structure, 2024.

-
- [39] Zhuoyue Lyu, Safinah Ali, and Cynthia Breazeal. Introducing variational autoencoders to high school students, 2022.
 - [40] Francisco José García Peñalvo and Andrea Vázquez Ingelmo. What do we mean by genai? a systematic mapping of the evolution, trends, and techniques involved in generative ai. *IJIMAI*, 8(4):7–16, 2023.
 - [41] Safinah Ali and Devi Parikh. Telling creative stories using generative visual aids, 2021.
 - [42] Marko Vidrih and Shiva Mayahi. Generative ai-driven storytelling: A new era for marketing, 2023.
 - [43] Tam Sakirin and Siddhartha Kusuma. A survey of generative artificial intelligence techniques. *Babylonian Journal of Artificial Intelligence*, 2023:10–14, 2023.
 - [44] Sandeep Singh Sengar, Affan Bin Hasan, Sanjay Kumar, and Fiona Carroll. Generative artificial intelligence: A systematic review and applications, 2024.
 - [45] Ajay Bandi, Pydi Venkata Satya Ramesh Adapa, and Yudu Eswar Vinay Pratap Kumar Kuchi. The power of generative ai: A review of requirements, models, input–output formats, evaluation metrics, and challenges. *Future Internet*, 15(8):260, 2023.
 - [46] Kohei Uehara, Yusuke Mori, Yusuke Mukuta, and Tatsuya Harada. Vinter: Image narrative generation with emotion-arc-aware transformer, 2022.
 - [47] Pengcheng Wang, Jonathan P Rowe, Wookhee Min, Bradford W Mott, and James C Lester. Interactive narrative personalization with deep reinforcement learning. In *IJCAI*, pages 3852–3858, 2017.
 - [48] Angela Fan, Mike Lewis, and Yann Dauphin. Strategies for structuring story generation. *arXiv preprint arXiv:1902.01109*, 2019.
 - [49] Nanyun Peng, Marjan Ghazvininejad, Jonathan May, and Kevin Knight. Towards controllable story generation. In *Proceedings of the First Workshop on Storytelling*, pages 43–49, 2018.
 - [50] Bingyuan Wang, Qifeng Chen, and Zeyu Wang. Diffusion-based visual art creation: A survey and new perspectives, 2024.
 - [51] Hong Chen, Xin Wang, Yuwei Zhou, Bin Huang, Yipeng Zhang, Wei Feng, Houlun Chen, Zeyang Zhang, Siao Tang, and Wenwu Zhu. Multi-modal generative ai: Multi-modal llm, diffusion and beyond, 2024.
 - [52] Ted Selker. Ai for the generation and testing of ideas towards an ai supported knowledge development environment, 2023.
 - [53] Victor Schetinger, Sara Di Bartolomeo, Edirlei Soares de Lima, Christofer Meinecke, and Rudolf Rosa. *n walks in the fictional woods*, 2023.
 - [54] Samee Arif, Taimoor Arif, Muhammad Saad Haroon, Aamina Jamal Khan, Agha Ali Raza, and Awaiz Athar. The art of storytelling: Multi-agent generative ai for dynamic multimodal narratives, 2025.
 - [55] Yongjun Zhang. Generative ai has lowered the barriers to computational social sciences, 2023.
 - [56] Fantine Huot, Reinald Kim Amplayo, Jennimaria Palomaki, Alice Shoshana Jakobovits, Elizabeth Clark, and Mirella Lapata. Agents’ room: Narrative generation through multi-step collaboration, 2024.
 - [57] Fangneng Zhan, Yingchen Yu, Rongliang Wu, Jiahui Zhang, Shijian Lu, Lingjie Liu, Adam Kortylewski, Christian Theobalt, and Eric Xing. Multimodal image synthesis and editing: The generative ai era, 2023.
 - [58] Charles D Stolper, Bongshin Lee, Nathalie Henry Riche, and John Stasko. Data-driven storytelling techniques: Analysis of a curated collection of visual stories. In *Data-driven storytelling*, pages 85–105. AK Peters/CRC Press, 2018.

-
- [59] Gayatri Raman and Erin Brady. Exploring use and perceptions of generative ai art tools by blind artists, 2024.
 - [60] Shiva Mayahi and Marko Vidrih. The impact of generative ai on the future of visual content marketing. *arXiv preprint arXiv:2211.12660*, 2022.
 - [61] Leonardo Banh and Gero Strobel. Generative artificial intelligence. *Electronic Markets*, 33(1):63, 2023.
 - [62] Shiva Mayahi and Marko Vidrih. The impact of generative ai on the future of visual content marketing, 2022.
 - [63] Mathias Thorsager, Israel Leyva-Mayorga, Beatriz Soret, and Petar Popovski. Generative network layer for communication systems with artificial intelligence, 2024.
 - [64] Shannon Smith, Melissa Tate, Keri Freeman, Anne Walsh, Brian Ballsun-Stanton, Mark Hooper, and Murray Lane. A university framework for the responsible use of generative ai in research, 2024.
 - [65] Jocelyn Dzuong, Zichong Wang, and Wenbin Zhang. Uncertain boundaries: Multidisciplinary approaches to copyright issues in generative ai, 2024.
 - [66] Robert Wolfe and Tanushree Mitra. The impact and opportunities of generative ai in fact-checking, 2024.
 - [67] Tanja Šarčević, Alicja Karłowicz, Rudolf Mayer, Ricardo Baeza-Yates, and Andreas Rauber. U can’t gen this? a survey of intellectual property protection methods for data in generative ai, 2024.
 - [68] Katherine Lee, A. Feder Cooper, and James Grimmelmann. Talkin’ ’bout ai generation: Copyright and the generative-ai supply chain, 2024.
 - [69] S. Alex Yang and Angela Huyue Zhang. Generative ai and copyright: A dynamic perspective, 2024.
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-
- [79] Hao Yu and Yunyun Guo. Generative artificial intelligence empowers educational reform: current status, issues, and prospects. In *Frontiers in Education*, volume 8, page 1183162. Frontiers Media SA, 2023.
- [80] Stephen Elbourn. The impact of generative ai on student churn and the future of formal education, 2024.
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- [83] Xiao Tan, Wei Xu, and Chaoran Wang. Purposeful remixing with generative ai: Constructing designer voice in multimodal composing, 2024.
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- [93] Nina Rajcic, Maria Teresa Llano, and Jon McCormack. Towards a diffractive analysis of prompt-based generative ai, 2024.
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-
- [98] David James Woo, Kai Guo, and Hengky Susanto. Exploring efl students' prompt engineering in human-ai story writing: an activity theory perspective, 2024.
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