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Visual Storytelling and Narrative Experiences in Extended Reality: Guest Editors' Introduction

Abstract

Virtual, augmented, and mixed reality technologies offer unparalleled opportunities for embodied presence in immersive digital environments. While these platforms are primarily discussed regarding their technological capabilities for simulating fictional scenes or enabling interactions with virtual entities, their profound implications on storytelling and narrative comprehension remain underexplored. The narrative dimension is instrumental as factors like interactivity, stereoscopic displays, and user mobility define what details become available and in what sequence, generating each user's unique vantage point and experience. In order to address the limited theoretical and methodological accounts on immersive virtual storytelling, this special issue brings together multidisciplinary perspectives spanning engineering, psychology, neuroscience, anthropology, and digital activism. With the proposed novel conceptual frameworks, technologies, applications, and inclusivity initiatives, the contributions examine immersive visual narratives in an expansive manner. Thereby, this special issue aims to provide a novel understanding of how virtual, augmented, and mixed reality platforms can be leveraged to craft and experience narratives in profoundly immersive ways. By providing insights into how immersive qualities transform narrative comprehension, this special issue advances our knowledge of the complex relationship between story, technology, and the human experience.

I   Introduction

Immersive digital media, such as virtual, augmented, and mixed reality (VR, AR, and MR) or the emerging metaverse are praised for connecting users and affording experiences where one can be present in a digitally created sphere that momentarily replaces the physical reality. While we are building these spheres with various functionalities, tools, and affordances to simulate alternative realities, we tend to disregard how immersive qualities challenge storytelling and how users engage with narratives that center them and their embodied experiences. Not least because besides thriving solely for egocentric and embodied experiences, immersive digital media also highlights interactivity, the use of stereoscopic depth, and the degrees of freedom that inherently define the amount of information and detail that is accessible to a user at a certain moment.

Immersive digital media may include education-related content, moving-image narratives, and games that present storified spaces. These storified spaces

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enable recreating and experiencing narratives of, among other things, cultural artefacts that no longer exist, digital and social media-based interactions, or even social inequalities. What is common: they all evoke enhanced epistemological, cognitive, and emotional presence. This special issue gathers authors from the fields of engineering, psychology, neuroscience, anthropology, and activism to examine the broader perspectives of how to deliver and receive immersive visual narrative experiences. Such interdisciplinary approaches in this collection contribute to the associated fields of immersive digital media by providing the following:

- novel methodological and theoretical frameworks that support understanding and analyzing the various aspects of immersive narratives,
- comprehensive reviews of recent technological advancements and cutting-edge research across the relevant subject areas,
- technical approaches that showcase context-specific technological strategies to address complex problems and generate innovative solutions,
- practical applications and case studies building on state-of-the-art research, and
- works fostering engagement and inclusivity by encouraging active participation and addressing the needs of diverse stakeholders and underrepresented populations.

These themes signify connections and relevance among various subject knowledge domains. As such, this collection is presented with our editorial initiative to accentuate the interdisciplinary nature of immersive visual storytelling as a research agenda, which encompasses the intersection of arts, culture, and technology.

While having inevitable roots in complex audiovisual narratives, such as film, theater, or video games, immersive digital media claims its own frameworks among the arts. It remediates other forms of moving-image, interactive, multisensory, and embodied experiences but demolishes the boundaries between content and beholder: the user (or *experiencer*) receives, interacts with, and curates narratives by occupying a diegetic space and encompassing bodily control over the visual and sonic stimuli. This curated cross-media experience is central

to some contributions to this special issue. Duncan, Park, Ott, Langlotz, and Regenbrecht (2023) present the capacities of volumetric image capture to convey cultural narratives in a personal encounter with a Māori storyteller, while O'Meara and Szita (2023) analyze the cinematic roots of augmented reality experiences through performative, embodied, and cognitive angles. The work of Duncan et al. reports the developments of a real-time volumetric recording system that allows for streaming three-dimensional immersive content to connect New Zealand's Māori population to their ancestral traditions in a virtual *marae*, a building central to Māori communities for discussions and sharing stories. By this, the authors present methodological and technological frameworks for capturing cultural heritage through oral storytelling in a complex virtual space.

The authors identify the limitations of other audiovisual media in the lack of interactivity and physical proximity that affects engagement with stories being told by a single storyteller and reliving the manners, habits, and traditions related to storytelling (and listening) practices. O'Meara and Szita also combine frameworks of media technologies, narrative strategies, and the user's embodied involvement. They emphasize the affective qualities of AR filters and backgrounds, which reside in a user's ability to control and creatively modify their body characteristics, postures, and positions in real time, all while interacting with the digitally manipulated environment. The work contributes with its in-depth exploration of AR cinema techniques and the connections between AR technology and cinematic storytelling showcasing the potential of AR as a low-budget creative tool for emerging film and media-makers, particularly those who distribute media through social media and digital streaming platforms. As such, these papers provide important practical implications for content creators, user experience designers, and researchers working with extended reality technologies.

To reflect on practical implications, the contributions to this collection appropriately identify the need for new methodological and theoretical frameworks. Extending the scope of the two papers explained above, Alliata, Kenderdine, Hibberd, and Mason's (2023) work introduces a novel framework designed to explore extensive

audiovisual archives within immersive environments, thereby promoting an embodied experience for users or visitors. The current access modes are predominantly dependent on conventional information retrieval systems using metadata, which exhibit limitations that may constrain the development of an innovative interface. By integrating the concept of generous interfaces and the principles of immersive visual storytelling, Alliata et al. argue that a more profound, embodied comprehension of a collection can enhance the process of participation. The proposed framework positions users as active agents in the experience, driving the emergence of narratives through their interactions, fostering greater engagement with the public, and therefore enhancing their understanding of cultural aspects.

Tikka, McNamara, Gerry, Kosunen, and Kaipainen (2023) also present new methodological and technical solutions, but focus on shaping human-machine co-presence experiences. More specifically, they analyze the complex dynamics of human interactions with *Computer-Generated Others* (CGOs) and the implications for designing immersive narrative systems that foster a sense of co-presence and empathy. Through a case study, Tikka et al. explore the affective-cognitive experiences of human participants interacting with two artificial asylum seekers, examining the role of contextual narratives in empathy and decision-making concerning asylum. The authors propose a novel triadic model of enactive co-presence, encompassing virtual characters, humans, and specific contexts, to better understand these intricate relationships. By emphasizing the multi-layered nature of empathy in human-CGO interactions, this research contributes to the understanding and advancement of interactive immersive narrative systems, such as games, cinema, and virtual reality installations.

Centering arguments around the sense of presence, Kukshinov's (2023) work presents a theoretical framework to highlight the narrative and technological components of immersion. Kukshinov argues that different immersive experiences produce different cognitive states related to the sense of presence: whereas a complex narrative, for example, a film or a video game, elicits a mental state where a beholder engages with the fictional space, characters, and actions, immersive tech-

nologies afford another, more complex layer of sensory experiences. This paper proposes a distinction between sensory and mental immersion (extending studies that draw these lines based on technology or spatial immersion) to define how users deal with simulations. While Kukshinov reflects on the shortcomings of the definitions related to immersive experiences, Jefferies's (2023) entry to the special issue contributes to filling a methodological gap: by combining frameworks from arts, human-computer interactions, and visitor studies, he proposes potential methods for assessing user experiences of linear and nonlinear augmented reality narratives. The methods include a set of quantifiable observations related to interactions with digital interfaces along with the elicited emotional reactions of users engaging with two augmented reality experiences created by the author, the first being a reconstruction of the historical state of a public building and the second a set of digital objects superimposed to physical objects in an exhibition space.

Exploring heritage sites and historic places, contributions to this special issue raise questions about capturing cultural narratives in ethical and informative ways. Similar to the work of Duncan et al. (2023) on capturing the indigenous Māori cultures using immersive technologies, Ackerman, Koudelka, Hirsch, and Zaengle (2023) propose a technique of immersive virtual storytelling which combines realistic materials and translucent, ephemeral "ghost textures" to reconstruct World War II-era sights from archival material. Ackerman et al. view immersive experiences related to recent history with attention to excluding colonial frameworks but providing complex accounts of marginalized communities. Correspondingly, Zhao et al. (2023) delve into the utilization of augmented reality in the context of a practical project, which seeks to recreate and chronologically narrate a series of significant incidents that transpired around a case site to memorialize the then minorities who valiantly struggled for equal rights at the time. The focus of the paper is on elucidating the narrative design for the proposed location-based AR application, taking into consideration the affordance and environmental constraints inherent to the AR medium. Equality and activism are central themes for Dare and Yamada-Rice's (2023) work

as well: applying queer theory and the Brechtian alienation effect, their two case studies (interactive digital worlds) inspect narratives of queer experiences and the "problematic neoliberal structures in academia." By this, they reflect on the visibility, lived and imagined experiences, and social dynamics of communities. These papers systematically address specific design concerns, such as the methodologies for emphasizing particular groups of individuals within immersive storytelling and the seamless integration of virtual content into the real world and real societal challenges. Drawing on the unique affordances of immersive technologies, the authors propose design strategies that can potentially benefit the realms of education and activism.

By including novel methodological and theoretical frameworks, technological and practical applications, and works fostering engagement and inclusivity, this special issue aims to examine the mechanisms of delivering and receiving immersive narrative experiences. Its interdisciplinary perspectives from digital technologies, cultural applications, and cognitive and embodied experiences provide a foundation to initiate new discussions on immersive storytelling that apply equally to current tools and future innovations. This is crucial as immersive technologies like VR, AR, and MR gain increasing significance in online communication, social interactions, and information transmission. Therefore, we argue that theoretical and empirical analyses, as well as technical developments, must address emerging issues to establish a starting point for comprehensively understanding immersive visual storytelling. These include, for example: How can narratives convey a sensation of presence and emotional engagement to users? What elements and affordances of immersive technologies enable efficient information transmission? And what mechanisms allow users to efficiently distinguish between fictional and factual contexts during immersive digitally enhanced experiences?

The multidisciplinary perspectives collected here suggest the vast potential for using VR, AR, and MR platforms as new media for narrative expression. The fusion of narrative theory, cognition, and digitally enhanced environments proposed in the contributions points to an array of opportunities for meaningful progress in research and development. Overall, this special issue expands our understanding of the relationship between immersive technologies, stories, and human experiences.

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