Digitalizing experiential celebrations in the early modern civic space: A methodological investigation of augmented reality as an interpretative tool

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Abstract

This article investigates the methodological suitability of Virtual and Augmented Reality (VR and AR) to the recreation of early modern civic spectacles. These are presented as instances of controlled engagement of a (royal) user with a civic space temporarily 'augmented' by the engaging superimposition of structures, performances, and haptic experiences – hence fulfilling Ronald Azuma's definition of AR. The writings of theorists of space and Cross Reality innovators provide the basis for a comparative discussion of practical applications of VR and AR in history-related fields (archaeology, history, education, and gaming and entertainment). For their methodological similarities to civic festivals in addressing the complexity of human experiences in augmented spaces, AR-based virtual reconstructions are demonstrated to be cognate and ductile investigative tools.

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1 Introduction: Representing and Understanding Geometrical and Human Space

The potential of space to be represented and understood through the lens of human re-interpretation has attracted much experimentation over the centuries. During the medieval period, scholars and artists superimposed God's design upon the existing world, to help human minds make sense of the natural in the light of the supernatural and vice-versa, and represent it visually to an often illiterate audience. During the early modern period, the discovery of perspective offered naturalists, alchemists, and collectors the opportunity to represent space and matter as controllable quantities, regulated by the newly discovered forces of physics and empirical sciences. More recently, new technologies, such as 3D point cloud, Virtual Reality (VR), and Augmented Reality (AR), and more generally cross reality (XR),[1] have allowed space to be captured and then faithfully replicated, but also reinvented and transfigured, opening up new fields of research for specialists but also encouraging the public's explorations. These

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possibilities come with their own set of theoretical issues and opportunities: when confronting established understandings of the relationship between humans and space, different approaches 'can leverage traditional assumptions so they become visible and hence available for rethinking and reconceptualization' (Hayles, 2012, pp. 23–4).

In particular, the field of spatial history is currently trying to make use—but also make sense—of the 'here-and-now' approach of databases and data-based geospatial digital technologies. A discursive approach to space as diverse is now prevalent, one that addresses it as—in the words of geographer Doreen Massey—'lively' and challenging to tame, being constantly remodelled by human interactions (Massey, 2005, p. 14; Hayles, 2012, pp. 183–84). Massey argues that it is a regrettable characteristic of modernity to frame human history as merely spatial while downplaying the temporal element—and of spatiality to define the production of knowledge by binding places to what was perceived as 'their own internally generated authenticities' (Massey, 2005, p. 64). Historians' willingness to explore the potential of geospatial digital technologies in performing more time-sensitive spatial mapping, could then help redress this trend. Such studies of social interactions in spaces over time are particularly suited to the investigation of the early modern civic communities of Western Europe as places of dynamic instability and creativity, where multiplicities of views coexisted, as hubs of both new ideas and local folklore, and as places of transient involvement and criss-crossing of porous boundaries. This approach would help reframe current cries for supposedly lost 'spatial coherences' as nostalgic responses to globalization (Massey, 2005, p. 65).

Early modern civic communities experimented with acknowledging and expressing their own societal and spatial complexity, and the coexistence of chronologically and spatially contiguous disjointed identities, through shared 'databases' of gestures, customs, and visual tools that were both site-specific and pan-European in defining the 'civic' experience as such (Muir, 2005, pp. 255–56). In particular, civic ceremonies such as processions, festivals, and triumphal welcomes organized by the urban community to honour visiting rulers, were devised as experiences of collective and interactive ritual display. They routinely gave access and tangible form to such complexity, through experiential re-enactments of the renegotiation and reaffirmation of societal beliefs. This article discusses these early modern civic recreations as precursors of modern, virtual investigations of spaces through the computer-based mapping and reconstruction of spatial experiences, where a complex, layered physical reality is intentionally manipulated and enhanced to respond to the user's perceived needs—of entertainment, education, introspection, and studious observation. This article, then, investigates the methodological suitability of technologies based on VR, AR, and XR as cognate and sympathetic—but as this research will reveal, at the same time problematic and even limited—investigative tools for critical representation. In particular, it challenges any expectation of rigour and authenticity as intrinsically embedded in technologically mediated experiences, addressing their curated, non-neutral nature. Consequently, the comparison herein provides useful new pointers to both historians and designers, striving to understand the links and overlaps between the potential and limitations of the representative medium, and the complexity of the built and social environment being represented.

2 Materials and Methods of Spatial Representations: The Present and Past of AR

Early modern civic ceremonies gave visible, tactile form to the multiple identities of a civic community, grounding its inhabitants' sense of self—as politically active burgesses, devout believers, economically invested guild members, trustworthy subjects, battle-ready activists, and more—through choreographed experiences of enhanced physical reality. They promoted the construction of temporary spatial superstructures (decorations, stages, canopies, and tribunes). They conjured up the appearance of illusionary or supernatural characters and objects (costumed performers, holy relics, giants, and angels), and of miraculous events (the sudden manifestation of provisions or heavenly music) to make local lore come alive. Also, they enhanced the legibility of an urban space shaped by dynamic practices connecting physical buildings and locations, with social structures (Bennett and Polito, 2014, pp. 2–3). The case studies referred to for comparison mostly come from the

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British Isles, but also from France, the Italian peninsula, the Low Countries, and Spain, demonstrating geographical and cultural scope. Triumphal entries present particularly suitable elements for comparison, being centred around the advent of a royal guest for whom the augmented civic experience was built, and whose moving presence activated many of the added-on elements. Royal guests acted as the main—but, as I will argue, not only—'user' of a spatial exploration carefully enriched by a highly interactive, 'browsable' sequence of entertainments. Here, different experiences could take place sequentially or simultaneously and with different purposes in mind—from offering entertainment to securing attention and sympathy, from promoting knowledge to advancing dogmatic agendas (Mulryne *et al.*, 2013. Guidicini, 2020). Hence, this early modern culture of three-dimensional, experiential storytelling and real-time urban enhancement is notably part of the same tradition leading to the modern pursuit of VR and, in particular, of AR.

These augmented (urban) spaces are paralleled here to those in which computer-generated objects co-exist with and supplement the existing world. This is in line with Ronald Azuma's views of AR—rather than as the multi-layered and multi-modal modern reality created by the use of digital signage and WiFi hotspots, and identified by Augé (1995, pp. 94–115) as homogeneous, oversaturated, disembodied, disconnecting 'non-places' of supermodernity (Allen, 2008, pp. 27–30). Azuma's (1997) landmark definition of the three characteristics of an AR system states that (1) it combines real and virtual; (2) it is interactive in real time; and (3) it is registered in three dimensions (Azuma *et al.*, 2001, p. 34). This article argues that early modern civic space as remodelled for, by, and during triumphal ceremonies worked in just the same way; AR could then be considered as methodologically sympathetic, cognate tool to approach, study, and raise public awareness about these intrinsically elusive events, to be further explored in the context of conservation and heritage tourism. Comparable similarities will be now explored more in detail and in relation to Azuma's tripartite definition.

First, in relation to the combination of real and virtual, the addition of both figurative and physical temporary superstructures to existing civic architecture and societal constructs, worked with and built on the civic community's existing cultural connotations, and the spatial footprint expressing them, respectively. Manovich's (2006, p. 220) definition of 'augmented space' as 'physical space overlaid with dynamically changing information' fits with remarkable exactness the juxtaposition of urban surroundings and temporary, interchangeable added-on elements characterizing early modern triumphal entries. Such juxtaposition brought the implicit human (hi)stories embedded into civic spaces as folklore, memories, customs, and habitual acts of inhabitation out in the open and into focus, neatly packed in a compact experience for the (royal) user's time-efficient consumption. In fact, Manovich's (2006, p. 220) definition addresses the historical and cultural implications of the practice of spatial augmentation and does not refer only or specifically to technological means, making the further explorations into early modern territory that I propose, legitimate, and even advisable. Ceremonies of welcome, for example, were staged at civic borders, such as the civic gate of Saint-Denis in Paris, and London Bridge in London. In these locations, added-on structures allowing or forbidding entrance, symbolic props such as gate keys, and interactions with defensive automatons and welcoming performers, built upon these locations' traditional role as markers of the urban perimeter and guardians of the civic community's privileges (Bryant, 1986, pp. 125–40; Rodriguez, 2014). The ephemeral element is treated analogously in both modern AR experiences and in early modern enhanced civic environments, in that virtual objects did not replace the real world but were superimposed to it, creating a new compounded reality delivering enhanced new meanings through such very juxtaposition. In 1532, for example, the city of Bologna stood in for Rome for the coronation procession and ceremony of emperor Charles V; the erection of temporary structure and triumphal arches in key locations created spatial parallels and spiritual connections with the Papal seat, giving form to Bologna's claims of antiquity and ambitions as the second city of the state (Eisenbichler, 1999, pp. 433, 435–36). The experience of AR—which supplements information related to the real physical space in which the user is immersed—is then much more relevant to the workings of a welcoming ceremony than that of VR, the latter being based on a novel simulation in which the user works that is distinct from the actual space containing them (Manovich, 2006, p. 224). This

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could provide a criterion based on methodological reasoning, to guide the choice of one method of engagement and representation over another when dealing with reconstructing early modern ceremonies and civic spaces.

Secondly, in relation to Azuma's second requirement of AR being interactive in real time, the space of triumphal entries promptly responded to and interacted with the monarch's presence—the ceremony's principal 'user'. The monarch's prearranged arrival at a preselected spot activated musical performances, prompted the delivery of speeches, and decreed the start of set performances, before each elaborately composed setting returned to a state of quiet as the monarch's moved forward. As part of her coronation procession in London in 1559, Elizabeth Tudor's arrival at an artfully staged wasteland prompted its sudden transformation into a verdant, blossoming garden. The speech delivered by actor/gardener Vertumnus to James VI/I during the latter's welcome into London in 1604 explained how the king's arrival had overcome the withering effects of autumn. Alas, this was only a temporary change, as regretted by chronicler Thomas Dekker; after its temporary elevation thanks to the monarch's inspiring presence, the city would return to its everyday dull self (Bergeron, 1971, pp. 82–84; Parry, 1985, p. 2).

Early modern ceremonies also responded to the ruler's spontaneous interfacing with the space and the event—that is, with their unprompted experience of the augmented urban space, and potentially capricious reactions. Monarchical expressions of displeasure or interest could influence the format of subsequent interactions into appeasing, distracting, or further informing them. A monarch's unplanned appreciative, lengthy perusal or—to the contrary—quick rejection of a set performance could determine the pacing of the spatial progression, and the monarch's own willingness to involve others in the experience could change the expected identity and number of users. When Protestant Elizabeth (London, 1559) and Catholic Mary Stuart (Edinburgh, 1561) were confronted with similar circumstances during their civic entries—the homage of a bible and psalm book by Reformers—the former engaged at length in gestures and words of gratitude directed to the attending crowds, while the latter hurriedly passed the gift on to a sympathetic courtier and moved on (Kipling, 1998, pp. 127–29). In 1617 in Edinburgh, the homage of a book and a speech by learned subjects delighted James VI/I so much that 'in the mean tyme off the orationn, the King was so glade of it that he made Pembrughe, Southhampton, Montgomerie, and the Bischopes, draw nyer to heir quhat was spok' (Hardy, 1894, p. 20) to also experience the event, changing their role from background extras to co-users. These unplanned interactions of the user(s) with the enhanced space requested of the spatial reality the capacity to swiftly respond to and flexibly allocate for changes of pace and focus. This exemplifies the 'interactiveness' in real time advocated by Azuma for AR scenarios. They also granted the monarch/user a degree of spontaneity, self-expression, and spatial assertiveness not dissimilar to that experienced by players of AR games—although further considerations on the fictitious character of user-led spontaneity in both instances will be made later.

Thirdly, in relation to Azuma's requirement that an AR experience be registered in three dimensions, the peripatetic character of triumphal entries made them eminently three-dimensional based on the monarch's bodily engagement with a space to be walked through in its physicality. Its material concreteness was not only to be seen passively, but handled, tasted, smelled, and heard, as the organizers strived to create multisensory experiences. This included handling textured materials, engaging with musical performances, and being overwhelmed by the scents and odours of the ceremony. Attendees would also partake of the well-wishing distribution of wine and edibles—for example of food supplies, claret, and spiced wine at the Ponceau fountain during Parisian royal welcomes, or from purpose-built temporary fountains sprouting wine during the entrance of Johanna of Austria into Florence in 1565 (Bryant, 1986, pp. 141–42; Else, 2018). These additional components were 'registered' three-dimensionally—to borrow a term from the world of AR of which they are forerunners—and aligned to the early modern city's everyday physical reality to create a seamlessly amplified, inherently haptic, augmented civic experience (Papagiannis, 2017, p. 3). Early modern civic ceremonies were not the only experimentations with illusionary recreations of spatial experiences of the pre-industrial period, but they were notably the most well-rounded. Giovanni Battista della Porta's *Camera Obscura*, invented after

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1558, used the principles of optics to create perfect representations of the real word, but only as emphatically disembodied, metaphysical visual experiences. Triumphal entries—roughly contemporaries of *camera obscura*—also explored mankind's semi-divine powers to understand and create a space that was both realistic-looking and transcendent, attempting to make invisible concepts such as loyalty, authority, or hope visible for personal reflection and shared discussion. By adding layers to the civic backdrop—of decoration, of experience, of sensory stimulations—triumphal entries were not unlike the mid-17th century experience of the Magic Lantern, a device projecting shadows and images onto screens, curtains, and smoke, revealing ghostly figures to an audience eager to access invisible celestial planes. In relying on but at the same time directing and regulating the monarch/user's movement in space and physical engagement, triumphal entries also had points in common with late-18th-century Panoramas. These were 360° life-size indoor painted landscapes simulating the real world, encouraging a controlled degree of visual exploration and promenading within the bounded perimeter of the viewing platform. Later on, Charles Wheatstone's stereoscopic displays (from the 1830s) offered the illusion of physical immersion into a virtual space, thanks to a new understanding of the laws of physics and optics, and the potential of multiple viewpoints offered by a hand-held device. The resulting immersive experiences were based, like triumphal celebrations, on experimentations with the laws of perspective, physics, and optics as they were known at the time, and implied the user's willingness to suspend disbelief and abandon their senses to a newly created (if often mostly visual) reality (Hillis, 1999, pp. 41–49).

It seems apparent that triumphal entries need not envy these better-known, device-based early examples of AR experiences. On the contrary, triumphal entries were more markedly multisensory, consistently took place in real time and space, and created a complex three-dimensional reality loaded with subtle significances, and representing experiential portals to explore a physical world's enhanced meanings. Their lasting popularity across Europe between the 15th and the 17th century demonstrates their success and applicability, employing the transformative potential of a shared spatial experience to open a channel of communication between the local community and a monarch too often perceived as distant. The similarities between these complex, layered ceremonies with the world of AR as presented by Azuma, offer useful methodological pointers in the selection of sympathetic, suitable techniques of representation and investigation, within the numerous technological options available.

3 Results and Discussions on Current Experimentations

Virtual Heritage Visualizations (VHVs) have become established practices in the field of cultural heritage, developing from the early 1990s to include laser scanning, digital recording, and virtual tours, exhibitions, and reconstructions. The London Charter for the Computer-based Visualization of Cultural Heritage (2009) is a landmark document underlining how visualizations may be critically selected as the most appropriate method for research, study, dissemination of knowledge, and public engagement. It also discusses the importance of the pursuit of authenticity, intellectual and technical rigour, and transparency—all elements highly relevant to current discussions of suitable means of representing the early modern civic world.[2]

For example, taking the digital visualization of the city of Edinburgh as in 1544, realized by the University of St Andrews in 2017, the layout and appearance of the disappeared spaces have been brought back to life with sensitivity, and an eye to accessibility and public engagement through the associated website.[3] The visualization, offering a smooth bird's eye view of evocative, if somewhat eerily empty, spaces to the tunes of soave music, concentrated on the architectural, geometrical, and spatial element of the burgh, deciding not to engage with the experiential aspects of human interaction and inhabitation. Perhaps, by necessity, given the constraints of the medium of film, the user is presented with the oven-ready, final results of a creative investigation by researchers that happened previously and behind the scenes. The act of mapping, measuring, and representing a space for the consumption of others—philosopher Michel de Certeau argues—forms 'tables of legible results',

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from where 'the tour describers have disappeared' (de Certeau, 2005, p. 78). When discussing the power of engaging with space through the act of occupying and interacting with it, de Certeau argued that 'space is a practice place', observing how Maurice Merleau-Ponty's differentiation between geometrical space and anthropological space attributed a generative, qualifying power to the human act of experiencing, practising, acting, and moving in a geometrically defined place (Merleau-Ponty, 1962, pp. 324–44; de Certeau, 2005, p. 74).

It is difficult then to argue that a result-based, predetermined tool such as a VR-based pre-recorded video would be the flexible, experiential methodology to deliver the complexity of an interactive urban ceremony of the kind previously described—while describing satisfactorily the geometrical form of its container. In fact, reconstructing early modern festivals set within an urban setting presents the additional challenge of engaging with the intangible aspects of cultural heritage, related to the temporary structures, performances, and human interactions taking place in it, which added layers of significance and value to urban spaces. Laura Fernandez-Gonzalez's critical study of her own reconstruction of the entry of Philip I of Portugal (II of Spain) into Lisbon (1581) gamely acknowledged the difficulty encountered in finding suitable ways to present one's findings through a visual medium in a way that is rigorous and intellectually transparent, but also imaginative, open-minded, and engaging, and implementing the ever-important connection between research, teaching, and outreach activities (Fernandez-Gonzalez, 2016). Superb reconstructions focusing on the creative element of enhanced festival settings in early modern European cities and courts are being collected by the research groupART-ES as an accessible online exhibition.[4] Many final renditions include attention-grabbing elements, such as moment-specific sound effects, jocose speech bubbles, realistic alternations of close-ups and panoramic views, and details from contemporary paintings and engravings to superimpose to and populate images of current spaces. Although still bound by the format of a prearranged visual sequence, this created the impression of an interactive, even multisensory experience, while maintaining demonstrable rigour and accuracy. In more highly specialized reconstructions devised for purposes of research and further testing, users equipped with sensors became part of an interactive situation, which simulated their physical presence within painstakingly rendered environments. For example, in the 3D models of historic town Segeberg and Gieschenhagen, the user's movements in real life (RL) are tracked and replicated by the actions of their corresponding avatar in the recreated environment. This reconstructed world of German historic cities is described as 'walkable': however, spatial realism is questionable, as extra abilities such as teleportation are added for convenience, and spatial limitations are implemented maintaining the allowed area of movement within the preselected reconstructed areas (Deggim *et al.*, 2017). Apps such as Hidden Florence also give popular, convenient access to the 'walkable' reality of the historical city, through the less technologically demanding requirements of a hand-held device, frequently the user's own phone. Apps of this kind geolocate and follow the user's movements in a sensor-rich area within prearranged boundaries, and cross-reference them to a historical map of the city (in the Florentine case, that by Stefano Bonsignori from 1584) to present the users with location-appropriate audiovisual experiences.[5]

Within the limitation of the app format and the medium of a hand-held device, these reconstructions offer the user the chance to physically map (a predetermined portion of) the enhanced spaces themselves, turning them from a passive receiver of a prearranged sequence of information to an active co-creators of the experience. The progressive gamification of some aspects of urban reconstructions has indeed provided opportunities to focus on the potential and challenges of engaging with the experiential element. At the most popular end of the spectrum, the historical setting of games such as the Assassin's Creed series offered the player an interactive engagement with the spaces and cultural settings of selected historical cities, through their avatars' in-game explorations; frequently, spaces and settings did not represent historically accurate reconstructions of the past, nor were perhaps meant to. However, what a game-based approach can offer to the VHV conversation, is promoting awareness of the impact of an individual's actions in a historical continuum that is not predetermined, but constantly readjusted as a direct consequence of human

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decisions and interactions with events, people, and places (Dow, 2013).

In a scholarly setting, the application of AR to the field of archaeology, where evidence is often fragmented, has demonstrated the potential of interactive 3D virtual reconstructions to support both teaching and research. Virtual heritage already offers near first-person access to dynamically enriched visualizations, and a window into a past that was itself perceived and experienced 'in 3D' (Sanders, 2014). VR headsets such as Oculus Rift now offer an enhanced gaming experience of physical engagement, in an environment separated from the player's physical surroundings. In the field of AR, the potential of phone-based apps superimposing reality with a selection of spatial visualizations rich in sound effects and haptic elements such as vibrations—think Pokemon-GO—is of even more relevance. The app follows the player's exploration of their surroundings via geolocation, and populates them with creatures and props, to be interacted with against the backdrop or real-life spaces and buildings—many of them repurposed to new in-game roles that are often sympathetic and responsive to their RL ones. When engaging with enhanced spaces within a spatial visualization akin to Pokemon-GO, users experience the role of early modern visiting 'king', those for whom a temporary juxtaposition of illusion and reality is created, and who have the power to change the course of the narrative through their active engagement with elements in space: they are those whose individual perspective—literally—matter. At the same time, shared uses of AR experiences also challenge the king-like centrality of the single player. Early modern civic ceremonies, bringing together and depending on the concurrent experiences of the monarch, the organizers, and the onlookers as both spectators and performers, progressively blurred to become a collective construction. Similarly, in an AR scenario, the views of potentially endless players/'kings', now used to the breath-taking, semi-divine, individualistic power of creating reality, could then be aligned in a mutually enriching way, offering complementary rather than contrasting views of the same narrative, concurring in the construction of a shared experience.

To expand on this, let us consider again how during the early modern period, triumphal celebrations set in the civic space represented opportunities to 'augment' civic reality, seamlessly integrating a real background with objects and experiences that were 'virtual', to deliver a chosen (political) message more efficaciously. *Virtual* is meant here in the modern sense of temporary, not physically present, only a representation. Triumphal structures such as arches, platforms, and models were built quickly and economically in canvas and timber painted to resemble marble and brickwork, effectively matching the substantial reality of the surrounding city as long as, like a theatrical setting, they were seen from the intended viewpoint. In Florence, large canvases with painted perspectives and urban vistas to complement specific locations, were part of the civic decorations welcoming Johanna of Austria in 1565 and Maria Magdalena of Austria in 1608, directing the visitor's gaze to an illusionary horizon and subtly suggesting a direction of travel (Testaverde, 1980, p. 82, fig. 117). More three-dimensionally, flags, coat of arms, painted shields, statues, and singing performers, actors, and wondrous objects enlivened both the permanent, tactile, functioning buildings and spaces, and their temporary, virtual counterparts. An example of a temporary gateway was built in 1561 for the entry of Mary Queen of Scots in Edinburgh in the vicinities of the Over Tron building: it was a realistic, substantial 'port made of tymber, in maift honourable maner, cullorit with fyne cullouris, hungin with fyndrie armes; vpon the quhilk port wes fingand certane barneis in the maift hevinlie wyis' (Thomson, 1833, p. 68). However, the *virtual* component of triumphal entries as augmented experiences should also be related to the Old English meaning related to the Latin *virtus*—having beneficial qualities or desirable characteristics promoting personal growth and measurable improvements. Engagement with new technologies and modern AR experiences can empower the user by offering tools to expand their creative thinking and imagination, through experiences that impact markedly the users' perception of themselves, their abilities, roles, and position—in society, in space, or about a topic. In Assassin's Creed, the player's decision-making process is influenced by progressive access to confidential information and to 'behind the scenes' aspects of events, through a creative exploration of a reconstructed historical space unfettered by the physical, logistical, and social limitations of reality (Dow, 2013). More soberly, enhanced immersion into another person's or group's reality and perception of

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the world through augmented experiences reinforced by appropriate spatial significance—for example, of refugees or war victims—can promote awareness of alternative points of view, and encourage the user to take action to cause positive change in the real world (Papagiannis, 2017, pp. 38–41). As comparable narrated augmented experiences, triumphal entries also presented a monarch often perceived as culturally, geographically, religiously, or politically remote, with a selection of viewpoints and concerns representing the interests of the local community, the region, or the nation. This opened a backchannel of communication separate from more prescribed, regular associations, and a window for the monarch into the inner workings of the hosting city. In 1513, Ferdinand of Aragon's trusted advisors worked closely and at length with Valladolid's civic and religious authorities, appointed local artists, and scholars, to fund, devise, actually make happen, and then memorialize via printed publications the celebrations for the king's arrival (Knighton and Morte García, 1999, pp. 140–43). Frequently, these events were focused on presenting issues, proposing solutions, and alluding at advantageous *quid pro quos*, alerting the monarch to what intervention was ideally expected of them. For example, the entry for Cardinal Archduke Ferdinand staged in Antwerp in 1635 denounced the damage years of bad politics had done to the city, with two final arches showing the poverty of the city and even hinting at the Spanish responsibilities for the situation, as well as respectful appeals to the Archduke for help (Strong, 1984, pp. 48–49). On a more intimate level, through their many references to the necessity of pursuing virtue, entries were educational experiences providing ambivalent rulers with a moral compass to direct their future actions. The monarch's experience of 'walking in the organizers' shoes' by experiencing an enhanced civic space during the processional event was meant as a transformative one, returning a transfixed, morally enriched ruler to the real world, eager to improve its many shortcomings by embracing their new role. In 1640, a sympathetic, persuaded Archduke Ferdinand obtained from his royal connections the authorization for Antwerp to trade in the East Indies, the very solution to the city's economic stagnation that had been presented to him during his entry (Strong, 1984, pp. 49–50). The progress in space of the king's own 'avatar'—the carefully crafted public persona he 'wears' while inhabiting the augmented civic world—was frequently temporarily halted by interactions with physical objects, staged events, and attractive viewpoints, as opportunities for engagement and learning through both action and reflection. The monarchs engage with a series of revelations—applying here words originally referring to the context of game-playing—'that allows them to progress, to escape stasis, to reassert their dominance over their environment' (Gallagher, 2018, p. 142).

The construction of the early modern spatial narrative was not without unresolved issues, and considerations can once again be made by comparison with the world of modern AR. First, the civic AR was designed to embody the views and expectations of only a section of the population—influential, well-connected, affluent. Theirs was the power to determine what sort of transformative experience the ruler will be subject to—hence, what sort of world the newly inspired ruler would be inclined to shape in the future. Individuals and corporations finding themselves without a voice—or a designated location to be seen or heard within the ceremonial narrative—looked for spatial alternatives, organizing *impromptu* meetings outside the tightly controlled boundaries of the civic space. In 1509, peasants gathered outside the civic gate of Valladolid to intercept King Ferdinand of Aragon and entertain him with spontaneous country dances and tambourine music, before the king proceeded to the more formal entertainments within walls (Knighton and Morte García, 1999, p. 154). In Edinburgh, during the 1617 entry, the newly founded University—lacking an assigned space on the traditional route—set up a performance for James VI/I in the courtyard of Holyrood Palace (Hardy, 1894, p. 20). Secondly, the monarch/user themselves might try to push the boundaries of the experience as designed for them to explore. Some rulers found themselves in disagreement at times with the principles and expectations embodied by the AR they were expected to inhabit, and refused to engage with it or attempted to force changes of their own making. Religious differences were a frequent cause of friction; the entry organized in Edinburgh for Catholic Mary

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Queen of Scots in 1561 by a largely Protestant burgh was designed to encourage the monarch to rethink her problematic religious allegiances (MacDonald, 1997). Mary's attempt to intervene on the timing and footprint of the event by bypassing the entry gate and heading to Edinburgh Castle for a courtly meal gave a spatial dimension to her displeasure and reaction (Guidicini, 2020, 81). Political allegiance could also be represented through imposed changes to the established route: after having besieged and conquered disloyal Naples, King Alphonso V of Aragon elected to ignore the working civic gate when entering the city in triumph in 1443, using instead a breach in the walls to emphasize forceful subjugation (Ruiz 2012, pp. 127–28).

Finally, while the centrality of the monarchical experience needs to be acknowledged as an essential characteristic of the augmented spatial realities of early modern welcomes, the organizers' and onlookers' own transformative experience impressed upon their ideas of royal magnificence, civic pride, national relevance, and loyalty to a monarch appearing, probably for the first and only time in their commoners' lives, spatially accessible. The transformative potential of early modern AR changed not only the king and the urban spaces but the community's sense of self, and the individual's confidence in the potential of collective action and personal agency.

Even for early modern ceremonies, then, it is difficult to determine whether they were—applying again the language of modern virtual reconstructions— 'read-only' events, or 'read-and-write' ones. This is in fact a question of some importance in modern studies of AR: a modern AR experience is often constructed as a highly personalized event, in which the user individually engages with their surroundings, by deciding when to turn, what to handle, where to look. However, previous examples have revealed it to be also inevitably pre-constructed, limited for example in a narrated experience exploring a building or a city, to areas where sensors are in place, with the information and virtual objects with which the user can freely interact belonging to a pre-arranged set. In games, the limitations of the player's freedom to a selection of spatial choices offer reassuring benchmarks in a potentially overly complex virtual world, often non-compliant to Euclidean rules (Gallagher, 2018, pp. 145–46, 149–50). In many AR/VR experiences, the user's sovereignty over the augmented space they survey and their ability to intervene on the narrative is an illusion; their access to areas, interaction with objects and bots, available body movements, and viewpoints have been pre-enforced and influenced by programmers' skills, personal bias, financial strictures, and businesses' agendas. This inevitably questions any expectation of 'authenticity' of the technologically enhanced recreated space, particularly in the field of historic reconstructions, and consequently, the value of the user's experience in it and of it. This conundrum can be at least partially addressed by a shift in paradigm. Dueholm and Smed (2014, pp. 288–90) expand upon Wang (1999) to introduce a post-modern approach to the authenticity of Virtual Heritage, focused not on the (acknowledged) inaccuracies and selectiveness of virtual recreations lamented by heritage managers, but on the existential authenticity of the experiences they make possible, and on the emotions and individual responses activated by the users' interactions. The non-neutrality of AR and VR technologies remains problematic in scholarly investigations based on the traditional object-related definition of authenticity and centred on the search for authoritative and reliable material(s). However, in more public-oriented circumstances, if the authentication process could be viewed as 'hot'—that is, as a social construct involving the beliefs and cultural values of both creators and users—then expectations of quasi-scientific objectivity could be selectively lowered, in favour of a more comfortable alertness to an acknowledged non-neutrality that privileges engagement (Dueholm and Smed, 2014).

In offering the opportunity for *media*ted engagement with augmented civic spaces, early modern ceremonies of welcome are not conceptually far from contemporary *media*-centred urban and social experiences. Their flexible understanding of augmented spaces as vehicles for political communication was based on visualization and distribution of space-sensitive information in relation to the contemporary concept of Geomedia, making connotations usually embedded within the urban fabric and in the community's inner consciousness, temporarily evident,

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with permanent social consequences (McQuire, 2016, pp. 1–7). Augmented spatial ceremonies were three-dimensional attempts to understand, catalogue, and control, a world becoming geographically, politically, religiously, and scientifically more complex and less established (Guidicini, 2020, pp. 33–35). In the 21st century, the experience of game-playing in an AR world is again just that, 'an allegorithm of the player's fantasies of mastering an unruly, recalcitrant material world using technologies that render it legible and tractable' (Gallagher, 2018, p. 142), describing allegorithm as the experience of interpreting a game's algorithm in a way that 'reflects a truth about the role of technology in "everyday life"' (Gallagher, 2018, p. 142). Similarly, the creation of a prearranged civic experience was deceptively centred on a harmonious narrative leading towards a satisfying resolution, speaking of hoped-for agreement, communion, and mutual trust. Those who experienced it were presented with a much-appreciated respite from real-life uncertainties—a parallel to modern game-like AR experiences offering the illusion of spatial coherence, agency, and fulfilment. At the same time, the partisan and non-neutral views and experiences of organizers, users, performers, spectators, and chroniclers contributed to the creation of a collective, temporary, ideal world enriched, rather than threatened, by the potential for multiple interpretations.

4 Conclusions: A Reasoned Choice

AR-based reconstructions—particularly those including experiential, interactive, even game-like elements—represent methodologically suitable tools for academically sound reconstructions of lived-in civic environments and of the early modern civic celebrations taking place in them. Particularly in the case of triumphal entries, the spatial limitations and operational restrictions intrinsic in the representative medium, mimic and reflect the experience and challenges of devising, creating, and engaging with an enhanced civic space, making them sympathetic tools for investigation and representation of this kind of intangible, experience-based heritage, as well as public-friendly tools for dissemination.

Both experiences offered the user (an illusion of) free choice in responding to a preselected series of elements and locations, which will compose a meaningful narrative both educational and entertaining. In both the cases, physical progress and movement in space granted the user (the illusion of having) an active role in the mapping and construction of an individual, but often carefully choreographed, narrative. Both realities are in fact bound by disguised, but in truth rather fixed, spatial boundaries, which bolder rulers/players/users will strive to explore, challenge, and bend. Both present the challenge of incorporating the main user's views with those of others who also claim—as fellow users, designers, scholars, observers—some role in the devising, mapping, construction, and ultimate enjoyment of the spatial reality. Finally, both circumstances offered a safe, sandbox-experience of engaging with the issues and controversies of an increasingly complex world, creating an opportunity for reflection and personal growth which would possibly go beyond the range of expected outcomes imagined by the designers. In fact, as mediated and declaredly politicized events encouraging individual and filtered responses by different participants, and aiming not at strict realism and veracity but rather thriving on the multiplicity of viewpoints and interpretations, triumphal entries can make the best of—rather than being weakened by—the non-neutrality of technologically mediated experiences.

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Notes

1 The extended reality that combines augmented, virtual, and mixed reality experiences.

2 The London Charter at http://www.londoncharter.org/index.html.

3 Edinburgh 1544, Virtual Time Binoculars, in https://www.smarthistory.co.uk/Edinburgh1544/.

4 ART-ES. Appropriation and Hybridization between Visual Arts and Performing Arts in Early Modern period, https://wip2.khm.at/. Information about the project at https://artes.hypotheses.org/, and digital exhibition at https://www.artes-exhibition.digital/opening/.

5 Hidden Florence, in https://hiddenflorence.org/.

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