

Future Playgrounds. How to Digitally Expand the City. Augmented Reality (AR) Art-pieces in Public Space

Valerie Messini^{1,*}

¹Peter Weibel Research Institute of Digital Cultures, University of Applied Arts, 1010 Vienna, Austria;

E-Mail: valerie.messni@gmail.com

*Corresponding author

Abstract

Distractions and disruptions of attention, induced by mass and social media, have become an omnipresent part of our everyday lives. Constantly online and with a device at hand, remote and digital technologies seem to shape people's behaviour more than surrounding architecture does. Even our urban tissue has become a tagged metaverse driven by chronic hyper-efficiency, simultaneity and equanimity—an accumulation of lonely humans staring into their phones. Do we still have the possibility of a collective virtual and material urban space, a shared experience, settled in built and unbuilt space alike, both beneficially interwoven into each other? In this article I will present selected works from my artistic and academic practice using Augmented Reality (AR) as a medium in an urban context. On this basis I want to discuss how our cities expand into the virtual realm through digital media and, on the other hand, I would like to demonstrate how urban space could be enhanced through playful virtuality. Conventional digital interactivity, historically rooted in video-games, is driven by protocols and efficiency. Conversely, it seems that the absence of a protocol is what conceptually differentiates playing from gaming: playing implies invention and learning, while gaming is about performing preconceived rules. Playfulness is, therefore, understood as a form of interaction capable of constituting and shaping identity and thus proves a valid method to liberate chronic hyper-efficiency-driven urban fabrics.

Keywords

arts-based research; augmented reality; digital interaction; playfulness; urban space.

1. Introduction

In this article I will exhibit selected works from my artistic and academic practice using the medium of augmented reality (AR) in different contexts. I will also discuss Rafaël Rozendaal's (2001–2019, 2012, 2020) work, which was a major inspiration for creating new understandings of digital space and materiality as presented in this paper. On this basis, I want to discuss how digital media pushed our cities into their 'expanded field' (Krauss 1979) and, on the other hand, I want to show how urban spaces could be liberated from capitalist compulsion and enhanced through playful virtuality.

We are living in the age of the digital and the virtual. This has been made inevitably clear by the Covid-19 pandemic and the accompanying preventive measures such as smart working, health tracking, distance teaching, zoom parties etc. It could be said that digitalization instigates a profound and irreversible change in the way we live together—it has transformed society already and will do so even more in the future. No wonder, the 2021 Venice Biennale poses the question 'How will we live together?' (Sarkis, 2021). Melissa Gronlund (2017) confirms that digitality and the Internet have become integral parts of our everyday lives and, thus, have also entered the art world, drawing a distinction between the Internet of the 1990s and the Internet of today. In the mid-2000s four revolutionary developments led to

an unstoppable growth of social media: Facebook, YouTube, Twitter and the iPhone as the first smartphone (Gronlund 2017, p.2). Since the advent of social media, we have been evolving towards a 'metaverse', a term that first appeared in 1992, coined by Neal Stephenson (1992) in his novel 'Snow Crash', describing a collective and collaborative virtual space. This shift towards virtuality, the demounting of reality and the tendency towards immateriality have already happened in the field of art throughout the 20th century. Also, the theoretical topic of virtuality has been treated in numerous works of art and thought models. Among others, Peter Weibels (1990, 2015) work, both theoretical and artistic, plays a central role in this discourse. Originally, the spatial experience of humans was body-centred. Da Vinci's Vitruvian man or Le Corbusier's Modulor are just two examples from the history of architecture, where engineers or architects tried to find an anthropometric scale of proportions. Thus, this is not unproblematic, as Federica Buzzi (2017, 'The Modulor Man and other dummies') points out: "Situated within a certain Western humanistic programme that goes back to Protagoras 'Man, measure of all things' then revived by Leonardo da Vinci's Vitruvian Man, Le Corbusier's Modulor is an updated version of this masculinist and ableist universalism."

According to Peter Weibel (1990), a machine-based spatial experience emerged with industrialization, and since the information revolution (telephone, telefax, television and internet) we can speak of a media-based spatial experience and architecture. Initiated by the technology of telecommunication and thereafter enhanced by the massive expanse of digital data space, demand arose to shift fundamental concepts of architecture such as materiality, gravity and volume towards the virtual realm. Stephan Doesinger's (2008, pp.16–19) 'bastard space' as well as Weibel's writings on 'disappearing architecture' (Flachbart, 2005, pp.12–15) and 'machine or media-based spatial experience' (Weibel, 2015, p. 31) present theoretical approaches, in which materiality/physicality and -digitality are not understood as separate, but are interwoven, interconnected, and merged into one. Therefore, I would like to pose the following question: Do we still have the possibility of a collective virtual and material urban space, a shared experience, settled in built and unbuilt space alike, both beneficially interwoven into each other?

2. Rafaël Roozendal

Understanding the digital not as a self-contained realm but as yet another layer of the reality-complex we live in, is an approach embodied, among others, in the work of Rafaël Rozendaal, a visual and digital artist who attracted attention by using the World Wide Web as his canvas (Jordan, 2017). Rozendaal programmed a vast set of pleasing homepages (Rozendaal, 2001–2019), each based on one distinct effect. Sometimes the pages are responsive to the visitor's behaviour: by clicking s/he might subdivide the canvas or trigger the program to perform the assigned artistic action. In any case, the interaction is rather meditation-like—there is not much to do on Rozendaal's pages—on the contrary, visitors get decelerated and find themselves observing and enjoying. "Art is a place for reflection and contemplation. Quiet, calm, staring. Trying to observe without too many thoughts. (...) We are used to viewing art that way, but the internet is a different place. The internet is fast paced, jumping from link to link, from impression to impression". (Roozendal, 2020)

'Quiet, Calm, Staring' (2020) was the title of the first exhibition on the online portal of Amsterdam-based upstream gallery. Rafaël Rozendaal selected 13 websites by different artists that do not require interaction or provide information but are endpoints. Visitors find themselves decelerated, in a quiet space, a safe space, that seems protected from the constant information and sensory overload characteristic of the internet. On the contrary, those are spaces capable of offering calmness.

Social Media and therefrom constant distractions and disruptions of attention have become not only an omnipresent part of our everyday lives, but even our urban tissue has become extended by digital layers of information: We navigate the city, constantly online; we are using dozens of Apps to access the public transport schedule, unlock a car or call an Uber. We share our location; we check opening hours and ratings. At the same time electronic billboards, automated lights, sometimes even acoustic announcements attract our attention and guide us. Through data we talk to the city and the city talks back to us. But this communication is mainly driven either by the idea of hyper-efficiency or serves to persuade us to consume. Also, it is characterised by multiple

Apps running in simultaneity and delivering information in equanimity, until we run out of battery and therefore often seems rather exhaustive, especially on a visual and perceptual level. Time Square NYC is definitely one of those places, which best exemplifies this over-stimulation; even more impressive, in this context, seems one short moment of respite at the dead of night:

Between 41st to 49th streets, just before midnight around 100 of the iconic electronic billboards display digital works of art for 3 minutes, from 11:57 pm to 12:00 am. "Midnight Moment is the world's largest (...) digital public art program." (Time Square, 2022) A new artwork is presented every month. The program has been running since 2012 and has since showcased the work of over one hundred contemporary artists. In February 2015 Rozendaal presented his work 'much better than this': Two faces, depicted as brightly coloured silhouettes, are kissing each other. With each kiss, one of the silhouettes—the one, which initiated the kiss—is changing its colour. Exhibited during Valentine Season, through its simple but compelling visual language, the work aimed at addressing the viewer regardless of social and economic background, ethnicity, or education. This way—by using digital media—the artist created visual stillness and a moment of emotional contemplation at one of the busiest places worldwide: An artistic proposal for emptied virtual spaces, where digital or virtual space is used to reduce sensory overload.

Rozendaal's (2010) first attempt to bring the Internet into physical space dates some years back, to his idea for the open-source project 'BYOB'. The first BYOB event was organised by Anne de Vries & Rafaël Rozendaal in Berlin. They invited 25 artists to 'bring their own beamer' (projector) and collectively populate space for one night with projected digital content. Thereafter, BYOB was repeated many times around the globe.

I find Rozendaal's investigations in the creation of visual stillness or togetherness within the digital realm relevant to my work, as they imply an interest in perceptual processes and the construction of space through digital media. Furthermore, Rozendaal's work shows how virtual spaces offer op-

portunities to occupy space that is free of regulatory restrictions, established by institutions or markets.

Average screen-time is globally increasing, "teens spend up to 9 hours" (AACAP 2020) a day in front of their phones. This clearly shows the scale of virtual space: it will soon exceed the physical, built space and, therefore, has entered the conceptual realm of architecture. Consequently, we need new perspectives on built and unbuilt spaces, where both can be advantageously interwoven.

3. Other Matter

Does architecture always need to be physical? Which ways of spatial expression, embodiments, extension and new awareness can be achieved and designed through digital media? And what role could Augmented Reality (AR) play in (re-)programming space, especially in exhibition design and contemporary, virtual design methods?

I approached these questions in the course 'Other Matter', conducted together with Bence Pap and in collaboration with students from various departments at the University of Applied Arts in Vienna during the summer term 2021. We wanted to investigate the possibilities of the population of virtual and augmented space in a playful use of digital technologies, in this case AR. We looked at different notions of immaterial architecture in order to develop ephemeral, audio-visual objects, structures or installations, which are able to enter into a dialogue with the existing architectural context and echo new experiences or new ways of perceiving space. The existing spatial context was 'the Heft', a deserted iron ore plant in Carinthia, Austria, with a built extension, an impressive steel-glass-construction erected on the occasion of the Carinthian Provincial Exhibition between 1993 and 1995, which is today considered a central work in architect Günther Domenig's oeuvre. Due to its vacancy over several decades, a unique situation of sculptural and architectural overlaps as well as overgrowths by nature have emerged. In the course, groups of students were asked to develop a space-bound AR-exhibit. Each group was asked to accentuate one of the many layers or histories of the place and investigate possibilities of how the interface design could foster involvement in a way that is playful, intuitive and low-thresh-

old. The exhibits were shown as part of the exhibition Günther Domenig: DIMENSIONAL @ Heft/Hüttenberg (2022), curated by me. Likewise, the slightly dystopian and definitely post-anthropocentric effect of the building was accentuated by the interventions of the students. Each group selected a specific location, which, on the occasion of an initial field trip, was digitally documented and reconstructed in 3D to let the new ephemeral figurations, designed by the students, properly blend into the existing structure. The portals to those space extensions were black and white QR-codes, positioned on delicate pedestals, consisting only of a box-wireframe out of reinforcing bars. They could be scanned and viewed via the visitor's phone camera, whose paths got disrupted and their attention drawn to specific contextual layers (Video Link: <https://youtu.be/xz2tf01Zv1U>).

The Project Cyber Nature for example recalls Domenig and Huth's project Medium Total (1970–1973): a cellular membrane that adapts to its environment. Alina Logunova, Peter Marius, Tomaz Roblek and Adam Sinan created a colourful animation climbing up the walls inside of one of the two blast furnaces. The graphical language of the animation (see Fig-

ure 1) is based on the original drawings by Domenig and Huth (1969–70) in direct reference to Medium Total the project expresses a cybernetic nature that creates a new dynamic layer on top of the existing physical structure and thus the project sensitises the recipient for the multitude of layers of ruins, architectural structures, and nature found at the Heft.

In the other blast furnace a lens-like installation by Martin Eichler, Martina Moro and Dunia Sahir could be seen, which draws the visitor into the atmosphere of the original function of the building—an iron ore plant—by making the chemical reaction of iron ore perceivable through their audio-visual AR-installation 'the last iron lung'. Their project (see Figure 2) draws attention to the life cycle of the non-human entity of the furnace and how it shaped and continues to shape the local ecosystems. They treated the furnace as if it was alive. In their project description they explain, how the chemical reaction active during iron production could be compared to the act of breathing of living organisms, because oxygen is introduced from the bottom to ignite the melting iron, while CO2 is emitted on top, producing pollution.

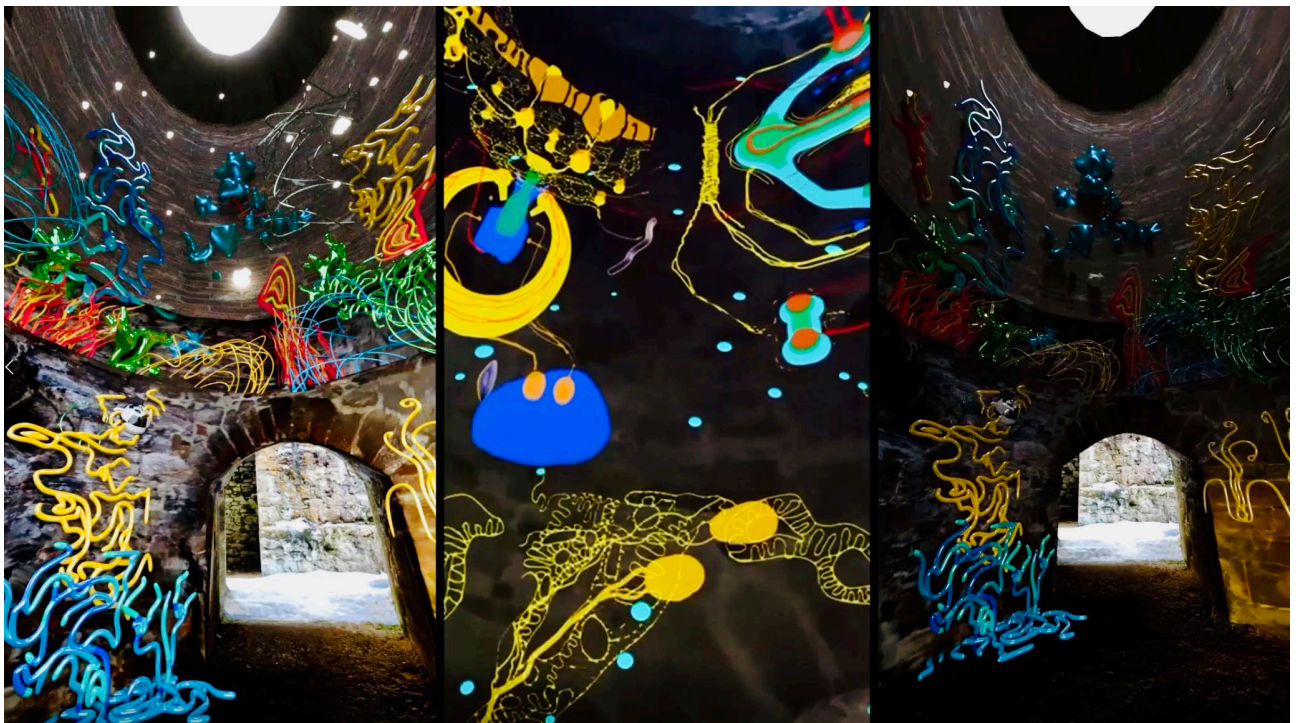


Figure 1. 'Cyber Nature'. Source: Alina Logunova, Peter Marius, Tomaz Roblek and Adam Sinan

These installations showed a deep connection to the place, a kind of territoriality or relation to the place, where they were meant to be installed. They are place-making or better place-establishing, as, by telling alternative (hi)stories, they create new access points and hence a new understanding for the existing space. Interestingly enough, the developed projects also could be relocated to be exhibited at the Angewandte Festival 2021. The works managed to carry the special atmosphere and the different layers of identity of the Heft to Vienna.



Figure 2. 'The Last Iron Lung'. Source: Martin Eichler, Martina Moro and Dunia Sahir.

Video Link: <https://youtu.be/UUA1thkr8XA>

4. Flying Eyes and Other Works by Eva Schlegel + 2MVD

'Flying Eyes' was a public exhibition at Museumsquartier (MQ) Vienna in Summer 2022 showing a set of AR sculptures (see Figure 3) developed by the artist Eva Schlegel in collaboration with 2MVD. Scattered around the exterior space, those sculptures were playful and engaging, drawing visitors in by their apparel.

According to Doesinger (2008), conventional digital interactivity evolved mainly through (video)gaming and, due to its technical limitations, is historically limited to a fixed set of possible actions. This induces a behaviour, which is following a strict protocol and, therefore, reduces creativity. Conversely, it seems that the absence of a protocol is what conceptually differentiates the action of playing from gaming: Playing implies invention and learning, while gaming is about acting according to preconceived rules.

The AR-sculptures were created as an exemplary case study for the AR-App Wikar. The study was first shown in October 2021 in Palermo at Spazio Incolto ai Cantieri Culturali alla Zisa (see Figure 4). The Wikar App was developed by the Advanced Visualisation Lab of the National Centre for Supercomputing Applications at the University of Illinois at Urbana-Champaign, the Cyprus Institute, der DARIAH uDigiSH Working Group and BEAMY.space. The App aims to offer a platform to various cultural institutions, to add historic and speculative cultural information layers to a specific venue in a city. We were in direct contact with Colter Wehmeier, who programmed the App, in order to develop and extend the App for an art use case.

2MVD is a collaboration between Damjan Minovski and me, founded in 2017 in order to develop speculative spatial projects at the boundary between technology, art, design, film, and architecture, while connecting architecture with innovations and advances in the field of digital technology. Our work has been shown in galleries and at Design and Film festivals in Austria as well as internationally.

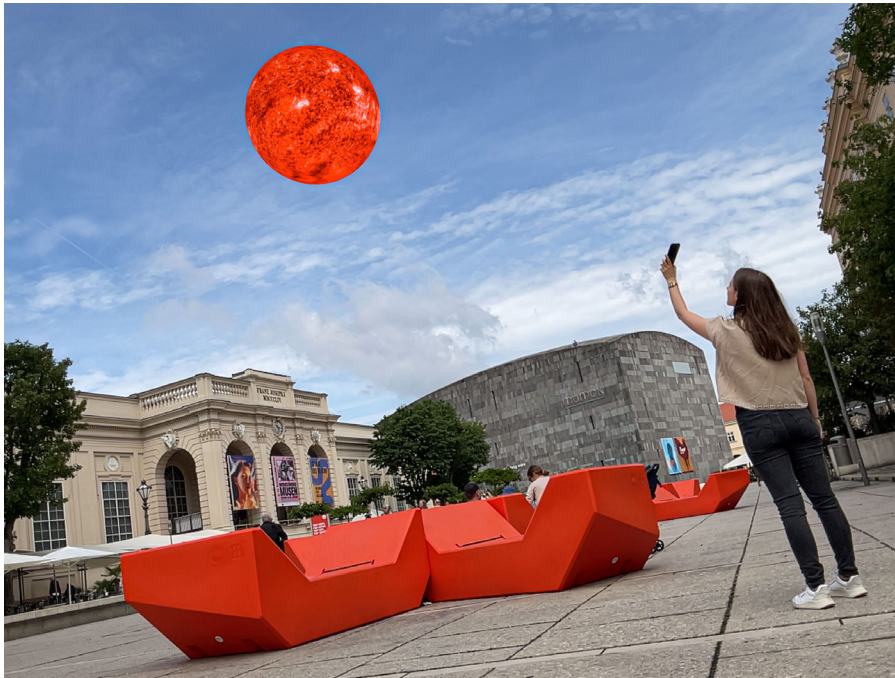


Figure 3. 'Flying Eyes'. Installation at MQ in Vienna. Source: Eva Schlegel & 2MVD; Foto© eSeL.at - Lorenz Seidler



Figure 4. 'Ice White', 'Nebula' and 'Read me'. Installation view at Spazio Incolto. Source: Eva Schlegel & 2MVD, Foto © Damjan Minovski

Eva Schlegel's (1994–2022) work focuses on the concept of space, immateriality, and the relationship between image and language. It is often concerned with perception and cognition processes or, more precisely, their failure. In her blurred photography (2002) she confronts the viewer with the inability of seeing in focus or she deprives the text of legibility by blurring text (1994). But despite this deficit at first glance, Schlegel is rather interested in how much information is inscribed in the underlying visual and spatial structures and, thus, remains visible. In the context of the bespoke study, those moments of perceptual failure were translated into AR-sculptures.

'Black Holes' and 'Ice White' are both ephemeral spheres, approximately 2–3 metre in diameter, floating one metre above

the ground. You can enter them and be completely surrounded by them. When inside, you see the world through the work, which acts as a filter, visually distorting or defragmenting the surrounding environment. 'Black Holes' is a matte black surface, which has an animated texture with vivid circular perforations. The perforations grow or shrink continuously and, thus, Black Holes becomes an animated mask, blending fragments of the surrounding space in and out (see Figure 5).

'Ice White' is based on the concept of refraction. The sphere has an icy texture, somewhat like a frosted window. It is transparent and you can see through it, but the image is not clearly visible. It is distorted by a shader script that alternates the information collected through the device's camera (see Figure 6).



Figure 5. 'Black Holes'. Source: Eva Schlegel & 2MVD, Foto © Damjan Minovski

Figure 6. 'Ice White' at the Stadtgarten in front of Kunstraum Dornbirn. Source: Eva Schlegel & 2MVD, Foto © Valerie Messini

The work 'Read Me' (2021) deals with the (in)ability of grasping words, the transience of time, and the immateriality and beauty of poems. All the works cited above were meant to be exhibited in a public space. Besides MQ Vienna, they were exhibited at Palermo Spazio Incolto and in Dornbirn in front of CampusVäre and Kunstraum Dornbirn.

The App needs to be downloaded, but it is free. Thus, it has a low-threshold for access and holds a potential for inclusivity, as possible viewers do not get scared by highly priced tickets and artworks closed off behind museum doors. The works proved to be very easily accessible and also involving. The fixed installation of the QR-codes established a stable position and orientation of the virtual objects, perceivable in the same way through any phone and by any user. This way, all visitors were navigating the same space and hence a communal experience could emerge. This became obvious as we could observe the visitors lively engaging, taking pictures, moving around or simply indulging in the viewing experience. But more than for taking selfies, the installation became a

place for the collective discovery of funny visual alterations of the self, the works would produce. As the App also incorporated a Photo-Button, it was an important part of the project to create an urge to take a picture. And of course, we wanted to design this experience to be pleasing, and to be rewarded by a good image.

The work both functions as a lens—when inside—and, on the other hand, when seen from the outside, as an object that enters in relation with the human body (see Figure 7). Some objects are moving, hence, the user can chase them or interact with them.

For the abovementioned exhibition at 'the Heft', Eva Schlegel, Damjan Minovski and I developed two site-specific works, or better adapted two of the existing sculptures to the spatial and contextual framework. In 'Read Me Heft' (2022), we respond to the history and structural condition of the Heft: ghostly, cloud-like ephemeral and transparent texts tell the story of the site (see Figure 8). Texts fly away, like memo-



Figure 7. 'Inspecting Eyes'. Source: Eva Schlegel & 2MVD; Foto © Martina Moro

Video Link: <https://youtu.be/4OCih5G7QYQ>



Figure 8. 'Read Me Heft'. Installation view. Source: Eva Schlegel & 2MVD; Foto© Valie Messini

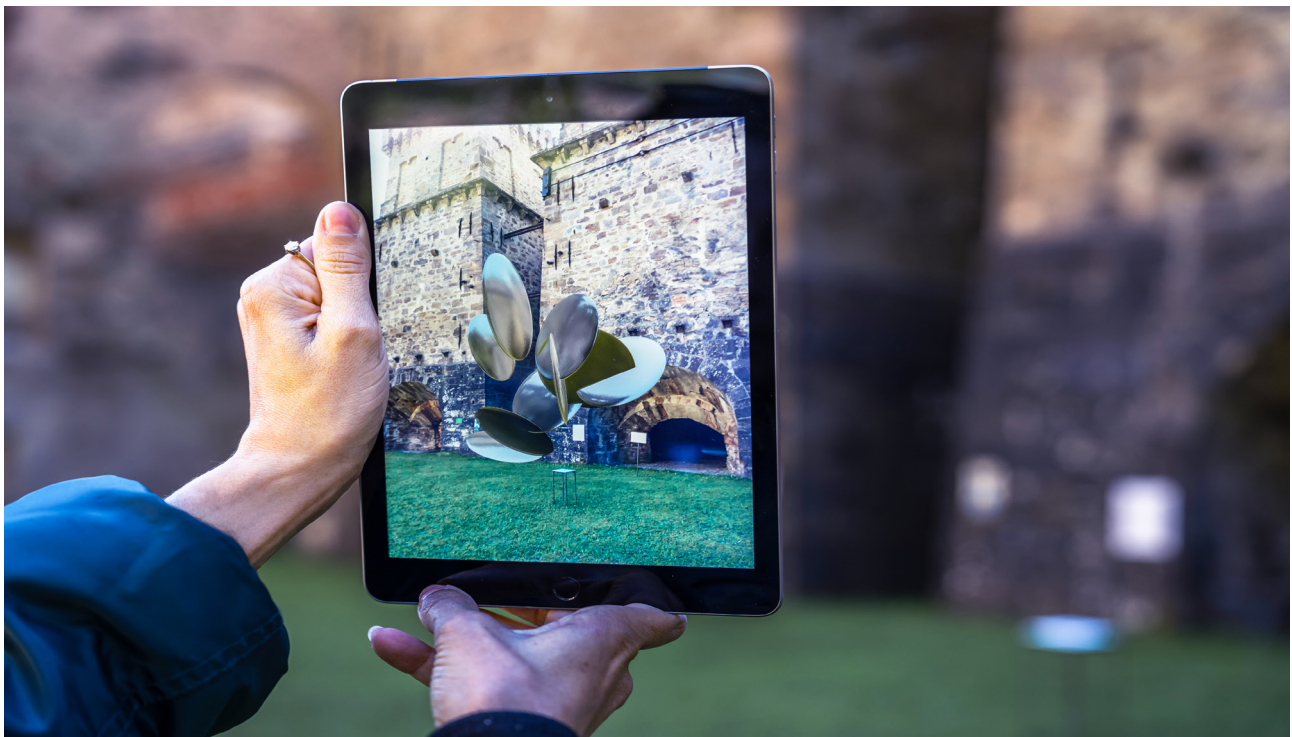


Figure 9. 'Shifting Blades'. Source: Eva Schlegel & 2MVD; Foto© Maria Wawrzyniak

ries, but are still readable, describing the evolution, and decay of this impressive architecture and the subsequent intervention by Günther Domenig.

The second sculpture, 'Shifting Blades' (2022), is floating in front of 'the Heft's' entrance: a huge, gravity-defying sculpture made of shiny steel, a reference to iron mining. The metal circles, weighing tons, move and (re-)configure themselves continuously. They mirror and reflect their surroundings in their movement (see Figure 9). With the help of a smartphone App, viewers can experience the space digitally. The App includes a photo function, so visitors can capture and share the experience photo- and video-graphically and perpetuate the history of the place.

5. Digital Twins

The work 'Digital Twins' (2MVD, 2022) is an investigation of a media-centric spatial experience, which, again, follows the theoretical approach described above, in which physicality and digitality are not understood as separate, but as merged into one (see Figure 10 and 11). We (2MVD) used digital design tools to populate and expand material space through visual effects that put a focus on the notion of interaction and artificiality. On an aesthetic level, the term 'digital nature' lies at the core of this work: We are interested in the interconnections and antagonisms of mathematical and natural shapes. Another main focus was the investigation of spatial perception in digital space as well as the possibilities and potentials of interaction with digital, virtual objects. We tested different forms of spatial implementations and interactivity to encourage diverse modes of interplay.

To view those augmentations, we developed the AR-application 'afx-isi' (2MVD, 2022): Through a smartphone the user can explore virtual art-pieces or scenes freely with what is called 'six degrees of freedom', which refers to the freedom of movement in space, and allows for a combination of translation and rotation in three perpendicular axis. The experience was designed to be spatial, architectural, and interactive. There was a focus on bridging the gap between physical and virtual space. Each virtual piece had a physical reference

object present in space. Some of those objects were displayed horizontally and framed by roll cars, thus movable. By moving the roll car, you could also influence the digital twin's position. The position and appearance of the virtual art-pieces can be fine-tuned to blend seamlessly with the physical environment. For 'afx-isi' all exhibits can be processed in several steps to allow for high visual fidelity within the technological constraints for/of mobile devices. As trigger objects, a diverse set of graphics is used, which are abandoning the conventional QR code aesthetics. To develop the graphics, we had to learn how the program sees or reads an image. We learned that they had to contain bold lines and large, asymmetric colour patches to ensure legibility.

In the exhibition, an additional virtual layer becomes tangible—immaterial, sometimes floating sculptures and new spaces, seamlessly integrated into existing brick walls or attached to material objects scattered in the exhibition space (see Figure 12–14). We want to address a supposedly banal question: What is the difference between materiality, virtuality, and reality? We want to tighten the threads between the immaterial and the physical to overcome this dualism. Therefore, we invite you to interact and explore the relations between what is there and what you see, between the human and the non-human, between you and the other... and make kin.

The building of relations between the human and the non-human, "the ontological inseparability of intra-acting agencies" is the fundamental notion of Barad's (2007, p.333) Agential Realism, and it is what they¹ calls intra-action: For the author, no phenomena nor objects exist, as such, anteceding their intra-action. They only pop into existence through and because of bespoke intra-action, which implies. Basing their argument on QFT and quantum indeterminacy, Barad looks at measurements, which they describe as "world-making: matter and meaning do not pre-exist, but rather are co-constituted via measurement intra-actions".

Digital Twins (2022) turned out to be very engaging and interactive. At the exhibition opening the empty exhibition space

1 Barad uses the pronoun 'they'.



Figure 10. 'Digital Twins'. Exhibition view at Magazin. Source: 2MVD; Foto© Simon Veres



Figure 11. 'Digital Twins'. Exhibition walkthrough at Magazin. Source: 2MVD; Video© Damjan Minovski

was full of creatures commonly identifiable by a rectangular device in one of their hands. New patterns of movement and behaviour started to appear, sparked by the interaction with these otherworldly beings.

For Judith Butler (1988, pp.519–531), performative acts are constitutive of reality as identity, being bodily and social reality, is created through performative acts. The author points out that “[f]or both Beauvoir and Merleau-Ponty, the body is understood to be an active process of embodying certain cultural and historical possibilities.” (Butler, 1988, p.521) For

her, the process of embodiment is a process of performative creation of identity. This leads to an understanding of body and identity, that does not refer to something ontologically or biologically given. Identity is therefore not fixed, stable, nor given. Identity is performed and thus open.

6. Conclusions

In this article I present three art projects from my own practice, which all share the use of the medium of AR and the public space as a domain. I understand those three projects as attempts to create a liminal space for an inclusive art experience and, hence, a new approach to urban creativity and collective (intra-)activity. Especially, I want to focus on the potential of virtual space as a space for free thinking that is non-monetized and open to all. Its exploration is relevant to create an understanding for the use of digital urban space, its qualities and materialities. Thus, with this article I seek to illuminate the effects of digitalization on the perception of spaces and objects in urban contexts.

‘Other Matter’, developed together with students of the University of Applied Arts in Vienna, showed how AR can be used to make the hidden or forgotten identity of a place visible. Art and its processes and reflection can also be understood as an ontological effort, as an act of (self)recognition. While ‘Other Matter’ is augmenting a place on an epistemological level, the works developed with Eva Schlegel are also approaching the ontological potential of AR as a medium. We developed sculptures, which act as tools for observing the surrounding environment, the self, and the other through and in relation to the virtual objects. Also, the created works offered an element of aesthetic attraction, creating interest and fascination on the users’ side. The users enjoyed engaging with the virtual pieces, also in small groups of two or three. This demonstrates, on the one hand, that the work has decelerating qualities similar to the works of Rafael Rozenaal, mentioned in the first section as a reference to user behaviour and created/implied spatial qualities. On the other hand, the work facilitates communication and community creation.

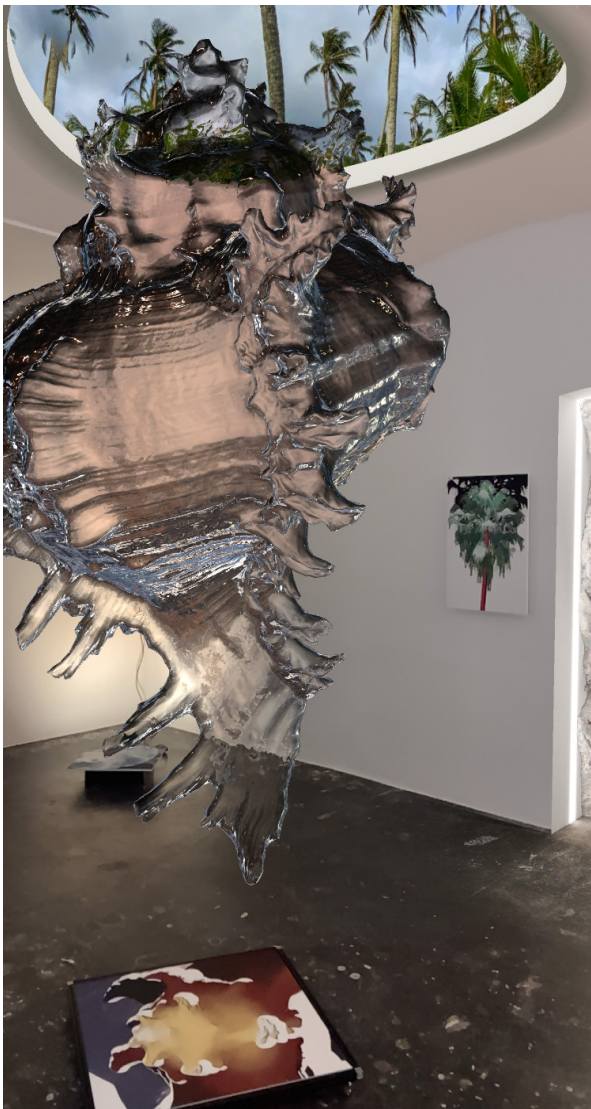


Figure 12. ‘Murrex’. AR-screenshot / installation view at Magazin. Source: 2MVD; Foto© Valie Messini



Figure 13. 'Jellyfish'. AR-screenshot. Source: 2MVD; Foto© Valie Messini

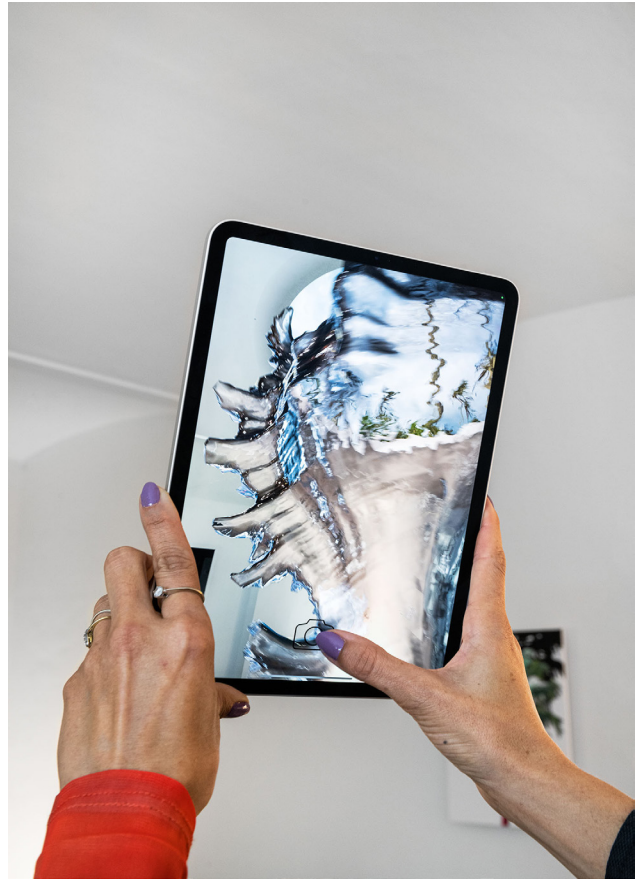


Figure 14. 'Murrex'. Installation view at Magazin. Source: 2MVD; Foto© Simon Veres

Coming back to the notion of playfulness and following the abovementioned concept of intra-action (Barad 2007), we could speak of playfulness as intra-action, where the action and the actor reciprocally constitute each other. Building on the experience acquired in the preceding projects, in 'Digital Twins' we fully focus on interaction, as per experimenting with different modes of involvement. By giving greater importance to the physical 'twin', we wanted to bind the virtual even more to the physical. The tracker objects gained a distinct visual appearance by abandoning the generic QR-code. The exhibition design had to take into account not only the experience of the human visitors, but also the methods of perception of the device. Similar to biological systems they have their own requirements to successfully navigate a room. In the case of 'camera tracking' the lighting conditions and

visual features of the room had to be tested and adjusted against this. This was necessary to ensure the perfect interweaving of the virtual with the physical, which proved crucial for tricking the brain into establishing credibility through visual experiences. Unexpectedly, once established, the exhibition visitors—mainly young architects and artists—tried their best to trick the App: they caught virtual objects from the second, less well-lit room and dragged them to places they were not meant to be, thereby creating spatial impossibilities. Anyhow, taking computer perception into account follows this same Baradian train of thought and introduces 'intra-action' as a method into the design process. Intra-action understands agency as not an inherent property of an individual to be conducted, but as a dynamism of forces (Barad, 2007, p.141), whereby the apparatus and the artist are equal-

ly involved into the same process.

The exhibition also showed that even though the work takes a critical position towards social media, it performed extremely well in the realm of social media. The installations all proved to be a lot of fun and very fotogenic, and were, thus, widely shared on instagram. AR proved to be a relatively low-threshold medium and, if displayed in public space, it appears to be accessible to art lovers in the same way as to residents and passers-by with other contextual or cultural backgrounds. Nevertheless, the experience offered is mainly a visual experience. It is not inclusive towards people with severe visual impairment. The visual could be complemented by acoustic signals, again excluding another social group. For now it remains unclear, if and how far completely non-ableist technologies will develop. Addressing more than one sense at the same time could be a possible strategy to diminish exclusion. This also offers an artistic challenge: To offer an equally accessible experience, when perceived only acoustically or visually or both audio-visually, seems to challenge the accuracy of immersive spatial expression and this would demand a separate artistic study in audio-visual perception. Also, the possibilities of long-term distribution of AR artworks remain unstable, as they are highly dependent on the IOS and Android platforms and their future development.

In the conventional social media use case, the body becomes inactive and only the eyes absorb the frenetic and completely two-dimensional information feed. In this case, the device, or social media in general, can become a separating or distancing factor to the surrounding space. As exemplified in the above examples, I want to argue, that AR, on the contrary, can induce a great feeling of presence in physical space, as it mainly works like a loupe enabling spectators to envision an enhanced version of the space, which is actually, physically surrounding them. It engages the body in movement, as the objects are geolocated and no virtual navigation interface is provided. Therefore, the visual feed on the display always corresponds to your physical point of view. This is crucial to tie virtual and physical space together and, hence, induce spatial presence. This presence also lies at the root of sparking collective engagement in virtual AR spaces and opening liminal spaces for urban creativity.

Conflict of Interests

The author declares no conflict of interests.

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