



Engaging Cities: From Urban Space to Media Interface

From Urban Space to Media Interface

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ABSTRACT

Technology in this millennium has evolved to become a conduit for communication, creative expression and knowledge transmission. Central to this is the designer's agentic role in mediating the percolation of the digital into the built environment to produce new and transformative experiences incorporating mixed reality. Through discussing two speculative projects, this paper poses the question of what instigative role media might play in efforts to boost spatial ambience and social agency. The first reimagines an AR media architecture experience: by expanding the scope of screen media to include touch media and mobile media, handheld devices fulfil a fresh function, to re-center the urban experience alongside encouraging multidimensional user interaction. Meanwhile, a virtually mediated tour conceived to explore interactions between media and architecture, user agency and behavior, redefines an appreciation for the mimetic. While VR is unable to replicate the randomness and complexity of real-world experience, the sensorial richness of the lived environment and in-person interactions, insights can still be gleaned by how people navigate in cities, even in a simulated environment. These examples reconfirm how our relationship with urban space has been irrevocably altered by digital affordance, through interpretation, interactions and interventions. They open up a dialogue on other alternatives to traditional notions and practices of media architecture. Given the proliferation of digital and online tools and platforms, it stands to reason that now is the opportune time to enskill and empower designers to seize control of the technological ensemble, and exploit what the digital affords, to interpret new and meaningful uses.

CCS CONCEPTS

• Participatory design; • Media arts; • Haptic devices;

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KEYWORDS

Bottom-up intervention, Media interface, Mixed reality, Digital resourcefulness, Speculative design

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1 INTRODUCTION

Dave Colangelo's [1, p. 505] proposition, "that media architecture may be well-suited to bridging the gap, acting as a public onramp for the messiness of the street to enter the media interfaces and databases of the online world, and a release valve for the immense pressure produced by torrents of digital data, making these apparent and actionable in relevant physical contexts," surfaces the dynamic reciprocity between the built environment and digital milieu – one which potentiates fresh adventures with new mixed reality experience. In Milgram and Koshino's seminal conceptualization of the reality-virtuality continuum, mixed reality (and this includes augmented reality or AR) is any form of technology-mediated reality [2]. More recently, Skarbez et. al. [3] revisited the duo's precondition for real and virtual objects to be co-present on a single display, and suggested a revision to this criterion in deference to viewer perception (Figure 1). In their redefinition, "when a user simultaneously perceives both real and virtual content, *including across different senses*, that user is experiencing mixed reality" [3, p. 4]. Rather than consuming information and immersive spectacles in urban settings that are the outcomes of vibrant audio-visual projections on passive facades, with the same structures serving as scaffolds for large-scale LED screens, or flows of real-time data surreptitiously mined for surveillance purposes or to generate push media contents, might we not also consider latent possibilities in urban experience that are just as palpable across the spectrum and do not discretely distinguishing the analogue from the digital?

I draw on Yuk Hui's proposition that a digital object does not exist in itself. Instead, digital objects are essentially informational data, defined by discrete relations that configure them into an extensive system [4]. Central to this is our agentic role as "connected informational organisms" in enabling data flow in the 'infosphere'. Coined by Luciano Floridi, the 'infosphere' – for which cyberspace constitutes a subset – is a layer in the ecology that also includes the "offline and analogue space of information" [5]. The axiom that 'data is more than just "data"' suggests that information is never truly neutral or scientifically objective because of the individuals, institutions and corporations that make use of them. This in turn influences the flows that shape our everyday lives, actions and governmentality. Consequently, transformations arising from the

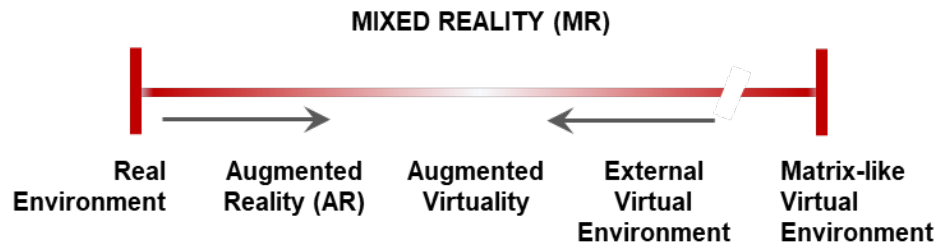


Figure 1: Revised reality-virtuality continuum proposed by Skarbez et. al. [3], adapted from Milgram and Koshino [2].

percolation of the digital into the built environment give rise to what Scott McQuire terms ‘hybrid spatialities’. He explains, “If urban space has historically been defined by the relationship between static structures and mobile subjects, this dichotomy is fast giving way to hybrid spatialities characterized by dynamic flows which not only dissolve the fixity of traditional modes of spatial enclosure, but problematize the unified presence of the subject traversing their contours” [6]. As sites, urban space inevitably exacerbates spatial contestations illuminating the politics of place, as much as they introduce new forms of encounter that can—depending on the individual—enrich or dilute one’s urban experience.

Technology in this millennium has evolved from the domination of information to become a conduit for communication, creative expression and knowledge transmission—initiatives premised on active sharing. This is made possible with the ‘extension of data’: no longer confined to one device, ICT infrastructure has advanced to the extent that large amounts of data can be processed by establishing data network connections, which enables simultaneous exchanges between platforms and one database to be linked to another—all to form a more extensive and larger system. The global adoption of broadband Internet connection in the mid-2000s, along with the proliferation of price-competitive mobile phones and other portable devices, foreshadowed the advent of ubiquitous connections [7]. This emerging networked landscape effectively equipped users to make the transition from passive content consumers into active content producers. A visible spirit of collaboration and co-creation among hyperconnected individuals have similarly ignited a culture of participation that is currently reshaping creative practices [8]. As French anthropologist André Leroi-Gourhan [9] argued decades ago, every technology is a social construction: innovation only occurs when technical supply matches cultural demand, and when a new technology and new social practices are congruent in the same techno-social feedback loop.

The Fourth Industrial Revolution that ushered in the twenty-first century is characterized by the merging of technologies, blurring the physical and digital divide, and integrating at an unprecedented scale on a systematic level [10]. Those who are able to harness these new technologies and intensified communication gain a competitive advantage. As a result of technological breakthroughs, new affordances emerge with the proliferation of digital devices, infrastructural diversifications and social media. For those unable to adapt to the changing labor landscape, the technological divide will further exacerbate technological alienation. Preceded by the mechanization of labor during the first industrial revolution, humans

have become subordinates to machines, and their worth measured against their capacity to operate as part of the technical ensemble [11].

On the back of such bleak prognosis, the unforeseen COVID-19 global health pandemic resulted in the acceleration of numerous technological disruptions. With the economic downturn in the aftermath, coupled by automation, many labor-intensive occupations will become defunct. According to *The Future of Jobs 2020* report, while millions of jobs will be lost, 14 percent more task-specialized jobs are predicted to emerge by 2025 [12]. Despite widespread fear of an inevitable ‘AI-takeover’, the scientist Max Tegmark [13] remains optimistic that those in the creative industry will continue to thrive. Rather than simply skilling and reskilling the existing workforce, it would seem prudent (even pre-emptive), considering the trajectory of technology, to integrate enskillment alongside digital resourcefulness into design education now.

The work of architects and other designers is varied. Whether they are solution-centered, exploratory, innovation-oriented or highly speculative, the resultant outputs are often driven, and informed, by application [14]. Building a resilient community of practice that is not only methodologically sound but also technologically equipped is vital if they are to remain relevant in this increasingly digitally fluid world. Renewed pursuits for fresh design applications and an expanded role for architecture likewise infer creative practitioners now need to demonstrate competency in conceptualizing across 2D, 3D and 4D, and adept at producing both analogue and digital outputs. By means of outputs from two exploratory projects arising the graduate design studio I lead, I demonstrate how digital tools and digital resources can be effectively harnessed to cognitively instill in students the value of qualia and contextual sensitivity—qualities that are fundamental to inform the conceptualization of meaningful design interventions, including those of a media nature. The first project, *Retrace* (2020) by Choo Hui Zhi and Josiah Tan, reimagines a mural depicting a mid-twentieth century provision shop in Singapore as an AR media architecture experience for visitors to learn about the objects and goods depicted in the artwork. The inclusion of another contemporaneous output, a mediated architecture tour orchestrated as preliminary research for *Virtual Venice* (2020) by Elaina Ong and Hu Huiyao, illustrates how our relationship with urban space has been irrevocably altered by digital affordance, in interpretation, guided interactions and design interventions.

2 DIGITAL CONVERGENCE IN ARCHITECTURE EDUCATION

Given the ubiquity of media, access to vast resources online, and lower barriers to learning, avenues for knowledge acquisition and skills appear limitless. With the ever-expanding repository of open source contributions, free-to-use developer apps, and the fluidity of massively multiplayer online role-playing games (MMORPG) to support open-ended activities and exchanges across physical distances and time zones, the onus now resides on one's capacity to utilize online platforms—as virtual spaces of gathering, empowering vehicles, knowledge production, reinforcing a common identity or ideas, or nurturing relationships. Connecting platforms have shaped a tangible form of sociality arising from the merging of knowledge sharing and creative expression. José van Dyck clarifies, “Sociality is not simply ‘rendered technological’ by moving to an online space; rather, coded structures are profoundly altering the nature of our connections, creations, and interactions” [15, p. 20].

A foreseeable crisis pervading the commodification of education is the trend towards ‘learnification’, which focuses on short-term learning. This model offers personalized education by managing, monitoring and modifying learning materials via computation, and through data collection, makes inferences of user needs [16]. By contrast, design competency is honed through applied learning, that is, practice of the craft and reflection-informed improvement [17]. Architecture knowledge and design abilities are therefore accrued through sustained learning—education in the traditional sense, whereby mutually overlapping intellectual nourishment, social, technical and cognitive skills are consolidated over the long-term, rather than taught in discrete modules. Preserving the ‘ecological’ approach grounding J. J. Gibson’s [18] theory on affordance, Boyle and Cook [19] reflect on the technological affordances of ICT for learning, and in particular, highlight how technology has not only changed the way we have now adapted to the new environment but also how we operate. Of note is the increased ease in which we are able to access knowledge and information directly from the Internet, how we navigate the infosphere, and make decisions.

At this juncture, with respect to our relationship with technology, we have reached a stage where design practitioners no longer simply employ digital tools for ideation purposes but think through them [20]. Considering the speed with which new apps emerge and environment software are constantly updated, such as Unreal Engine (a relatively open real-time 3D creation game development tool popularly adopted by architecture students for its highly photorealistic renderings), it stands to reason that the most expedient way to develop digital literacy is to incorporate both digital and online design tools for project-based learning. Since 2019, I have run a media-based design studio at the Master of Architecture level. The studio’s approach deviates from the established pedagogic structure of the ‘enclosed’ atelier formalized in the mid-nineteenth century; blended learning, along with open source materials are recognized as optimizable resources for teaching and learning. Differentiated instruction [21] remains possible with multiple avenues for learning to support customization of knowledge, while skills training can still be tailored to the interests and ability of the individual. The mid-length duration typically allocated for design projects offers adequate time for tutors to ease students into an ‘inside-out’ mode of

learning expected at graduate level. A structured ‘inside-out’ mode of learning can stimulate deeper learning and synthesis of knowledge [22]. The hands-on nature of project-based assignments, which exemplifies higher cognitive learning achieved through doing, accords students the freedom to pursue their own design enquiries and projects and utilize ‘outside-the-classroom’ resources—free-to-use developer platforms, open source assets, i.e. filters, plug-ins and 3D objects, and the online community. Ultimately, this more porous arrangement revises the educator-learner relationship to a more egalitarian one, which concurrently encourages greater independence and self-directed learning on the student’s part.

The benefits of small class sizes and intimate setting of a design studio is that they offer a safe space for experimentation, yet are conducive enough to support explorations and speculative projects driven by curiosity and enquiry. The diverse outcomes I have witnessed over the years are exemplified by the divergent development paths—from initial enquiry to execution—that define the two student project outputs discussed in the subsequent sections, and led to the informed choice of augmented reality (AR) and virtual reality (VR) as their respective primary interface. This is an important distinction because as modes of mediation, AR takes its cue from the real world to overlay digitally rendered graphical information without obscuring the reference object or surface. VR, however, strives towards immersive experience of a virtual environment. Media archaeologist Erkki Huhtamo crucially proposes the scope of screen scholarship be expanded to include other media practices such as ‘touch media’ and ‘mobile media’ [23]. He relates our dexterous navigations of smartphones and tablet computers (tablets) to earlier forms of touch practices dating back to the nineteenth century, whereby proto-interactive devices for producing optical illusions were hand-operated by users. Meanwhile, one variant of mobile practice revolves around the mobile observer interacting with a static object and is contingent on the viewing device accompanying the user being portable and does not impede movement. It is on this basis the following project adopts a cross-modal engagement centered on handheld devices.

3 MEDIA ARCHITECTURE AS SPECULATIVE ENQUIRY

The widespread use of mobile devices while on the move not only diminishes people’s situational awareness but also poses a significant safety hazard, prompting the implementation of a series of draconian measures in many cities worldwide to mitigate distracted walking and driving [24]. In 2018, traffic accidents involving pedestrians distracted by their mobile devices escalated to 887 injured and 39 fatalities in Singapore alone, prompting the Highway Code to be updated the following year to include an advisory admonishing distracted walking [25]. Rather than partaking in public condemnation of callous phone zombies oblivious to their surroundings and civic mindfulness, I instead focus on how we might exploit smartphones and tablets as apparatuses that (re)initialize interactions with urban space and indirectly, facilitate analogue human contact. After all, “Such devices are carried on your person, become symbiotic with touch and tactility: personal, portable intermediaries between bodies, memories, situations and locations—and their shadows in the world of networked representation” [26, p. 14]. In this era, the

smartphone has become the singular indispensable device with which we manage our lives. It fulfils multiple functions: long- and short-range communication, access to news and entertainment, photography and audio-visual recording, timekeeping, scheduler, digital token for ingress, public transport and cashless payment, and way-finding. The embedded global position system (GPS) functionality in portable devices is a true game changer; for the first time, we could navigate with real-time maps that follow our movements and simultaneously indicate our position and orientation at any given moment with relative accuracy [27]. On the one hand, continuous connectivity and the sense of security tethered to devices and apps have emboldened newcomers and tourists to venture into unfamiliar cities and neighborhoods. On the other hand, this posthuman arrangement alters how we previously learn about or appreciate a place—through direct immersion rather than mediated through the screen of our devices, or understanding gleaned from information that is either presented or readily accessible to us. The following speculative project contemplates how media architecture can be positioned to critique the average pedestrian's overdependence on smartphones, and perhaps momentarily, reintegrate passers-by into attentive experience of their real-life environment in real time.

Through habituated use and familiarity, buildings that we encounter on a daily basis over time tend to recede to the back of our consciousness and relegated to become undifferentiated urban backdrop. Transplanting Walter Benjamin's [28] notion of 'distraction' to our perception of the built environment, Charles Rice [29] contends that it is precisely *our* conditioned inattention to our everyday surroundings that makes them such charged sites for fresh interventions or disruptions, aimed at eliciting new ways for citizens to engage with their city. Essentially, by bringing together an existing urban artefact, digital media and well-executed design intervention, something new can be created that could potentially be a transformative experience. It poses the question of what investigative role media might play in efforts to boost spatial ambience and social agency.

Publicly accessible art, e.g. murals, sculptures, installation, whether they are privately commissioned or initiated by the government, are arguably urban artifacts. They are deemed to represent aspects of our culture and heritage, but in truth, could simply be a manifestation of the myopic viewpoint of an artist in urban space, or to reinforce the existing state narrative via cultural programming. Unlike graffiti art and illegal tagging, public murals are classified as street art in Singapore and in fact, flourished in the early 1990s until a government crackdown on artists' activities in the early 2000s. Even now, although the National Arts Council works closely with other local government authorities and non-profit organizations to open up wall spaces for street artists, there are stringent criteria as to what constitutes acceptable subjects to be depicted set by the Urban Redevelopment Authority of Singapore, the national urban planning statutory board overseeing land-use approvals as well as building conservation. For the distracted street public, encounters with permanent artworks tend to be reduced to cursory engagement, or worse, ornamental objects to be bypassed. A compelling proposition would be to introduce multidimensional user interaction that can be both informative and entertaining, and seamlessly integrate the physical with the virtual. Augmented reality (AR) emerged as the most appropriate experience as it can accommodate

multiple modalities. Phone-based AR has an added advantage as the augmented layer is directly activated on the screen of a smartphone or tablet. Furthermore, the interactions are contained within the field of view covered by the forward-facing camera of these handheld devices and in no way hinders movement or peripheral awareness.

In this speculative project, the evocatively nostalgic mural *Provision Shop*, painted in 2015 by local artist Yip Yew Chong, is assigned the function as a virtual window. To be precise, the virtual window is a digitally enabled virtual manifestation that exploits the perspectival frame to reinforce the Albertian window as a discrete space detached from the world and environment of the viewer. It places the viewer as the relative center in this visual paradigm. Sited in the heart of the Blair Plain conservation area in Singapore, the life-size painted reproduction of a mid-twentieth century sundry store's frontage and its interiors are highly visible, since the long gable shophouse wall that forms the mural's canvas faces a prominent crossroad (Figure 2). Besides this artwork, Yip has also completed two contemporaneous murals in this neighborhood—the cheerful *Barber* operating in an al fresco setting and *Amah*, featuring a housemaid handwashing laundry.

The sundry contents of the shop, array of storage containers and eclectic collection of mechanical apparatus, are painstakingly rendered in great detail. According to the artist, the painting is a mosaic of object recollections, blending the client's description of a provision shop that existed in the 1950s and Yip's childhood memories two decades later. "The final outcome of the mural looks a bit like something out of the 60s and 70s, but actually spans across a good three decades" [30]. The design duo sought to verify his admission by constructing a historical timeline to chart each featured object's year of inception, and subsequently, extended the list to include the location's colonial architecture heritage (Figure 3). Noting the inclusion of several anachronistic items, what eventually emerged was a comprehensive timeline covering almost two centuries. This material culture mapping, implicating material history and the economic value of commodities and objects, critically reveals the transnational, urban historical entanglements between the material (built environment, artifacts and people) with the immaterial (memories, events and imaginings), and offers a qualitative complement to the "coherent city of information" appellation in science fiction author William Gibson's [31] controversial essay on the technocratic city-state.

By building on story elements already present in the mural, passers-by are invited to directly interact with the urban artwork as they enter the virtual window into another world, via their personal devices to access curated digital contents. "Environmental storytelling creates the preconditions for an immersive narrative experience in at least one of four ways: spatial stories evoke pre-existing narrative associations; they can provide a staging ground where narrative events are enacted; they may embed narrative information within their mise-en-scene; or they provide resources for emergent narratives" [32]. The proposed media architecture achieves the latter two with AR, whereby a digital 3D object is 'attached' to a real-world artifact (in this case, the mural painting) using object detection for users to then view the virtual augmentation on the screen of their devices using webAR. The interactive content plays on the long experience of individual memories and



Figure 2: *Provision Shop*, a mural by Yip Yew Chong (2015) on Everton Road, Singapore.

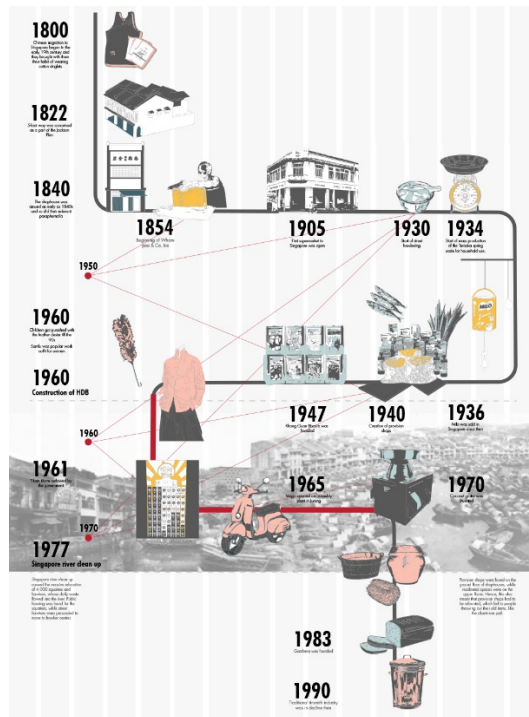


Figure 3: Historical mapping of the public art site and objects featured in the *Provision Shop* mural. Drawing by Choo Hui Zhi and Josiah Tan (2020).

collective past, and is therefore appealing to a multigenerational user base. Reputable websites that explain each object's provenance, web links to sites where they can be purchased, along with prompts on associated places and other objects within the same group or theme, are linked to one another, mixing education, retail and cultural tourism. Rather than simply superimposing images of the neighborhood from the past and relying on nostalgic associations, greater immediacy is derived from situated knowledge. The fact that

the digital assets are co-located virtually but anchored in a real location reaffirms knowledge acquisition as an embodied and spatially situated activity. The onerous task of organizing the constellation of information and curating a multimodal interplay between media and public space is made worthwhile in its contribution to public history and cultural enrichment.

In the realm of speculative design, Dunne and Raby argue that creative practitioners and thinkers can "let their imaginations flow freely, give material expressions to the insights generated, ground these imaginings in everyday situations, and provide platforms for further collaborative speculation" [33, p. 6]. This project is speculative insofar as it is hypothetical at this stage due to the technological and time constraints in translating a college assignment into an actual piece of media architecture. To circumnavigate this shortfall, the cohesively conceived scheme is communicated by means of a beta prototype created using WebAR and animation demonstrating interaction experience. A crucial determinant influencing design strategy is affordance: as discussed by Martin Oliver [34], it can place constraints but at the same time, permit and even persuade users to behave in certain ways. Ultimately, it falls on the designer to recognize the implicit potential of affordances and how these can be introduced into one's creative arsenal. From the technological and social standpoint, a considered, low-key media architecture intervention of this scale carries latent potential to generate impact through accessibility and dendritic reach.

"Most of the value in AR resides in the proposition that interacting with the world in this way will feel 'effortless'. But as we've seen, any such effortless requires the continuous, smooth inter-functioning of a wild scatter of heterogeneous elements" [27]. This user flow concept drawing represented schematically (Figure 4) addresses Adam Greenfield's concern by elaborating on key aspects and value proposition for the proposed scheme and its constituent components. Visualization helps to organize information and make flow patterns visible. After all, as Donald Schön believes, design enquiry is prompted by "a making of representations of things to be built" [17, p. 4]. Specifying user flows at the point of ideating the technological interface not only frames the scope of the project, design process and requirements, but also clarifies the user path

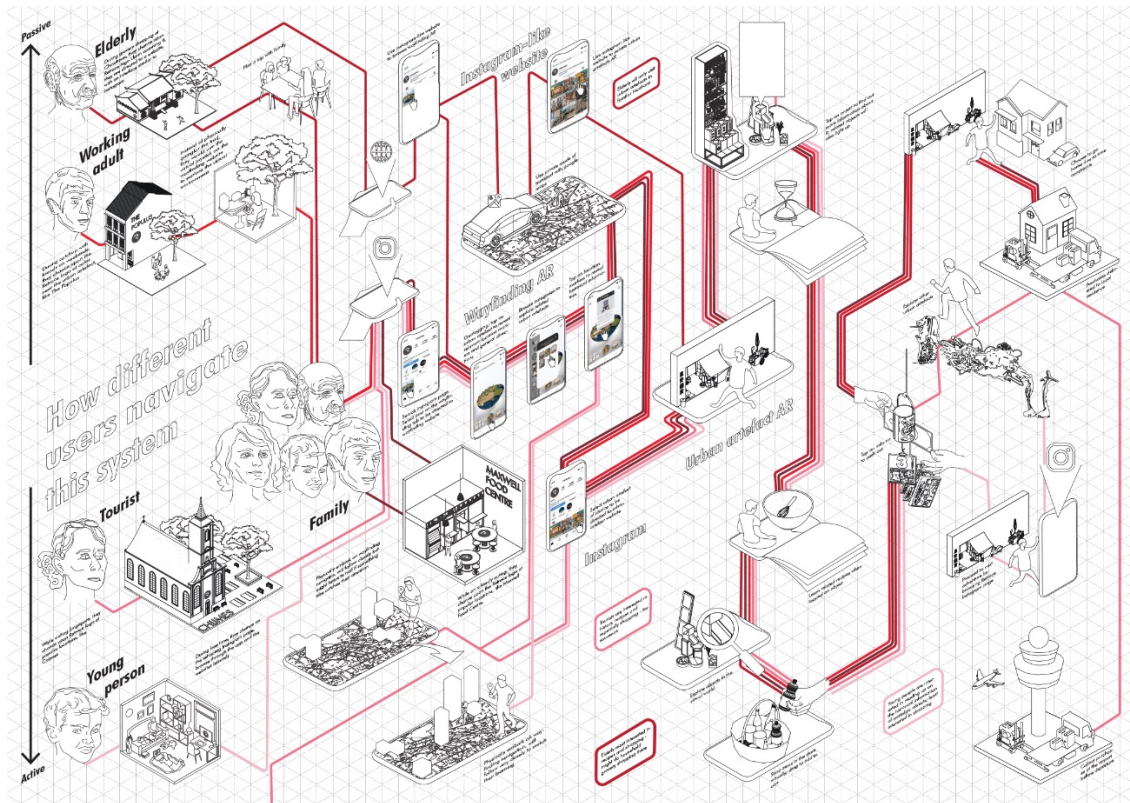


Figure 4: Concept drawing of user flow. Drawing by Choo Hui Zhi and Josiah Tan (2020).

of the proposed digital object, the structural relationship between users, the tangible as well as intangible elements that make up the media architecture system. Even though the designer can influence the range of information, databases to use, and (to some extent) direct the interpretation of its users—by selecting the material for inclusion and scripting user flow—there will always be variables that cannot be accommodated. Regardless of the target user group or demography, intended users need to be able to apprehend the interface and intuitively navigate it. This demands a consistency of action and smooth data flow. For this component, Figma, a web-based design tool, is employed to visualize the user interface design. Static mock-ups are converted into a prototype that simulates the actual interaction experience to demonstrate usability (Figure 5).

While this project is hypothetical, it occupies the realm of the probable, one of four future outcomes in Dunne and Raby’s speculative schema: “Most design methods, processes, tools, acknowledged good practice, and even design education are oriented toward this space” [33, p. 3]. What it attempts to demonstrate is the pathway and possible consequences of technical application. They offer valuable learning points to understand and consider the technological challenges involved in devising a piece of media architecture without having to actually realize one.

The fact that webAR and Figma are free-to-use and do not require developer competency in coding and 3D skills means that prototyping tools and platforms no longer reside in the domain of experts, and opens up possibilities for mobilizing DIY media

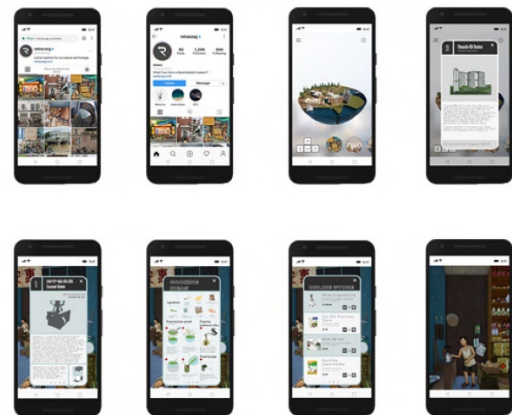


Figure 5: Screenshots from Figma prototype illustrating digital interface activated by the urban artwork.

architecture. As exemplar, this project encapsulates the features of DIY media architecture outlined in Caldwell and Foth [35]—a small-scale, street level intervention that shrewdly utilizes open source, tangible urban assets and a bottom-up approach to exercise one’s civic rights. With the growing prominence of platforms and their penetration in most industries, we are now witnessing a shift

toward connective action with regards to how local communities are increasingly seen to organize themselves [28]. This signals an unprecedented departure from the forms of collective action that defined social movements in the past. Platforms vitally allow intangible social networks to stretch across space and time, enable simultaneous exchanges and transferability of data. Most importantly, they can facilitate asynchronous and aspatial mobilization of action.

4 TRAVELS AROUND THE VIRTUAL CITY

The digital revolution has likewise affected geographical liberation, enabling people to roam virtually in addition to globally. A prediction made by Makimoto and Manners, on how “technology’s spur could turn nomadism into a mainstream lifestyle” [36, p. 72] appears to have come to pass. Or at the very least, it now offers a qualitatively viable alternative to in-person travel. With the year 2020 mostly taken up by protracted lockdowns across major cities, and international flight restrictions enforced worldwide, armchair travel greatly raised mass appreciation for what the mimetic could offer. Prompted by this realization, a virtual Venice exercise was conceived to explore the interaction between media and architecture, user agency and behavior, in the form of a mediated architectural tour of the city using Google Earth VR.

As a virtual environment, Google Earth is an actual object in the real world. In short, it is a mirror world—a digital replica of this planet. Utilization of a head-mounted device (HMD) is significant here for it allows the user’s virtual body and movements to be collocated with the real body in the physical world. The year 2016 is widely accepted as a watershed that heralded a new era for VR even though the technology has been around since the late 1960s. Complementing the penetration of smartphones globally following breakthroughs in mobile technology research and development that considerably lowered production cost (and hence, retail price) of smartphones, the launch of the crowdfunded Oculus Rift HMD revived popular interest in VR. Virtual presence, which allows users to feel they are in a virtual location, is dependent on quality of the hardware and computing systems. For this to be met, the virtual environment experience needs to achieve ‘place illusion’ (when users are able to be immersed in the place represented even though they are fully aware it is a simulacrum) and ‘plausibility’ (the credibility of a scene even though users know it is not real) [37]. Google Earth VR, a free-to-play simulation video game featuring a large database of cities, is a representation of our material environment. But unlike the real environment, players can fly, teleport, and descend into a Street View to explore a 360-degree photograph immersively. The democratization of geographic data has mobilized bottom-up reconfiguration in how data is utilized, which differs from hitherto top-down management and access to data under the purview of experts and government agencies [38]. With this shift, opportunities begin to emerge for users to be involved with knowledge production and to share their discoveries with others.

It needs to be stated there are limitations to environmental correspondence when a 360-degree VR panorama is built using photographs instead of a model-based VR. In reality, visual perception helps us organize spatial elements along a depth of field, i.e. foreground, mid-ground and background. 360-degree photographs,

though easily constructed and light on rendering requirement, are unable to achieve this due to the omission of the parallax effect [39]. This however by no means diminish their suitability for depicting large-scale scenes such as street environments, or views of objects from a distance. Ultimately, balance needs to be struck between high fidelity rendering of digital landscapes and smooth interaction, since granularity of control directly contributes to interactive freedom when creating one’s storied experience.

As the previous project has shown, digital-born assets have tangible links to the real world. On one level, maps, digital images and videos acquired through crowdsourcing are an indispensable base material for constructing the physical world virtually. Real world content can likewise be introduced into a virtual environment by embedding live video streams, or overlapping photographs parsed together to generate 360-degree panoramas replete with environmental information. On another level, attaching tags to analogue and digital objects allow them to be coded as bona fide elements with distinct identifiers in the digital milieu. These actions can be divided into ‘digitization of data’ and ‘datafication of objects’ respectively [4]. With the convergence of technology and media, the comprehensive coverage of Bluetooth, Wi-Fi and GPS allow for real-time detection of the real in the digital and vice versa.

Geotags, place tags and hashtags are essential for maintaining a contextually and topographically accurate verisimilitude of the physical world. More importantly, digital tagging makes visible the network apparatus, and constitutes the connective tissue that reaffirms the extension of the self through objects [40]. In truth, tags are the products of participatory contributions and maintained through active use. There is an element of sociality underlining the process of accumulation even if the interactions between various parties are indirect. Yuk Hui elaborates:

“On the side of the individual users, tagging puts the users in the particular situation of being able to make judgements, instead of limiting them to reading by pressing a few simple buttons. It opens a new process of collective ideation toward idealisation in both objective and material senses. Now to judge is not to give a predicate to the object, but rather it involves a retrieval of the life-world, a reactivation of the experience of others and their intuition toward objects. [...] The digital object with user-generated tags becomes a special cultural object consisting of different intentionalities represented as traces of interactions and retrievals; it doesn’t just present itself as an object that belongs to a specific culture but also as the constitution of the We [...]” [4, p. 216]

Slater and Sanchez-Vives remain convinced that VR will not, at least in the foreseeable future, replace travel in the real world [39]. It does however present an appealing alternative for those who are unable to travel, abhor the undue stress caused by unanticipated travel disruptions, or choose not to further contribute any travel-induced carbon emissions. While VR is unable to replicate the randomness and complexity of real-world experience, the sensorial richness of the lived environment and in-person interactions, there is merit to conducting this exercise. Using real-time tracking

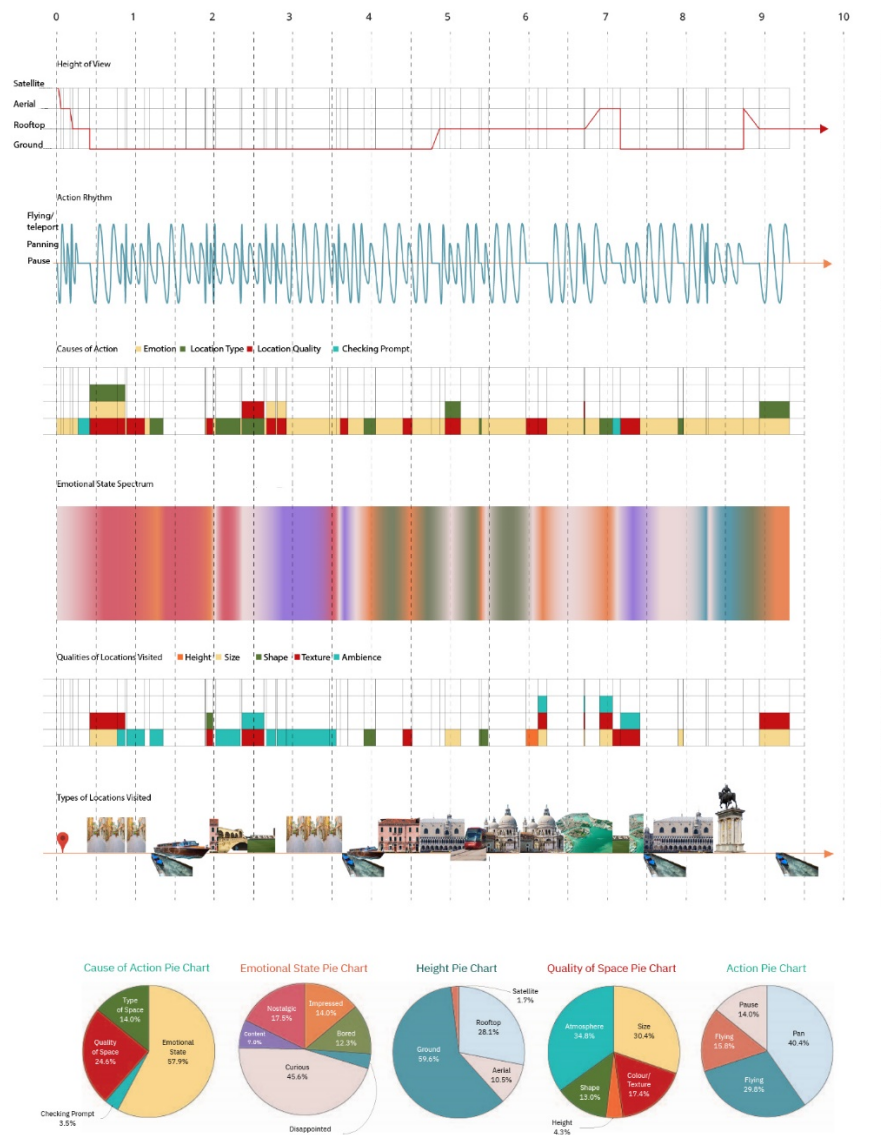


Figure 6: Qualitative analysis of Google Earth VR journey of Venice by participant who has visited Venice in real life. Drawing by Elaina Ong and Hu Huiyao (2020).

and video capture, crucial insights can be gleaned by how people navigate in cities, even with a simulated environment. Screen recordings have two advantages over direct observation. Firstly, details of interactions that might be missed in real-time observation can be inferred from the user's perceptual view which corresponds with the onscreen field-of-view. Secondly, being stable data, recordings are a vital resource since they can be reviewed numerous times over to distil findings on the subjective making of place experience.

To illustrate, a qualitative analysis of the immersive virtual tour activities, interaction patterns and perceived emotions of a player who has previously visited the historic city-state in person (Figure 6) is compared against another who has yet had the opportunity

to do so (Figure 7). Due to the qualitative emphasis of the exercise, unconventional methods for mapping various sensory registers are devised. Based on the visualized results, three key differences stand out. The first concerns the preferred viewing height. For the first time visitor, there is a propensity to hover at a much higher vantage point to take in the overall views of the city without truly focusing on specific sites or neighborhoods. This form of haptical engagement encourages the viewer's eyes to 'graze' rather than 'gaze' [41]. Meanwhile, having some familiarity with Venice, the return visitor opts to spend more time on the ground and be immersed in the urban milieu. The next discovery pertains to quality



Figure 7: Qualitative analysis of Google Earth VR journey of Venice by participant who has never visited. Drawing by Elaina Ong and Hu Huiyao (2020).

of space: with prior knowledge and experience, the same user identifies destinations based on the perceived atmosphere of the place(s). Being less strategic, the newcomer is guided by visual affordances, with decisions on where to explore governed by contrast, followed by textures and shapes. Finally, the lack of directed actions means more time is taken by the unfamiliar player to complete the exercise, with a sizable amount of time expanded on pauses. Though preliminary, it can be concluded that the first-time tourist is haptically drawn to the textures of the city, while the return visitor is more strategic, choosing sites to explore based on perceived atmosphere informed by past experience. Even at this stage, the discoveries are illuminating, and could be repeated with a much larger sample

set, where participating volunteers can be non-localational since it is possible to conduct such studies remotely. More rigorous analysis of the accumulated recordings may yield more definitive findings that can be applied, or replicated, in real-life settings.

5 CONCLUSION

As a product of their training and creative disposition, designers possess an innate capacity to identify potentials and interventionist opportunities that can provoke discourse or enact transformations. Even as speculations, explorations in cross-media interventions prompt us to re-evaluate our relationship with the material environment through meaning making and by confronting polemical

issues. They open up a dialogue on other alternatives to traditional notions and practices of media architecture. Given the proliferation of digital and online tools and platforms, it stands to reason that now is the opportune time to enskill and empower current practitioners—to seize control of the technological ensemble, exploit what the digital affords, and interpret new uses as they learn through doing while grappling with the complexities of the urban palimpsest.

The indisputable truth is that our everyday experience is now shaped and informed by the complex technological systems which support an expansive digital information network. My position aligns with that of Shannon Mattern's:

"As we head into a future offering ever more potential for mediated control of the urban landscape and, at the same time, a pervasive sense of our loss of control over the proliferation and often uncritical application of technologies, we would do well to enlighten ourselves (rather merely our cities) about what kind of 'smartness' or 'sentience' we want our cities to embody—and to encourage in its inhabitants." [42, p. xii]

Regardless of the virtual spectrum they each occupy, the media-based outputs discussed in this paper illustrate how an ecology of citizens, data flows and the material environment, and their relationships, can be rendered tangible in creative ways. This however entails a performative requirement from users of new technologies and digital media to (re)engage with the urban milieu in a multimodal manner.

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