Re-engaging the Physical within Liminal Landscapes

digital
liminal
design
sustainable
architecture
AI

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We live suspended between the digital and the physical, in a liminal space. The pioneers of digital landscapes we navigate realms unfettered by physical constraint, where stories can construct and reconstruct themselves at will, where time is not just static but can be reversed, where truth can be rewritten and history revised. Orientation increasingly turns to an expanding mirror world, the echo of Borges fiction. A 1:1 remaking of the world where huge ships hide within the folds of fake signals, infrastructure is analysed through its digital twin, and non-existent islands rise into being, leading very real expeditions to search for them.

It can begin to paint a picture of a digitized retreat into our imaginaries. With the dominant imaginary of the global north on course to decimate the conditions that both we and our fellow critters need for survival, this may feel like setting our course for a dystopian future. Yet our liminal landscapes equally hold the potential to deepen our embodiment within the physical realm, enhancing our understanding of our relationality and challenging corrosive anthropocentric perspectives. Through designing spaces we dare to imagine might we begin to construct the future we need; "*a future with a future*" as Tony Fry succinctly puts it?

Students at Oxford Brookes University, University of Brighton, and the Bartlett School of Architecture explored this territory, teasing out opportunities and unveiling potential futures. Might we begin to see beyond our limited anthropocentric perception? Might we extend our understanding of our histories? Could we begin to draw the digital back to its hidden corporeal foundations? Within this liminal realm might we pioneer new routes towards a sustainable future in real life; IRL?

INTRODUCTION

In real life, IRL, has become just one of many options available in the expanded spatial field we now inhabit. A third of our time can be spent online, and minute to minute our phones augment our capability to navigate, supplement our memories with twitter feeds whilst offering the world's knowledge and opinions at the touch of a screen. We are suspended between the physical and the digital, inhabiting a liminal realm.

Yet fundamentally we still inhabit what we always have, stories. All cultures, nations and ages have lived within their narratives of the world, and we are no different. These stories, or social imaginaries, offer frameworks through which to interpret the shear complexity of the world with which we are faced. Our architectures grow from our stories, becoming stage sets on which to play out reality as we wish to see it. Constant tending and maintenance can attempt to deny inconvenient truths, yet the metereological and the temporal can never be fully silenced. The fluid digital landscapes that play over the land are however freed from any physical constraint. Their capacity to construct reality knows no bounds; history can be rewritten, truths denied and time stilled. Pure storytelling freed of limitation or contradiction, these shapeshifting narrators ply their stories unfettered by physical constraint.

With the toxicity of the dominant imaginary of the global north driving us closer and closer to the destruction of the habitats we and other critters need for survival, an engulfment by the digital paints a dystopian picture. Our liminal landscapes however also hold within them the potential to enhance embodiment. IRL might become an expanded field of existence, merging the physical with the digital to draw us into relational understanding and unearthing wonder; re-enchanting us with the intoxicating complexity of reality. It could deepen our understanding of both ourselves and our co-inhabitant non-humans,

and in so doing might it start to challenge and undermine the stories of the imaginary and their toxic anthropocentric perception? Flowing over the imaginary's stage set of architectures the digital might reinterpret, readdress, resee, reframe, and reclaim. What we first need to do though is to become storytellers, to begin to write new stories through which to reclaim our future.

Since 2011 we have been crafting stories with undergraduate and postgraduate students. Collaborating at different times with Unit B at Oxford Brookes University, MA Architectural and Urban Design and BA Studio 3 at Brighton University and BSc UG10 at the Bartlett School of Architecture, UCL. We will begin with an exploration of the territory this work emerges from, and then offers some initial forays into speculative proposals; first steps in designing within this expanded realm.

EVOLVING FIELDS

There is a long history of engagement between microelectronics and the constructed landscapes of architecture, which stretches from the exotic to the mundane. Visionaries and theorists operating outside of the dominant social imaginary are perhaps amongst the most interesting. Prospecting for alternative futures they push boundaries of technology to further environmental and social engagement.

One of these early pioneers was Nicholas Negroponte who founded the Architecture Machine Group at MIT in 1967. The group explored the potential of microprocessors to enhance user interaction and adaptation of the spaces we inhabit by making them responsive. In his 1975 book Soft Architecture Machines he writes "*we are making buildings more context responsive, and in doing so we should not forget that building's final context of response is the needs and sensibilities of its inhabitants*" (Negrotponte,1975). The ambition was to use these new technologies to enhance human experience, as he writes: "*computers

have the potential for assuring a responsiveness, individuality, and excitement in all aspects of living*". Wellseley-Miller, a member of the same group, penned an influential analogy, which to this day can be heard within the ambitions of many projects, "*we are talking more of artificial domestic ecosystems capable of intelligent responses than of computer controlled conventional homes. Buildings that can grow and upgrade themselves, that open like a flower in fine weather and clamp down before a storm, that seek to delight as well as serve you*" (Negroponte 1975).

Gradually microelectronics began to be incorporated into commercial construction practices. The primary application became the intelligent glass facade with shading and/or automated ventilation, either activated by sensors or run through algorithms to lower energy usage. The focus on the potential of this technology to enhance human experience was no longer the primary aim. In the 1990s, as the prevalence of these facades grew, their capacity to reduce energy consumption whilst also providing environments enjoyed by the inhabitants started to fall into question (Stevens, 1999). The systems appeared to not be capable of achieving both, with user satisfaction apparently at odds with the technology's application to lower energy usage.

Interactive installations of the time which deployed the same technologies however illustrated no such issues. Indeed they clearly showed the potential to fulfill the early MIT ambitions by extending the capacity for people to adapt their environment. Importantly this interaction was actively welcomed and sort out. Christian Moeller's interactive dance stage, for example, deployed sensors to enable a dancer's movement to generate their own music. The recognition of peoples' presence through changes in light and sound, in a design Moeller completed for an interactive square in Rotterdam, made it a popular meeting space. The issues with user dissatisfaction within buildings with intelligent

facades were clearly not due to the capabilities of the technology (Stevens,1999).

The term user satisfaction is actually revelatory in itself of reasons for this disparity. By terming those inhabiting a building 'users' a positioning as other to ourselves becomes possible. This enables the consideration of the user as the issue in the system; ill-informed individuals limiting the operation of a perfect energy efficient machine (Stevens, 1999). This attitude is obviously in complete contrast to the early empowerment aims for these technologies, and also to the desire for participatory engagement embedded within Moeller's installations. The contrast in the reception of these different applications acts to reveal the power of the thought leading their design, and how it goes on to influence experience (Stevens, 1999). As Marx said "*technology discloses man's mode of dealing with nature, the process of production by which he sustains his life, and thereby also lays bare the mode of formation of his social relations and of the mental conceptions that flow from them*" (Woodward 1994, p.30). Technology is inhabited by the thoughts that design it, becoming almost a physical manifestation of them and this is perhaps particularly evident within interactive technologies.The ability of buildings to adapt in order to limit energy use was not in fundamental conflict with a provision of enjoyable environments. Respect for those of us who inhabit the final building was what was needed as a founding thought before design work began.

CRITICAL THOUGHT

Not just our technology, but our whole built environment is inhabited by the thoughts that design it. Yet this goes still further, as Harrison writes "*we replace the world with our ideas of it*" (Harrison, 1977). We do not just design our technology, our cities, but the reality we inhabit. We tell ourselves stories about our world generating our social imaginaries, the pre-reflexive frameworks we

live within. We have always lived within stories, every age and every culture has had its own belief system. They enable us to make sense of the immense complexity of reality. As alien as some of these stories may now seem, edges of the world from which you might fall, or dog headed people inhabiting the mediaeval age, fundamentally they are really no different to our present situation. We design our reality. David Graeber sums up the implications very clearly, "*The ultimate hidden truth of the world is that it is something we make and could just as easily make differently*." (Graeber, 2015).

These are the concerns that are at the heart of ontological design, which is the approach applied through my design teaching. Anne-Marie Willis (Willis, 2006) has set out a very clear introduction in her paper Ontological Designing, which to an extent can be summarized when she says "*we design our world, while our world acts back on us and designs us*" (Willis, 2006). The values embedded in the form of our built environment and technologies play out through our experience. For ontological design therefore, strong critical reflection and a clear critical position are crucial starting points for design. From these foundations we conjure alternative futures, new stories to inhabit.

Stories are all powerful, they guide our actions with immense implications for all living entities. The primary, and thereby default, imaginary of the global north is hugely problematic. Priorities for economic growth and ever-increasing consumption are clearly in direct conflict with any path to sustainable futures. A massively obvious statement but one that points to an unassailable truth, the need for radical change. Philosophers and theorists, such as Virilio (Virilio, 1984), Fry (Fry, 2012) and Guattari (Rawes, 2013) have all championed this call. The ex-Governor of the Bank of England, Mark Carney has even discussed how we have the technologies we need to address an environmental crisis, but first we need to rethink the value systems with which we

wield them. As he notes "*we can't self-isolate from the environmental crisis. We have to live the values that are necessary to solve it.*" (Carney, 2021). If the foundations of design are left uninterrogated this imaginary could however long continue to inhabit our cities, designing our future and moving it incessantly towards destruction. To move forwards to a viable future, towards cities that promote wellbeing for human and non-human alike, we must first sculpt with thought not form.

Our digital landscapes also emerge from these stories but do so with the capability of instantaneous shapeshifting, reimagining themselves at the touch of a button. Emerging mirror worlds, digital twins of our physical context, render reality as we choose to see it, or to be more precise, how the designers choose to see it. From the almost unimaginable complexity of the physical world choices are being made, what to include and what not to include in these digital replicas; a determining of what is of value and what is not, and is therefore fated to be written out of our reconstructed worlds. The further we retreat into this representation arguably the further we move from any possible critique or displacement of the values that form it, as little remains which might contradict them. Yet these digital landscapes can also become navigational charts to other futures. As extensions of our spatial field they might reconstruct interpretation, rebuilding our world, expanding rather than reducing our engagement with the physical.

DESIGN FICTIONS

Architecture itself holds the innate capacity to propose fictions, new stories. Alternative futures we might inhabit can be sculpted from thought into both physical and digital form. Through this they can lever what Lefebvre discussed as the possible impossible, extending the realm of the possible. He discusses this as "*making possible escape beyond the limiting perspectives of so called reality... [that] today more than ever there is no theory without utopia. Otherwise a person is content

to record what he sees before his eyes: he doesn't go too far - he keeps his eyes fixed on so called reality: he is a realist... but he doesn't think!" (Lefebvre 2009 [1970]).

Speculative architect Liam Young's film Seoul City Machine (2019) imagines beyond the present to a city evolved in conversation with an AI chatbot. It is occupied by automated transport, augmented reality, drone pets and holographic adverts. He conjures up a city which begins to speak to you, a sentient city that might evolve as an extension of ourselves. One can start to imagine how such a city might begin to speak to us of our past within the city fabric. The Future Cities, Urban Intelligence Conference at MIT in 2019 discussed the realistic potential of smart cities, with roads full of self-navigating cars and water pipes that report when they leak. With urban tech noted as the top for venture capital investment Liam's sentient city might not be as far away as we think.

Digital twins already offer the capacity to integrate vast complex systems, extending building management systems into mirror worlds operating at the urban scale. AI enabled they can interrogate multiple data streams, identify issues and propose responses. The Centre for Digital Built Britain at Cambridge University has been evolving shared operational principles for digital twins termed the Gemini Principles (2021). The critical position upon which they might be founded however seems little discussed, yet this is fundamental to the nature of the liminal futures we construct. As environmentally focused as it might appear, sole ambitions for limiting energy use can still be wrapped in the cloaks of the primary imaginary, and merely act to sustain a toxic culture for a little longer (Morton, 2018).

When driven by a clear critical position, however, evolving technologies can be applied to build alternative futures. Might IRL become an expanded spatial field of augmented perception? Might

we extend our understanding of ourselves as fundamental interconnected and relational beings by augmenting our senses and extending our perception?

Already our phones augment our navigational senses and extend memory capabilities to encompass both all we have experienced, as well as much we have not, offering the world's memories at the touch of a screen. Future cities might enable us to see magnetic fields, hear the communication of plants and feel distant vibrations. Google's orca tracking project uses AI to identify the whales' calls from a wealth of oceanic sound, and then accurately calibrates their locations. We might augment our cities and ourselves with the capacity to track other species, extending our perception to get glimpses into others' worlds. Our cities might augment our human limitations and by so doing overpower the hold anthropocentric perception has over our imaginary.

As AI powered design tools evolve and begin to challenge the role of the architect, the critical position from which we make design decisions comes clearly to the fore. These tools can become powerful allies, but we need to be at the helm in charge of decisions, determining which generated options are chosen. Increasingly architects are exploring these tools and evolving methods to deploy them. Thom Mayne, Wolf Prix and Patrick Shumacker are amongst those at the forefront of experimenting with this expanded tool kit (Leach, 2021).

Interesting work has also been carried out at SCI-Arc. Their 2021 ArchBestia exhibition and symposium explored generative design and co-authorship, with AI generating its own outcomes in real time from cross disciplinary feeds. All this work begins to signal potential modes of engagement. With clear steerage such technologies seem replete with potential to assist in envisioning new futures, Lefebvre's possible impossible.

RADICAL PROPOSALS

Since 2011 we have been constructing design fictions and evoking alternative futures from foundations of ontological design. Over this time period collaborators have included Unit B at Oxford Brookes University, MA Architectural and Urban Design and BA Studio 3 at the Brighton University and BSc UG10 at the Bartlett School of Architecture, UCL.

We asked how the design of our architectural spaces and cities might critically engage these liminal landscapes through investigating potential frameworks of engagement. Might we begin to evolve architectures which blur the boundary of the physical and digital, enabling entry into others worlds to see beyond our anthropocentric perception? Might we return the digital to the physical, revealing its hidden corporality? Could our cities offer us visions of our past, extending our understanding of our own histories? The following design explorations begin to offer first glimpses of futures we might dare to imagine: a zoo of proto architectures for the liminal realm IRL.

Head in the Clouds

The internet has become an integral part of our daily lives, on average we can spend a third of our time just using social media. At any one point in time thirty percent of us will be online, yet the mode of engagement disguises the physical reality of massive infrastructure and carbon footprint. The cloud is housed in anonymous data centres, which can consume the same amount of electricity as a small town. The project aims to draw the digital back into the physical, exposing in real time the weight of the cloud (Fig 1).

The oft hidden flickering beauty of the data centre is put center stage, giving the cloud back its physical presence. As levels of engagement with the digital landscape fluctuate so does the heat given off by the servers. A water heat recovery system collects this waste heat to

power the climate engineering of large glazed public gardens which sit alongside the data towers. Its pipes are foregrounded as key architectural elements highlighting the process. As data use rises heat output reaches a tipping point and mists begin to form, clouds gather then rain storms descend. The physical impact of the digital landscape is made manifest as it powers its own weather systems which fluxes in relation to the use of the cloud; the number of twitter feeds, facebook posts, instagram feeds (Fig 2).

Space, time and the beauty unseen

This interactive volumetric video installation allows people to experience themselves in a new multi-dimensional anachronous way. The piece aims to extend our understanding of ourselves and our physical, spatial implications.

Three sensor cameras create a live pointcloud of the subject and project this onto the three clear perspex screens. Delays built into the software's algorithm generate reflections from three different
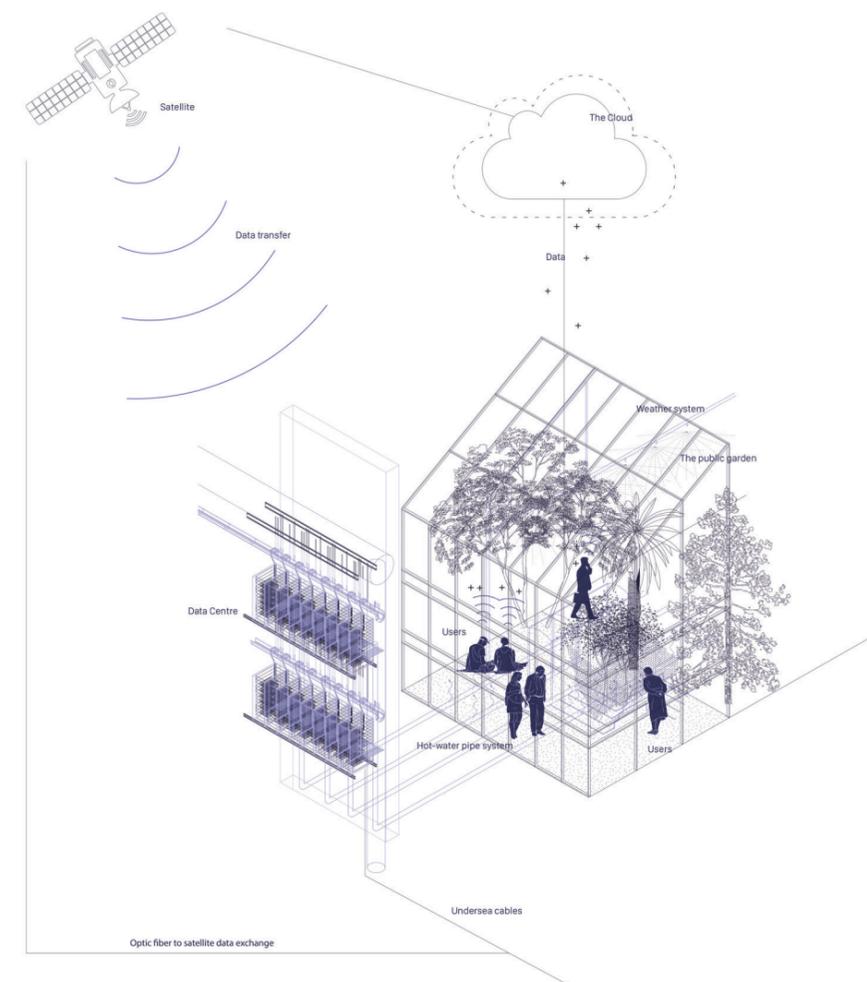

Fig.1 – Head in the Clouds: UG10, Bartlett UCL, Amanda Dolga.

Fig.2 – Head in the Clouds: UG10, Bartlett UCL, Amanda Dolga.

Fig.3 – Space, time and the beauty unseen: Matt Reed, MA Architectural + Urban Design, Brighton.

moments in time. The two side screens incorporate a delay of two and four seconds respectively, offering two historic reflections, whilst the central screen shows the present. As the images are provided by 3D scanners the viewer sees a three-dimensional representation of themselves, like a 3D holographic mirror. This aims to distort the viewer's perception

of space and time to create a sense of disembodiment within that particular urban space. Initially sited outside the Churchill Square shopping centre in Brighton, the piece would tour different citycentre sites, operating after dark.

The installation aims to shift perspective to enable reflection on the personal internal experience

of the immediate past through its delayed replaying of this. In this way it uses technology to begin to augment our physical experience, extending embodiment (Fig.3).

The Virtual Engine

A re-imagining of an abandoned theatre into a live/work residence of a VR Programmer and a Network
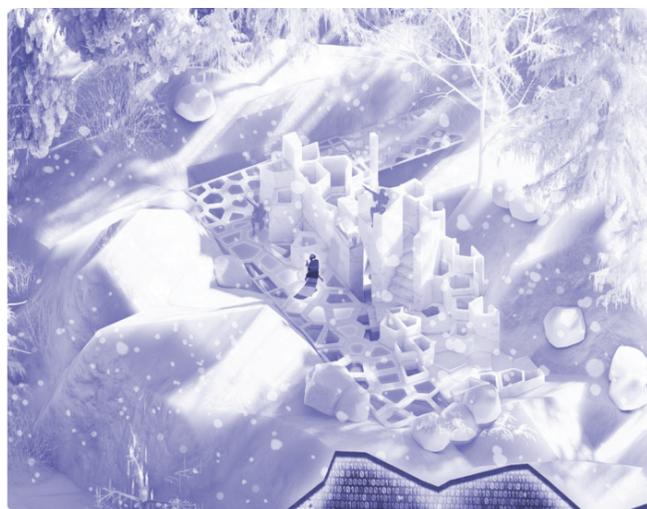
Engineer, the proposal inhabits both physical and virtual domains (Fig.4). It aims to reform the digital environment to both physically aid the physical world and extend our understanding of it. A layering of digital and physical environments blurs the line between, with mirror worlds blending into the physical alongside participatory immersive technologies inhabiting physical architectural space.

The virtual is further grounded within the physical through its powering of environmental technology through waste heat. This acts to contrast the intense synthetic experience of VR with the AI controlled aquaponic systems it supports.

The interfaces are designed to benefit users not reduce them to data to be harvested, as technologies create new realities with the digital in service of the upkeep of the real.

Between Ruins and Reconstruction

The work responds to concerns about gradual erosion of place, identity and belonging within a globalised consumerist culture. Environmentally sensitive feelers construct an ever evolving picture of the fluctuating site, building new identities. The data feeds an automated drawing machine to produce daily site portraits inspired by the tradition of Moghal
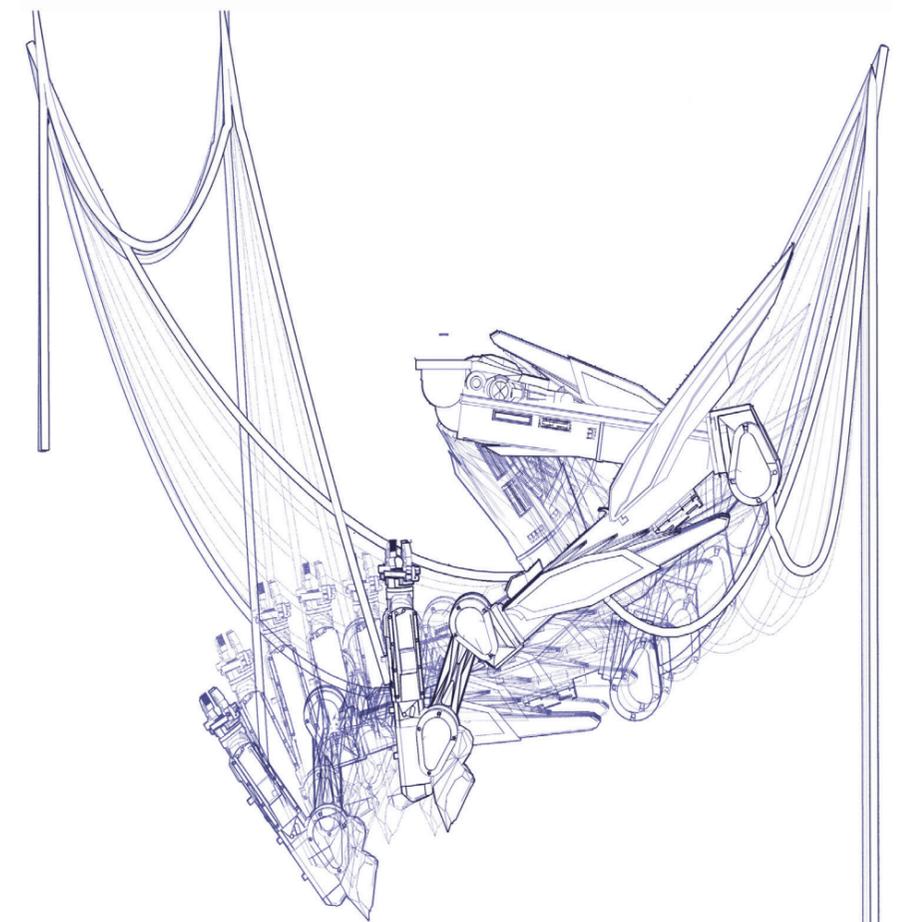

Fig.5 – Between Ruins and Reconstruction: Shahkar Ali, Studio 3 BA Architecture, Brighton.

minatures. A robotic arm inhabits a courtyard carved out of an abandoned shop on the main shopping street in Brighton (Fig.5 & 6). Open to the public it generates expressions of the ever-changing moment. The past calendar of daily drawings are exhibited on

automated tracks winding around the ruined interior.

The space aims to offer a counterpoint to the consumerist street beyond, expressing place and identity for individual interpretation; a reinvention of identity within a hybrid liminal space.
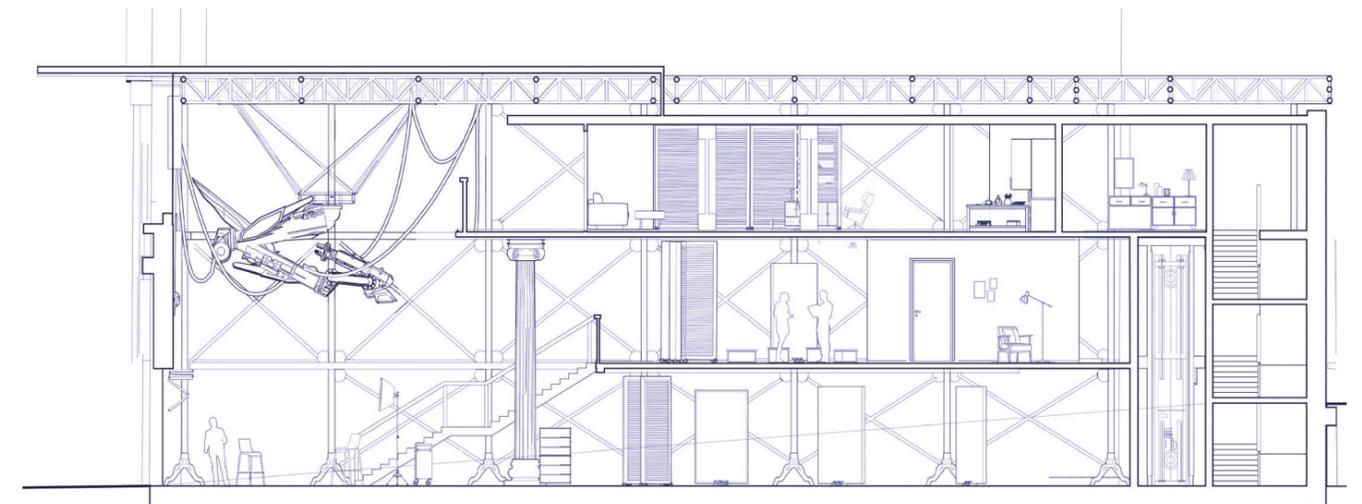

Fig.4 – The Virtual Engine: Ed Garton, Studio 3 BA Architecture, Brighton.
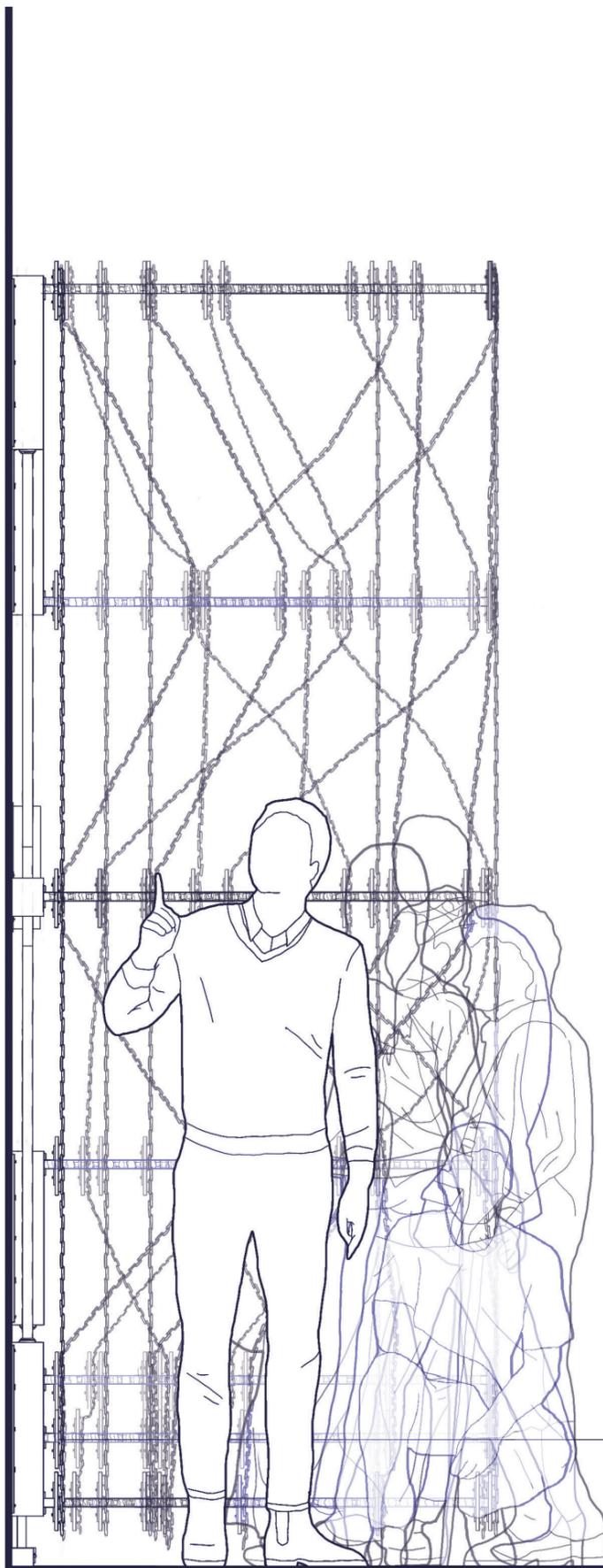
Fig.6 – Between Ruins and Reconstruction: Shahkar Ali, Studio 3 BA Architecture, Brighton.

Co-authorship: A collaboration between human and AI

In a narrow Brighton lane a wall begins to interact with people passing by. Initially responding to their actions but then predicting and preempting responses, a ballet between structure and people begins. During its use the AI controlled hydraulics begin to learn. Gradually it builds a recognition of behaviour patterns and begins to use this understanding to preempt action. The wall then starts to respond to predicted future behaviour, moving in advance of, as opposed to in response to peoples' actions (Fig.7).The project explores the potential for co-authorship between humans and AI. Peoples' activity influences AI which then in turn influences human movement in a ballet of co-authorship within the lane. The design was evolved and tested by the design, construction and programming of a 1:1 working prototype of a single module (Fig.8).

Brighton in 4D

The project asked whether we might now augment our cityscapes with its layers of past occupation, offering access to past inhabitations. It aimed to explore the potential of augmented reality to expand our understanding of place and identity. Might this immersive technology have the capacity to go further than photographs or recorded media in connecting us with our past? The project explored the potential of generating digital city ghosts via a smart phone app, with the screen as a lens into the past.

An app rebuilds Brighton's Chain Pier, allowing its presence to again sculpt activities, revitalizing lost connections and generating new ones (Fig.9). Little now remains to signal the existence of the Chain Pier on Brighton seafront, yet at in the 1820s and 30s as many as 4000 people visited a day. For an admission of 2d they were entertained by regimental bands and side shows. The digital

Fig.7 – Co-authorship: A collaboration between human and AI: Meg O'Hanlon, Studio 3 BA Architecture, Brighton.
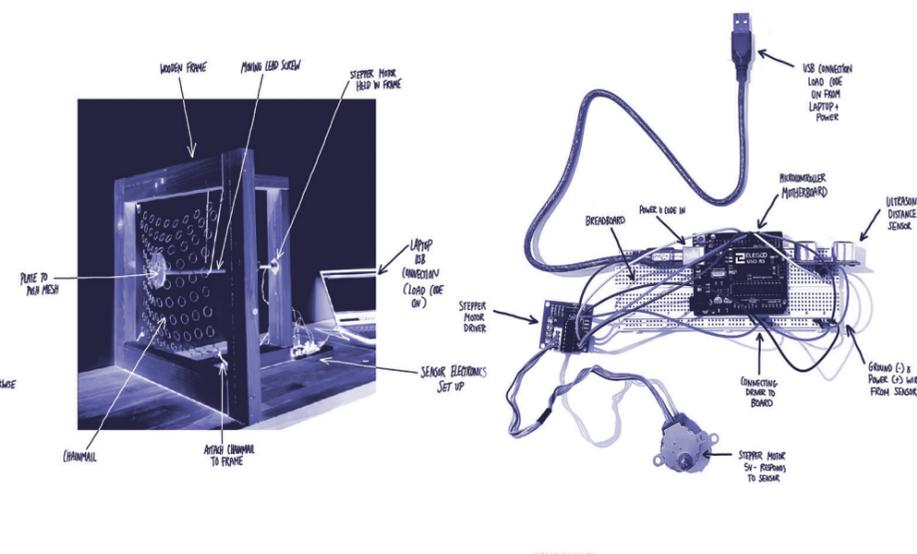

Fig.8 – Co-authorship: A collaboration between human and AI: Meg O'Hanlon, Studio 3 BA Architecture, Brighton.

resurrection drives physical interaction, building urban relationships by augmenting the city with its past.

CRITICAL FUTURES

To secure the sustainable future we need we must first design with thought not form. We must become storytellers, rewriting our narratives to recover enchantment and reclaim relationality. Ontological design offers routes forward, with design fictions signaling potential destinations. The digital and our liminal realm can offer an expanded tool box to negotiate the challenges we encounter if we maintain a clear eye on the road.
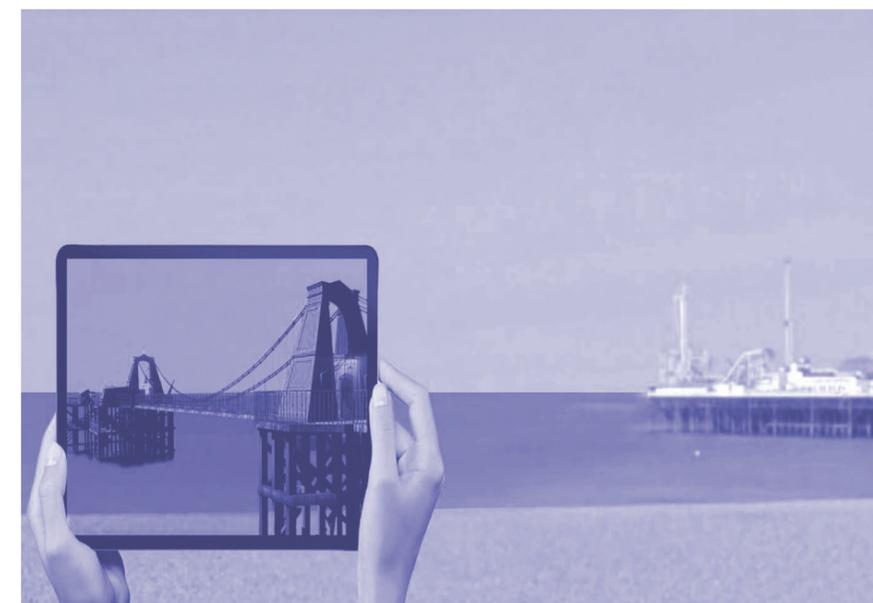

Fig.9 – Brighton in 4D: Matt Reed, MA Architectural + Urban Design, Brighton.

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