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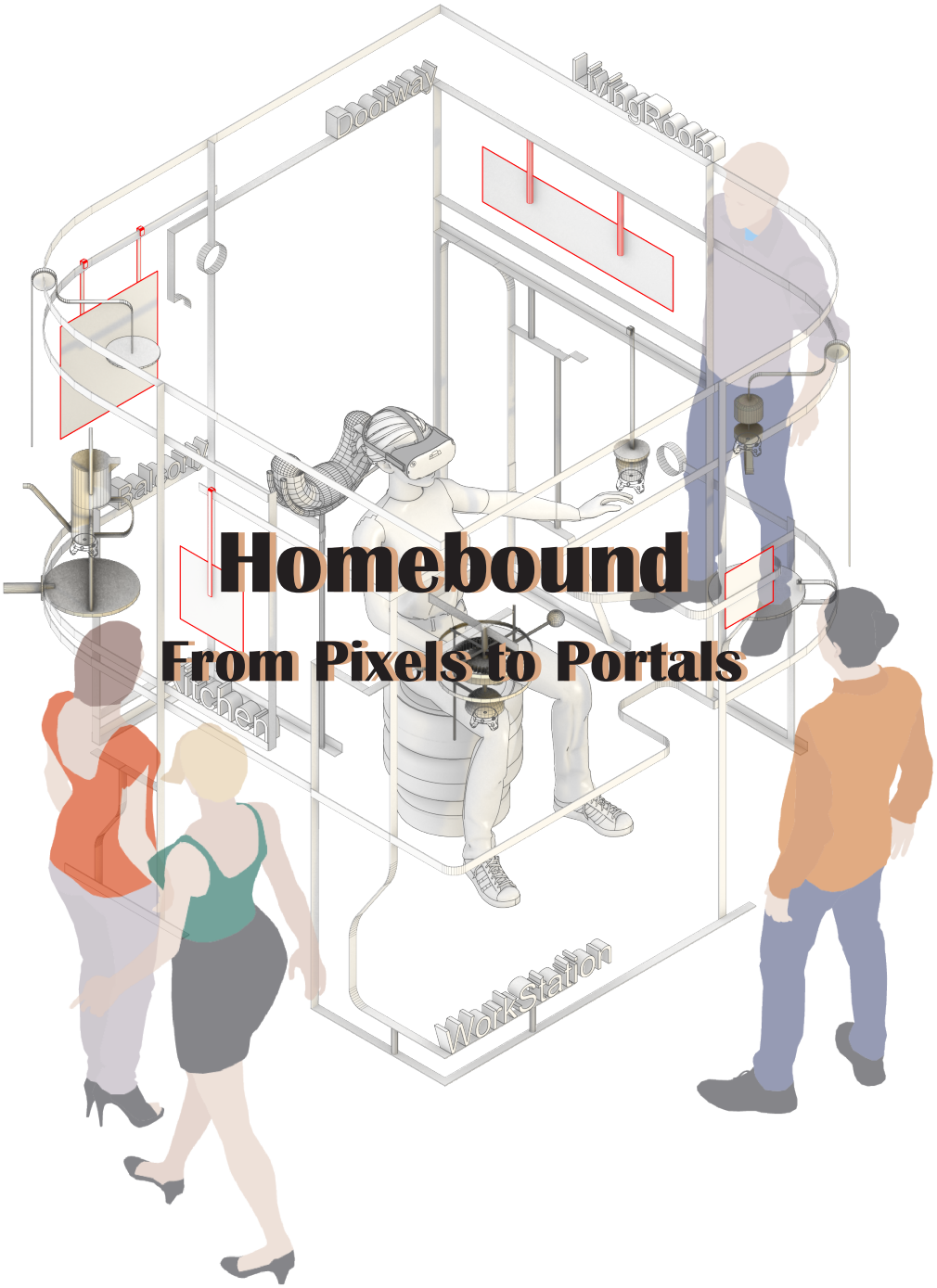
Cinematic and Videogame Architecture, 2023-24



Homebound

From Pixels to Portals

How do we live in an immersive, data-driven smart home where mixed-reality technology redefines the concept of domesticity?

Word Count : 8161

Contents

Figure 1.0
Mixed-Reality Portal Artefacts

01 Introduction

From the Internet of Things to artificial intelligence, smart objects and devices are influencing the rhythms and routines of our domestic rituals on an unprecedented scale. Today, we inhabit an intricately interconnected environment where emerging technologies progressively blur the boundaries separating the physical from the digital domains.[1] Data, in its broadest sense, becomes the invisible architecture within our homes. As the AI companions that we took for granted begin to gain enough agency to interpret the 'needs' of humans in the house and autonomously design services in response to those 'needs', humans are rendered into observers in their own homes and their control confiscated as a tradeoff for convenience. The paper's opening chapter introduces the innovative smart homes of the 21st century while proposing that the future home will cease to be a static structure but instead a customizable, automatic, and sanitised entity that can be described as one's pet or friend and that houses a complex universe of overlapping cultural references, daily rituals, unspoken desires, and aspirations. My house knows me, knows what I feel, where I come from, and where I want to go.

In the 21st century, the home becomes a space where contradictory expectations collide.[2] Propelled by technological advancements and financial constraints, with just four walls and a roof, the home serves as the hub for our daily rituals and activities. It is a minimal but programmable physical space that can effortlessly transition between different uses. Amidst a backdrop of limited domestic space and the progressive digitalisation of collective living, the paper seeks to study the phenomenon of the nomadic home through the lens of mixed-reality technologies, a relatively niche and underrepresented methodology in domestic architectural studies, where all items within the home have either become artefacts or if still functional, are simplified to its bare minimum value only for its capacity to meet basic human needs.[3]

How can designers critically react to the radically evolving identity of today's home? Utilising digital tools to craft unique, interactive, and highly personal immersive experiences, actors and audiences traverse freely between physical and virtual realms following rule-based structures reminiscent of computer games, and weave rich temporal layers where artistic encounters intertwine with everyday routines. These experiences are referred to as mixed-reality performances. Through a combination of precedent research and primary design methodologies, this thesis delves into the future of the home when people start to inhabit the virtual environment as their sequence of social connections become intricately intertwined with and sensorially bound to open-source tactile objects, which have developed into the seeds of spaces. In place of structural partitions and static fenestrations, mundane objects such as chairs and windows act as devices of identification which function as shared interactive portals into bespoke virtual odysseys within an infinite infrastructure of accessible luxury.

Apart from precedent research and speculative drawings and visualisations, a performative extended-reality model(XRM) is developed consisting of multiple 1:1 interactable components which serve as portals into futuristic spatial explorations of the smart home. In addition to testing the technical feasibility of the proposed home typology, the prototype also enables the viewers to directly experience mixed-reality living. To quote the Chinese philosopher Lao Tse's words, "What I hear I forget. What I see, I remember. What I do, I understand."[4] Sections of introspective descriptions highlighted in italic are interspersed in between the main essay body. Presented in diary format, these passages encourage readers to embark on a virtual house tour, offering reflective accounts of the author's personal encounters

Figure 1.1
A Perfect Day - Blending Physical and Virtual Realms: A Constellation of Spaces

1 *Steve Benford and Gabriella Giannachi, Performing Mixed Reality (Cambridge, MA: MIT Press, 2011), Page 5.*
2 *Oliver Herwig, Home Smart Home: How We Want to Live (Basel: Birkhäuser, 2022), Page 11.*
3 *Paula Strunden, Micro-Utopia: A Theoretical and Practical Study of Inhabiting the Virtual, Design Ecologies 8, no. 1: 32–63, https://doi.org/10.1386/des.8.1.32_1, Page 42.*
4 *Moehlenhoff, Grant, Blend space: Architectural storytelling in the age of mixed reality, https://www.researchgate.net/publication/333309990_Blend_Space_Architectural_Storytelling_in_the_Age_of_Mixed_Reality, Page 13*

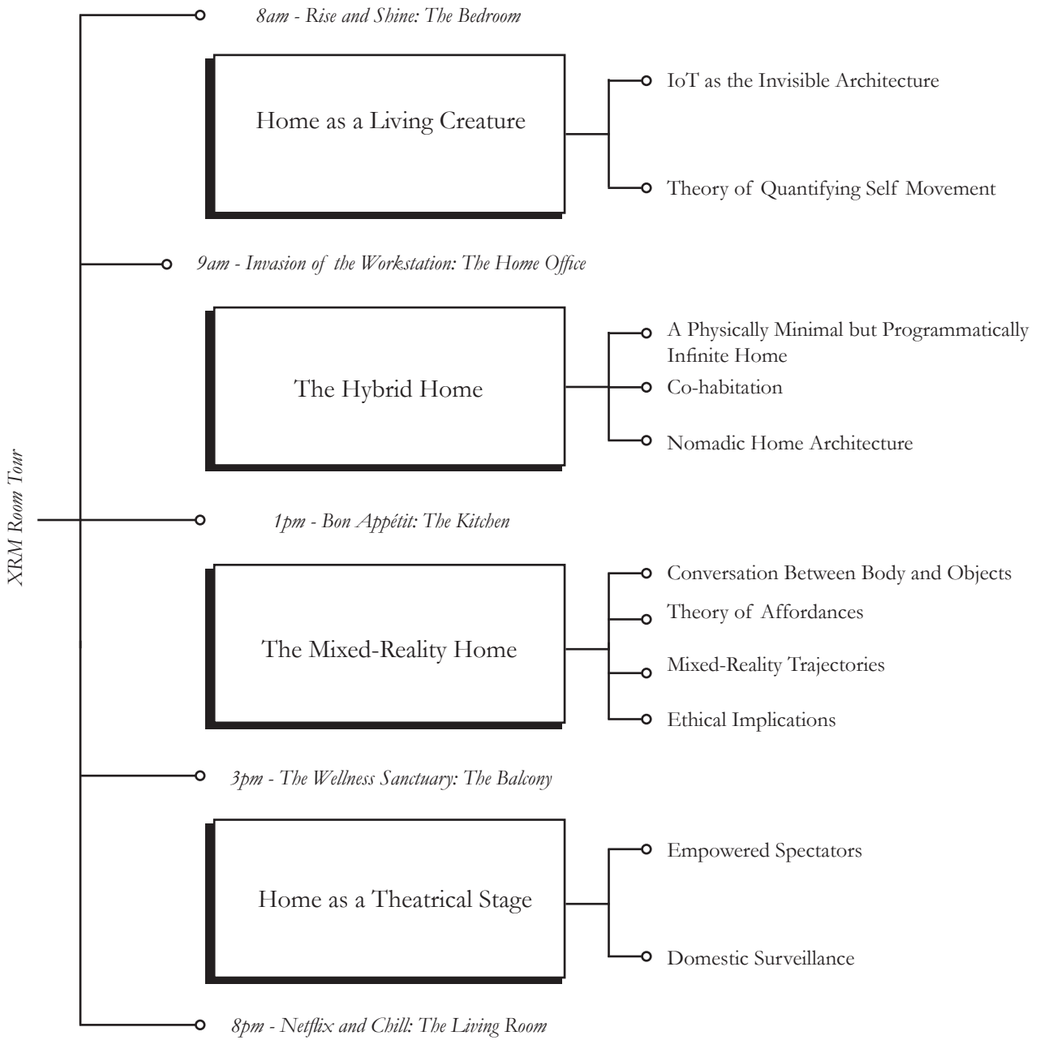


Figure 1.2 Thesis Structure

within the XRM smart home. Nonetheless, the imagined devices and spaces serve as diegetic prototypes rather than futuristic visions, as they feature a series of narratives and everyday scenarios that represent a method to critically examine humans' roles in an increasingly technologically mediated world. Employing these methods, this thesis explores mixed-reality spatial perception through highlighting the unconscious relationship between our bodies, objects and immersive spaces while provoking a new type of domestic living.

Architecture, like performance, has always contained the energies of live bodies.[5] Through analysing contemporary performative architectural installations, the last section frames domestic settings as a set of social interactions that are closely shaped by and connected to objects responsive to occupant interactions. The future smart home may evolve into a theatrical stage where the boundary between private and public is rendered increasingly unclear and indistinguishable. The partitions in our domestic shelters are crafted to steer the behaviours of those who dwell within them. Architectural cues inform individuals about what activity to perform, where, when, and for how long, similar to living within a script for a theatrical production. In addition, public performances inherently involve spectators, raising critical issues of surveillance. The passive observation by an audience in mixed-reality experiences mirrors the constant presence of smart home devices in our private spaces, highlighting the pervasive nature of modern surveillance. Mirrored in the boundaryless home is a boundaryless society, which introduces flexible work and thinking around the clock, and the private, even the intimate, becomes broadcastable.[6] Mechanical intelligence, data intelligence, mixed-reality intelligence – the next evolution of the smart house awaits.

5 *Alex Schweder, Performance Architecture. Le Journal Speciale'Z, 4, 102, Page 103.*
6 *Oliver Herwig, Home Smart Home, Page 12.*

02
Home Smart Home

8am - Rise and Shine: The Bedroom

"Tick-tock, it's eight o'clock, rise and shine, rise and shine, eight o'clock!" the invisible voice-clock chimed from within the bedroom walls, with an almost anxious tone, as if worried that no one would heed its call. The house was silent in the early morning hours, with only the persistent ticking of the clock echoing through the empty space. Struggling to get my bearings at first, I frantically rotate my head, weighted down by the hefty VR headset, to catch glimpses of the soft ambient lighting infiltrating through the translucent curtains which envelop the central bed, bathing it in calming hues, creating a serene atmosphere.

Eager to reconnect with my physically seated body, I thumped my feet against the floor and felt the plush carpeting that cushioned their blow. Playing on a low and meditative volume, the subtle hum of hidden speakers filled the air with tranquil melodies, while the occasional chirping of virtual birds outside the digitally rendered window added to the illusion of being immersed in nature. Extending my arm, I reach towards the sleek, minimalist furniture around me. Instead of the metallic coldness I was expecting, my palm cut through the void as I was reminded of my presence in this mixed-reality limbo state.

Figure 2.1
A Perfect Day - The Bedroom

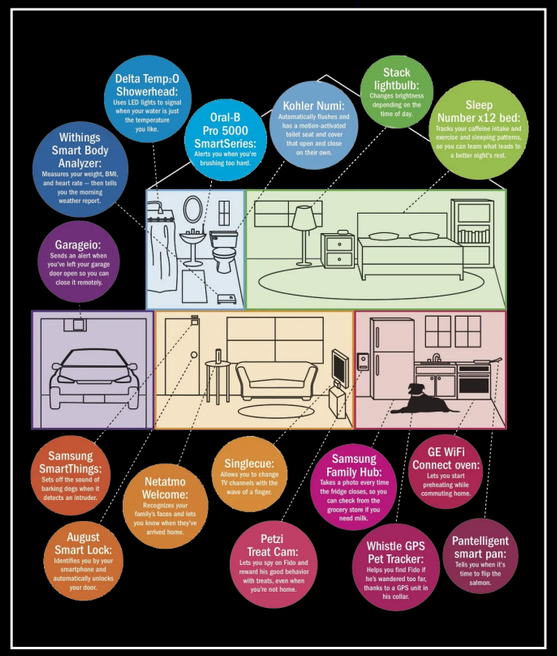


Figure 2.2 A Catalogue of Smart Home IoTs (Turbin, 2016)

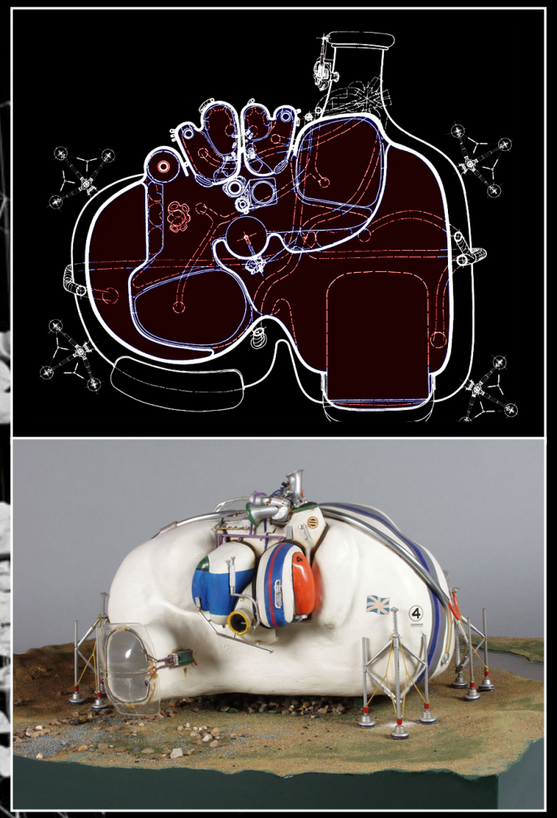


Figure 2.3 Living Pod (Greene, 1967)

This section analyses the multifaceted nature of smart homes. Firstly, presenting the concept of the home as a living companion, this section examines how smart homes embody anthropomorphic qualities and form symbiotic relationships with their inhabitants. Furthermore, within the contemporary smart home environment emerges the cultural phenomenon of self-tracking with technology. Referring to Superflux's Uninvited Guests as a case study, it can be evaluated that personal data evolves into a currency that users willingly surrender as an exchange for convenience and comfort, which also raises ethical concerns about privacy and surveillance. Finally, the invisible architecture of smart homes is unveiled, emerging from the mechanical intelligence era of the twentieth century, data intelligence serves as the foundational building block in contemporary dwellings, shaping the domestic environment and orchestrating interactions tailored specifically to its dweller's needs.

2.1 Home as a Living Companion

Through the continual instalment of AI technologies into the skins and bones of the once static skeletal home, the 21st century dwelling has transcended its conventional definition to become an entity that exhibits qualities reminiscent of living organisms. Equipped with advanced technologies and interconnected systems, a new era of domestic living characterised by unprecedented levels of convenience, efficiency, and customization leads from the modernist "machine for living" to the living machine of digital modernism.[7] Valued at over $90 billion in 2020, the global smart home market is projected to reach over $200 billion by 2026 while the number of IoT devices connected to smart home systems surges to surpass 14 billion by 2025.[8] As in-house inanimate objects from lamps to toasters begin to communicate and operate without human interference via an embedded computing system, the smart home awakens as a living creature, capable of automatically responding to the needs and desires of its occupants. However, when this happens, are we still masters of our own homes?

In the digital ecosystems that we inhabit today, the relationship between humans and their living spaces is redefined as embedded sensors throughout the home fixate their constant stare on the occupant's every move, tirelessly gathering data such as temperature, humidity, and light levels in real-time. Eliasson states that the actions of the users of a space continually recreate its structures and often space becomes a background for interaction rather than a co-producer of interaction.[9] However, as our homes learn to read all of our wishes directly from our own lips and react autonomously towards these unsaid commands, the action ceases to be one-directional as the idea of a static, non-negotiable home becomes a memory of the past.

Imagine the future home being transformed into a fully automated, sanitised, and cognizant entity that develops a symbiotic relationship with its dwellers. Inside David Greene's Living Pod, traditional domestic rituals, like bathing or cooking, are entirely mechanised. "Four automatic self-levelling compression legs, a non-static food dispenser with self-cooking modifications, and automatic body cleaning equipment"[10] form a self-sustaining living space that mimics the functions of biological systems. Just like organs work together within a living organism, the various components of the nomadic pod are interconnected and capable of generating their own energy, recycling their waste, and maintaining their internal environment. The house autonomously takes care of itself with minimal human interference. Nonetheless, the paramount selling point is comfort.[11] Imagine arriving home as dusk falls, blinds lower automatically as a welcome gesture while the bedroom temperature remains fine-tuned, ensuring warmth

7 *Oliver Herwig, Home Smart Home, Page 143*
8 *Bergur Thormundsson, "Topic: Smart Home," Statista, accessed May 5, 2024, https://www.statista.com/topics/2430/smart-homes/#topicOverview.*
9 *Eliasson, Studio Olafur, Models Are Real, Studio Olafur Eliasson, https://olafureliasson.net/read/models-are-real-2007/.*
10 *Hidden Architecture, "Living Pod," Hidden Architecture, April 24, 2019, https://hiddenarchitecture.net/living-pod/.*
11 *Oliver Herwig, Home Smart Home, Page 144.*

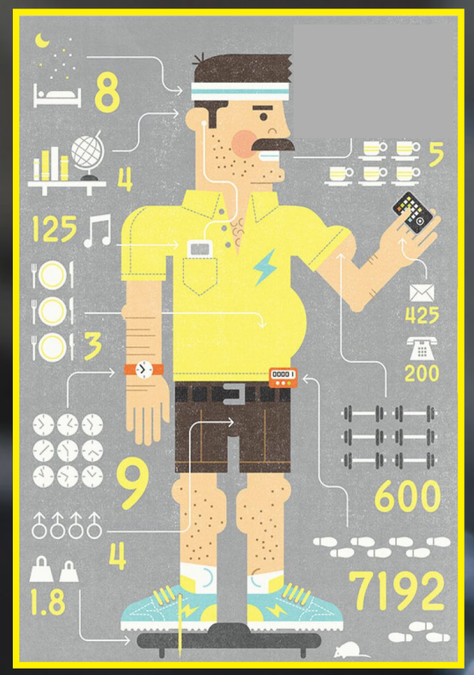


Figure 2.4 Personal Identification Through Numbers (State of the Bay, 2012)

Figure 2.5 Frictions Between an Elderly Man and His Smart Home (Superflux, 2015)

upon our return. Automated vacuum cleaners scuttle about while a fresh bundle of flowers perches glamorously on the dining table, reminding us of a long-forgotten birthday. One day, the dwelling eventually grows intimately acquainted with its inhabitants, surpassing their own self-awareness through relentless observation and adapting to their every nuance.

2.2 Quantified Self-Movement: The Invisible Stare

The quantified self embodies the cultural phenomenon of seeking self-knowledge through numerical measurables.[12] By incorporating data acquisition devices such as wearable gadgets or smartphone apps into daily routines, people constantly monitor their everyday activities where the collected data is later used for behavioural analysis to evaluate one's overall wellbeing. In a fast-paced society filled with appointments and to-do lists, data fetishism transcribes complex humanistic routines into a series of reductionist numbers, downgrading human bodies and minds as data points on an immense spreadsheet.

In the fiction film Uninvited Guests, Superflux Studio speculates on a future where ubiquitous smart home surveillance technology, such as drones and sensors, has become deeply integrated into everyday life, with the focus being elderly healthcare and remote tracking.[13] The elderly protagonist cohabits with a set of smart devices that monitor and control his every move, tracking everything from calorie consumption to daily physical activity, all in the pursuit of promoting a healthy lifestyle. Through highlighting the friction between human and machine agency in a domestic setting, the dystopic tone of the film raises concerns about privacy, security, and the potential for unintended consequences when we invite these devices into our lives. After all, as we equate personal health to the climbing digits shown on a control panel, the complex human emotional needs are neglected as the smart home becomes a cold-hearted machine devoid of the messy and spontaneous humanistic interactions, with the only goal being managing their human subject for optimal functioning.

The concept of privacy, in its literal sense of exclusivity, has ceased to exist. Even the basic right to the "inviolability of the private sphere"[14] appears to be partially eroded in our daily lives – often voluntarily. The argument put forth in 1999 about the "un-private home" grows ever more pertinent. The home, once a sanctuary offering shelter and privacy, has undergone a fundamental transformation.[15] Traditionally, the home was a place where one could shut the door and leave the outside world behind – a world of work and social obligations – at least for an evening or a night. However, historically seen as the cradle of the self, the home is now embedded with technologies that constantly monitor and collect data on its inhabitants. Virginia Woolf eloquently captured this sentiment when she wrote that "a lock on the door means the power to think for oneself."[16] The private domestic sphere, once a refuge for the interior life of consciousness, is now inseparable from the invasive reach of digital surveillance tools. Piece by piece, the pervasive presence of smart home technologies has compromised this sanctuary, transforming it into a site of constant observation and data extraction, where every action and interaction is monitored, analysed, and potentially monetized.

In this new reality, the smart home symbolises the erosion of privacy and highlights the deeply invasive nature of the quantified self-movement. While individuals delusionally believe their control over personal data, the truth is starkly different. Today's landscape shows that rights to privacy and knowledge have been seized by a bold market venture claiming others' experiences and the knowledge derived from them. This shift signifies the darkening of the digital dream into a voracious commercial

12 *"Quantified Self," Wikipedia, March 7, 2024, https://en.wikipedia.org/wiki/Quantified_self.*
13 *"Uninvited Guests," Superflux, January 24, 2023, https://superflux.in/index.php/work/uninvited-guests/#.*
14 *Daniel Vella, "There's No Place like Home," Ludotopia, December 31, 2019, 141–66, https://doi.org/10.1515/9783839447307-008.*
15 *Oliver Herwig, Home Smart Home, Page 19.*
16 *Virginia Woolf et al., Virginia Woolf: A Room of One's Own (Princeton, NJ: Films for the Humanities, 2015).*

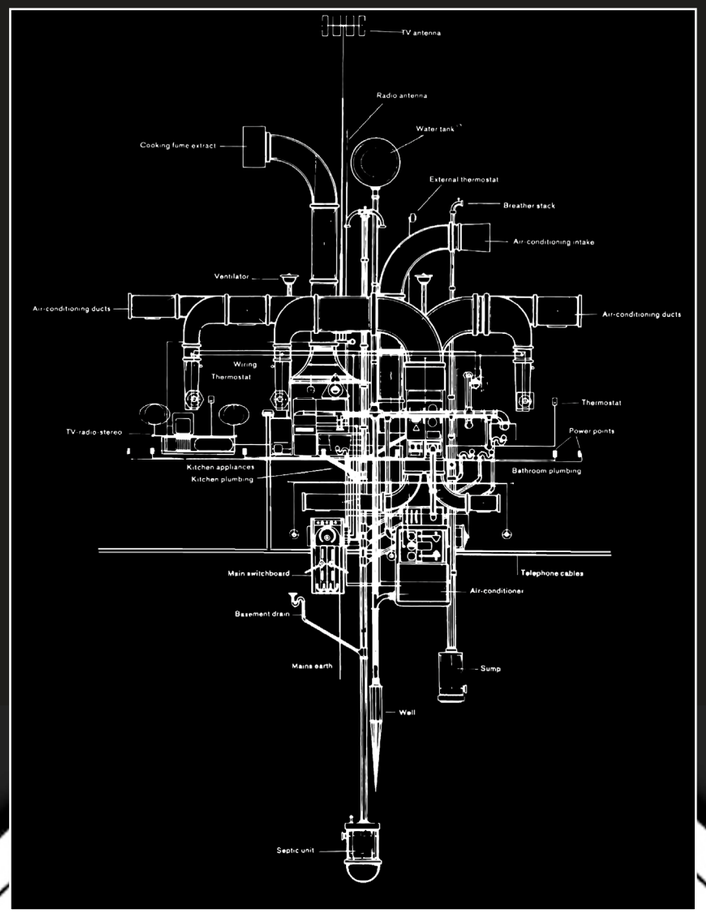


Figure 2.6 Mechanical Anatomy of A Dwelling (Dallegret, 1965)

enterprise known as surveillance capitalism.[17] Surveillance capitalism unilaterally claims human experience as free raw material for translation into behavioural data. In the name of service improvement, the collected data is declared as proprietary behavioural surplus, fed into advanced manufacturing processes known as "machine intelligence," and fabricated into prediction products that anticipate future actions. This shift signifies a move from merely knowing our behaviour to shaping it at scale. With this reorientation, it is no longer sufficient to automate information flows about us; the objective is now to automate us. This evolution from knowledge to power fundamentally challenges the early digital dream, which envisioned a more democratic, inclusive, and morally grounded digital landscape. Instead, surveillance capitalism reveals the dark reality: digital connections serve commercial interests, not individual empowerment. At its core, surveillance capitalism is parasitic and self-referential, with users paying for their own domination as they become the raw material for an inexorable surveillance economy. We are not customers but sources of vital surplus for enterprises trading in the markets of future behaviour, highlighting an unprecedented asymmetry in knowledge and power where surveillance capitalists infiltrate into our private homes and know everything about us, yet their operations remain opaque and inaccessible.

2.3 Data as the Home's Invisible Architecture

The era of the analog apartment is coming to an end.[18] Composed of physical home appliances and electronic interfaces, the expanding cloud infrastructure becomes the home's invisible architecture through which data can be connected and exchanged. As control panels vanish from reach and silent dialogues exchange unobtrusively behind the walls, computers become largely integrated within objects of everyday life,[19] enabling the smart home to gather a thorough understanding regarding the needs and desires of the occupants through machine learning algorithms and omnipresent surveillance. These data are consequently implemented in the form of personalised services and offerings, giving birth to a new form of spatial communication where the inhabitant is no longer the conscious message sender.[20] Data is received and transmitted simultaneously as the occupant watches from the comfort of their couch as articles of furniture emerge as needed from walls and floors and melt down again upon dismissal.

Essentially, the smart home extends ordinary space into a user interface through constant interaction between users and artificially intelligent entities, bound together by a continuous stream of data.[21] What if the future home starts to expand virtually? As foreshadowed by Banham, mechanical invasion is a fact.[22] Under the surface of digital components, a future unfolds where the concept of home melts seamlessly into the virtual landscape and digital data serves to mediate interpersonal interactions. Augmented reality technology is already shaping realistic virtual objects devoid of traditional projectors. Although living in an AI-powered home promises a lifestyle of convenience and interactivity, the all-around hassle-free package of the digital economy comes with the unavoidable compromise of non-existent privacy. Overall, the rapid integration of technology into our living spaces seems inevitable, but as we invite the surveilling eyes into our intimate home, where will we draw the boundaries of privacy?

Beyond understanding the present state of smart home technology, the section also envisions a future scenario where the convergence of physical and digital realms gives birth to a home that assumes the role of a responsive human companion. As the embedded IoTs become the core service mechanisms within the smart home, the house's envelope is nothing more than a hollow shell. Therefore, this section seeks to illuminate the transformative potential of smart homes as immersive mixed-reality environments where boundaries of spatial design can be redefined by human-computer interaction as the domestic environment evolves into an infinite space of inhabitation.

17 *Shoshana Zuboff, The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power (New York: PublicAffairs, 2020).*
18 *Oliver Herwig, Home Smart Home, Page 143.*
19 *Jane Evelyn McGonigal, This Might Be a Game: Ubiquitous Play and Performance at the Turn of the Twenty-First Century, 2006, Page 6.*
20 *Paula Strunden, Micro-Utopia: A Theoretical and Practical Study of Inhabiting the Virtual, Design Ecologies 8, no. 1: 32–63, https://doi.org/10.1386/des.8.1.32_1, Page 50.*
21 *Oliver Herwig, Home Smart Home, Page 143.*
22 *Reyner Banham and François Dallegret, A Home Is Not a House (New York, 1965), Page 70.*

03
Four Walls and A Roof

9am - Invasion of the Workstation: The Home Office

The curtains rise and instruments grow from around my feet. As I adjust my eyes to the transformed surroundings I get startled by a voice appearing from above. "Today is October 1st, 2074," blasts the voice, "currently, it's 9:00 AM and the weather in your area is sunny with a temperature of 20°C." It repeated the date three times for memory's sake.

Nestled within a lush, verdant landscape, sleek and minimalistic walls enclose a circular clearing with me situated at the very centre. Encompassing gadgets fix their gaze upon me, not forgetting to blink from time to time. Click. Clank. Within the walls, switches ticked. A house manual descends from the ceiling and batches of artificially generated photos begin gliding smoothly beneath electronic sensors. Familiar certainties perish, new routines take shape.

Devoid of time clocks and doors, the home office crashes the preceding tranquillity while throwing me into the convergence of home and work, a space where contradictory realms intersect and clash. Continuous surveillance and constant accessibility erode the sanctity of our homes. The act of shutting the office door, returning home, and reclaiming our humanity has become a memory of yesterday.

Figure 3.1
A Perfect Day - The Home Office

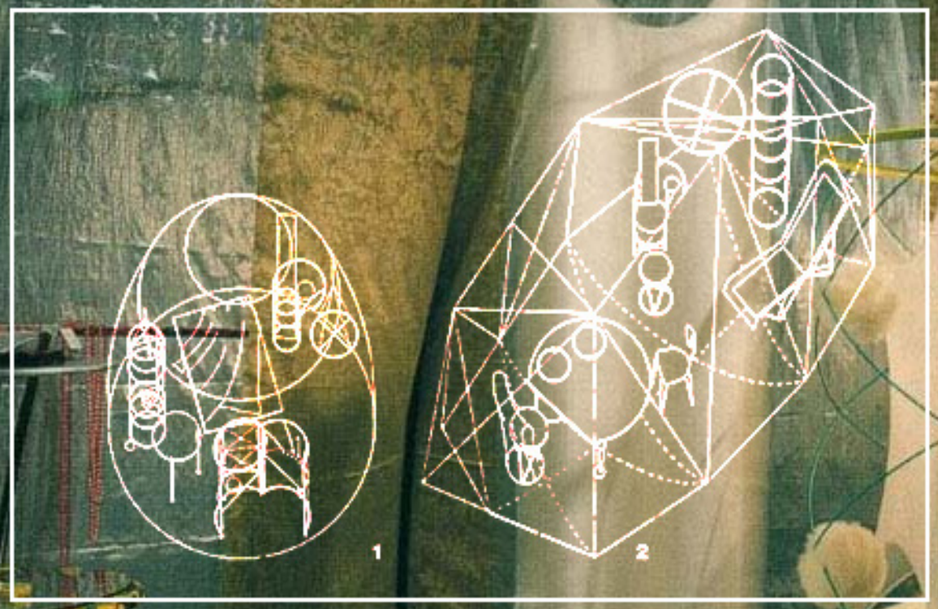


Figure 3.2 Axonometry of the two Paos, (Inaki Abalos, Juan Herreros, El Croquis 71, Page 33)

Figure 3.3 Dwelling as an Architectural Object (Ito, 1985)

This section delves into the emergence of hybrid domestic spaces devoid of clear functional designations. *Hybrid Everywhere* examines contemporary instances of hybrid homes and their embodied modes of living, where living-kitchen-workspaces seamlessly transform from an Italian restaurant to a bustling gym or a cosy immersive cinema. Examining case studies such as House of the Future by the Smithsons and Your Turn by Alex Schweder, *Cohabitation in a Shapeshifting Home* invites the readers into different forms of the hybrid home, where one witnesses customisable living spaces formed of adaptable layouts, movable partitions, and advanced automation systems that dissolve conventional monofunctional spaces and the rigid rituals they embody. The final subsection, *Plug and Play: Home as a Nomadic Module*, challenges the traditional idea of a static, permanent residence by envisioning the hybrid home as a modular, adaptable entity in support of a nomadic lifestyle. Ultimately, drawing evidence from Toyo Ito's Tokyo Nomad and The Continuous Monument by Superstudio, the section proposes the hypothesis that the hybrid smart home, linked to the digital grid, empowers dwellers 'to be home everywhere while calling nowhere home'.[23]

3.1 Hybrid Everywhere: A Physically Minimal but Programmatically Infinite Home

In the evolving landscape of smart home technology, the concept of the hybrid home emerges as a transformative paradigm that redefines traditional spatial design. Instead of discussing the hybridity that blends between the physical and digital realms, this section defines the hybrid home as an amalgamation of space functions, which has redefined traditional notions of domestic living. Rather than rigidly compartmentalised rooms with fixed purposes, the hybrid home features adaptable spaces that dynamically transform to accommodate various activities and lifestyles. As the boundaries between spaces, perceptions, and realities become increasingly blurred,[24] traditionally segregated aspects of life—work and leisure, public and private—are converging in unforeseen ways, creating territories where contradictory expectations intersect and coexist. As Mies van der Rohe promoted, "a new form of dwelling has an impact beyond four walls,"[25] and our interpretation of dwelling has become unstable as the outside world continues to encroach on our personal spaces.

As climbing rents force urban dwellers to downsize, micro-apartments rise in demand, requiring only a manageable financial commitment while serving as the ideal investment commodity for individuals, commuters, and young professionals. However, despite this shift in housing typology, outdated layouts and limited physical space continue to constrain urban dwellers from renovating obsolete infrastructure, which hinders adaptation to modern living needs and technologies. Yet, pressured residents persist in innovating to maximise the efficient use of limited space, seeking endless ways to optimise their twenty square metres of living area. Herwig states that an average household is likely to contain 10,000 objects, which increased from around 200 items from a century ago.[26] However, it can be argued that under the forces of digital dematerialization and explicit admonition, many domestic objects begin to perish while others have lost their former significance. Traditional displays like walls adorned with books and CD collections have been replaced by digital alternatives. The term "light living" encapsulates this contemporary ideal, as this shift goes beyond merely removing physical objects; it blurs traditional boundaries between concepts like inner and outer, work and leisure, self and world.

Reduction and hybridization define contemporary households. Rooms, now assuming multifaceted roles, transformed into zones where diverse activities unfold simultaneously. The plasma screen remains

23 *Paula Strunden, Micro-Utopia: A Theoretical and Practical Study of Inhabiting the Virtual, Page 42.*
24 *Oliver Herwig, Home Smart Home, Page 11.*
25 *Mark Stankard, "Re-Covering Mies van Der Rohe's Weissenhof: The Ultimate Surface," Journal of Architectural Education 55, no. 4 (May 1, 2002): 247–56, https://doi.org/10.1162/104648802753657950.*
26 *Oliver Herwig, Home Smart Home, Page 35.*

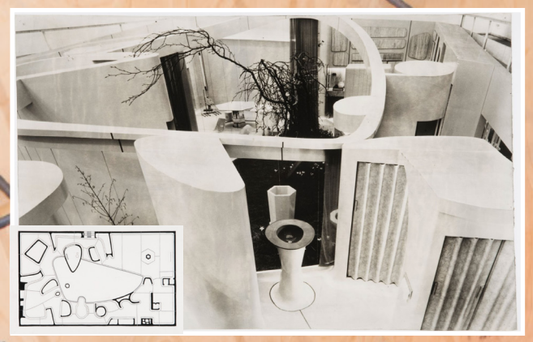


Figure 3.4 Interior view of the House of the Future (Smithsons, 1956)

Figure 3.5 Das Haus Model (Sebastian Herkner, 2016)

Figure 3.6 Cohabitation in a Temporary Home (Schneider + Shelley, 2017)

the stalwart centrepiece in the familial sanctuary, while all else undergoes a constant state of transformation. Embodying a dynamic hub, the living room transcends its conventional role. Bathed in the soft glow of ambient lighting in the morning, the culinary stage seamlessly shape-shifts into a cinematic sanctuary when the sun goes down but instantly morphs into a home gym when the yoga mats are rolled out. The possibilities are endless. Pao for the Tokyo Nomad Girl by Toyo Ito exemplifies approaches to compact living and adaptability within urban environments. Occupying a minimal living space for a single dweller, the circular architecture of the modular Pao is light and ephemeral—a tent that dissolves itself in the buzz of the metropolis. It is almost reduced to a series of design objects that allow for easy reconfiguration, achieving multifunctional spaces serving multiple purposes throughout the day. According to Toyo Ito, "they are ephemeral objects which are more of spontaneous phenomena like a rainbow than structures."[27] As the traditional partitions dissolve into translucent screens, the home expands outward, relinquishing its conventional functions to spaces scattered across the city and inward, ceding prominence to devices. While aspects of future domestic life may seem unfamiliar, the adoption of flexible floor plans and innovative community models is overdue. There is a pressing need for increased experimentation and investment in barrier-free environments, encompassing both physical and digital realms.

3.2 Cohabitation in a Shapeshifting Home

The apartment has historically served as both a gateway to and a sanctuary from the external world, evolving into a versatile entity that embraces fluidity to accommodate work, leisure, and social interaction within a single architectural framework. Moreover, it is no longer solely a private haven but instead shared with partners, friends, and digital followers, which causes the boundaries between personal and communal areas to become increasingly porous. Apart from the digital infrastructure made up of WLAN, routes, and access codes, which remain essential perpetual elements of the home, the rest of the living arrangements are expected to promote compatibility, flexibility, and minimise friction when transforming between different aspects of daily routines while thriving to accommodate as many life plans as possible.

The transition away from compartmentalised self-contained apartments began long ago.[28] Demonstrated in Peter and Alison Smithson's House of the Future, one witnessed the dissolution of partition walls as the entire house merged into one single room formed of a continuous string of spaces arranged around a central courtyard, with interior areas enclosed using sliding walls or strategically placed storage units. All interior artefacts were designed with rounded, organic shapes to facilitate smooth, uninterrupted movement while transforming familiar objects into innovative, futuristic creations such as after-shower body air-dryers and telephone message recorders.[29] Half a century later, Sebastian Herkner echoed this sentiment, stating, "I don't want any rigid walls, but instead a house that communicates openness."[30] His House of the Future adopted a similar design language, drawing inspiration from wheelchairs and nomadic yurts. It adapted a transparent, circular structure with minimal separation between spaces. Both designs integrated futuristic technologies to enhance functionality and modernity, eliminating rigid separations to achieve flexible, multifunctional spaces that adapt to diverse needs. This transition from conventional, compartmentalised apartments to open, fluid spaces represents a significant cultural and technological shift towards more adaptable living environments. Designs by the Smithsons and Herkner

27 *"Pao for the Tokyo Nomad Girl," Ramon Esteve, September 24, 2019, https://www.ramonesteve.com/en/manufacturing-the-interior/la-casa-para-la-chica-nomada/.*
28 *Oliver Herwig, Home Smart Home, Page 49.*
29 *Stewart Hicks, "Inside the Lost House of the Future by the Smithsons," ArchDaily, October 8, 2021, https://www.archdaily.com/969751/inside-the-lost-house-of-the-future-by-the-smithsons.*
30 *Sebastian Herkner für „das haus" 2016: Ein Zeichen der ..., accessed May 19, 2024, https://www.archiproducts.com/de/news/sebastian-herkner-fur-das-haus-2016-ein-zeichen-der-offenheit_49688.*

Figure 3.7 A Shapeshifting Home (Schweder + Shelley, 2017)

Figure 3.8 Homogenized Architectural Units Independent of Location (Superstudio, 1969)

challenge the traditional concept of homes as static, enclosed spaces, advocating instead for dynamic and interactive living spaces. This shift towards open-plan living fosters a sense of community and communication within households, aligning with the growing integration of technology into daily life. It anticipates the current trend of smart homes, where technology seamlessly blends with living spaces to enhance convenience and efficiency.

Under the progressive process of digitization, what if all items within the future home either become artefacts or, if still functional, are simplified to their bare minimum value only for their capacity to meet basic human needs? Alex Schweder and Ward Shelley's performative architecture, *"Your Turn,"* explores the interdependent dynamics of shared living spaces and the negotiation of control and cooperation required in cohabitation. Constructed as a twenty-three-foot by twenty-three-foot wall penetrated by essential living elements with six corresponding domestic activities: a kitchen, a bathroom, a bed, a dining room, an office, and a comfortable chair,[31] every object belongs to everybody but is not to be used simultaneously. The minimalist, shape-shifting home critiques modern living conditions and confronts the complexities of interpersonal relationships inherent in communal living. The repeated pushing and pulling of its amenities settles into a daily, twenty-four-hour rhythm following the flow of the daily, repetitive activities that define our lives. Expanding from Schweder and Shelley's performative home, the next sections of the paper will push the boundary and speculate how the sharing of physical objects between inhabitants can lead to bespoke virtual spaces through the incorporation of mixed-reality technologies, thus expanding the minimal home into infinite digital spatial layers.

3.3 Plug and Play: Home as a Nomadic Module

In the contemporary urban landscape, the notion of home has transformed into a nomadic unit under the influence of heightened functional versatility, escalating rental costs, and the continuous digitization process. As the urban population becomes ever more mobile, the apartment is no longer perceived as a permanent fixture but instead serves as a flexible, temporary shell, which matches Greene's vision of the future home being 'an appliance for carrying with you' and the city consequently as "a machine for plugging into".[32] As we reduce our domestic infrastructure down to a minimum, Toyo Ito argues that the increasingly fluid interplay between atoms and bits has led to a "simulated life" in which time and space are homogenised and "therefore, the communication that was once deeply rooted in a geographical area or in a local community has lost its significance."[33] Ultimately, the future home will not merely be a 'house' since it also connotes a state of being beyond its physical location[34] as the digital grid enables urban dwellers "to be home everywhere while calling nowhere home".[35]

31 *"Your Turn," Alex Schweder, January 8, 2021, http://www.alexschweder.com/your-turn/.*
32 *"# Great Speculations /// Living Pod by David Greene," THE FUNAMBULIST MAGAZINE, January 7, 2022, https://thefunambulist.net/editorials/great-speculations-living-pod-by-david-greene.*
33 *What Toyo Ito's pao project teaches us about pandemic living | architect magazine, accessed May 19, 2024, https://www.architectmagazine.com/design/buildings/what-toyo-itos-pao-project-teaches-us-about-pandemic-living_o.*
34 *Daniel Vella, "There's No Place like Home," Ludotopia, December 31, 2019, 141–66, https://doi.org/10.1515/9783839447307-008.*
35 *åyr (2016), 'Urbi et Orbi', in J. Self (ed.), Home Economics, 1st ed., London: The Spaces and Real, pp. 89.*

04
The Mixed-Reality Hybrid Home

1pm - Bon Appétit: The Kitchen

As office walls explode and retreat into the distance, my surroundings change once again as I land in the spacious kitchen set amidst a vast desertscape. Devoid of doors, partitions,and even service hatches, the space echoes with the sounds of miniature robotic minions scurrying out of pipes and darting across walls while the appliances operate silently behind the scenes. Gone are the days of manual cooking; machines operate seamlessly without human intervention, I am merely an observing guest in my own pantry.

Suddenly, the glimmering 3D food printer catches my sight, beckoning for activation at the touch of a button. Extending my arm, I reach towards the ambiguously shaped physical artefact, eager to discover its materiality as its skin meets mine. Ouch, that hurts, maybe not this far. Grasping the glowing handle, gears begin to turn in the physical world following my rotational choreography, meanwhile, the virtual machine awakens energetically, eager to begin its sacred performance.

Figure 4.1
A Perfect Day - The Kitchen

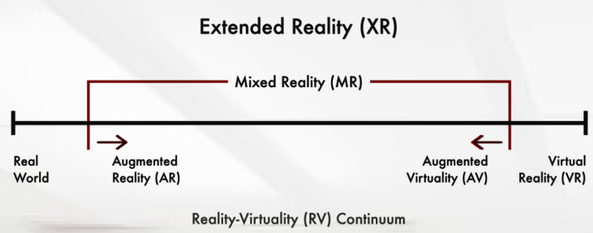


Figure 4.2 - Mixed Reality Continuum (Milgram; H. Takemura; A. Utsumi; F. Kishino, 1994)

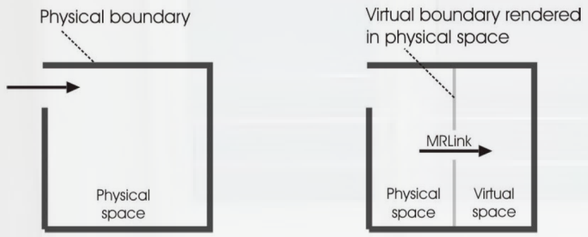


Figure 4.3 - Mixed Reality Portals and Links (Schnadelbach, 2003)

Figure 4.4 - Threshold: A Mixed-reality Exhibition (Collishaw, 2017)

The convergence of digital and physical realms through mixed reality (MR) technologies announces a new era in domestic architecture. This chapter delves into the lived experience of a mixed-reality home, where traditional static spatial design is revolutionised by the intricate interplay between the human body and hybrid artefacts that function as portals between the real and virtual worlds, where "storytelling gives way to storyliving."[36]

"Mixed Reality Architecture" delves into the principles of mixed-reality architecture (MRA), emphasising the importance of multisensory immersion when one enters a frameless visual space. By leveraging technologies such as augmented reality (AR) and virtual reality (VR), MRA engages with all senses, transforming the way we perceive and interact with our domestic spaces. At the heart of the mixed-reality home lies the intricate interplay between inhabitants and their surroundings. The second subsection examines the subtle, often unspoken interactions between the human body and hybrid artefacts—objects that serve as portals bridging the physical and digital worlds. Drawing on Bernard Tschumi's concept of architecture as an event and Markos Novak's idea of a building's performance as dance and theatre, hybrid spaces emerge as sites of continuous, performative interaction that form a dynamic choreography where gestures, movements, and spatial awareness trigger responses from smart objects, creating a fluid and intuitive living experience.[37] Furthermore, traditional architectural theories of affordances, which focus on the potential actions provided by the environment to its occupants, must be redefined in the context of mixed-reality. Analysing Paula Strunden's *"Micro-Utopia"* and creating an original MR project *"A Perfect Day"* from scratch as a methodological study, *"Redefining the Domestic Theory of Affordances"* provokes reconsideration regarding what a home can be in the digital age, envisioning it as a fluid, adaptive environment that responds to the inhabitant's needs and actions in real-time. The section concludes with a discussion regarding the implications of living in an immersive mixed-reality environment, including issues of privacy, data security, and the psychological impact of blurred boundaries between the real and virtual. Overall, inhabiting a mixed-reality home represents a paradigm shift in domestic architecture, one that challenges traditional boundaries and opens up new horizons for multisensory, interactive living.

4.1 Mixed-Reality Architecture: Multisensory Immersion

MRA represents an innovative approach to architectural design, where computer-generated virtual spaces introduce a three-dimensional spatial metaphor that interacts with the tangible elements of the immersant's physical architectural environment, engaging their five senses while facilitating social interaction among individuals who may not be in physical proximity.[38] In MRA, this merging of physical and virtual realms not only enhances interactivity but also presents a forward-thinking framework for future domestic living. Traditionally, space is understood as the essential three-dimensional environment encompassing both living beings and inanimate objects.[39] However, conventional architecture's static nature is unable to keep up with the dynamic needs of modern society.[40] Aided by technologies like head-mounted displays (HMDs) and positional tracking, this blend of real and virtual spaces creates hybrid environments where physical and digital data coexist, allowing users to navigate and interact within a space that responds to their real-world movements in real-time.

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36 *Mandy Rose, "Technologies of Seeing and Technologies of Corporeality: Currents in Nonfiction Virtual Reality," World Records, January 1, 2018, https://uwe-repository.worktribe.com/output/875778/technologies-of-seeing-and-technologies-of-corporeality-currents-in-nonfiction-virtual-reality.*

37 *Steve Benford and Gabriella Giannachi, Performing Mixed Reality (Cambridge, Mass: MIT Press, 2011).*

38 *Vellumadmin, "Mixed Reality: The Future of Architecture, Today.," Vellum Architects | Modern Architecture, April 26, 2021, https://vellumad.com/mixed-reality-the-future-of-architecture-today/#:~:text=Mixed%20Reality%2C%20or%20MR%2C%20uses,both%20digital%20and%20physical%20components.*

39 *Izabela Derda, Tom Feustel, and Zoi Popoli, (In-)between Spaces: Challenges in Defining the Experience Space in Mixed Reality-Driven Art Exhibitions., January 4, 2021, https://doi.org/10.31235/osf.io/te3a4.*

40 *Mixed reality architecture: Concept, construction, use, accessed May 29, 2024, https://www.researchgate.net/publication/32885582_Mixed_Reality_Architecture_Concept_Construction_Use.*

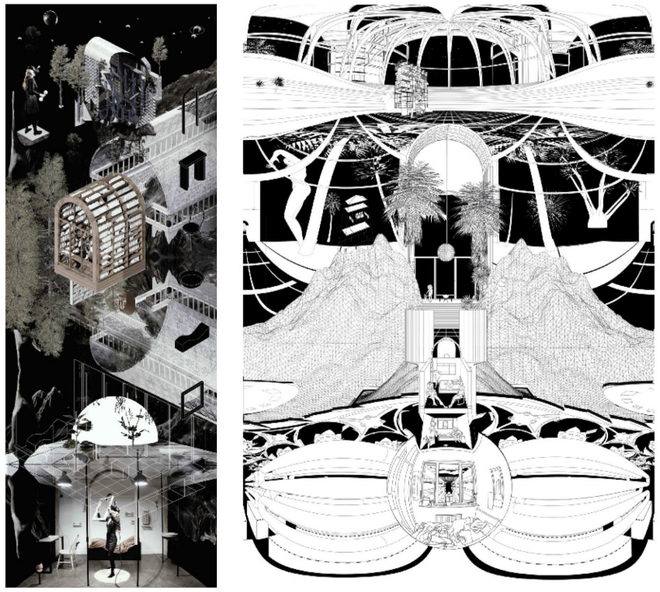

Figure 4.5 - Micro-Utopia: Constellation of Overlapping Virtual Dimensions (Strunden, 2018)

Figure 4.6 - A Perfect Day: XRM Physical Installation Setup (Lisa Xiao, 2024)

"Threshold " by Mat Collishaw represents a MRA gallery experience that employs high-definition visual projections and holographic images to overlay virtual scenery onto physical structures to construct a portal to the past. Adopting a 360° sensorial immersion to move beyond imagery-dominated perception, the installation engages auditory and tactile senses that align with the visual projections. Donning a pair of HTC Vive headsets and a MSI PC computer on their backs, visitors pace within the white-boxed physical room while interacting with surfaces and objects that respond with haptic feedback mechanisms to reveal their hidden stories. Rather than merely observing through a window, MRA pushes immersants into the frame itself, providing an unparalleled sense of presence and immersion.[41]

"Liquid architecture," a term coined by Novak, describes a design approach that is "as much about time as it is about space."[42] In this concept, architecture transcends physical constraints by utilising digital media and algorithms to design and transmit architectural forms across networks, creating what he calls "animate" or "animated" architecture. Movement through space inherently involves the dimension of time, as actions unfold sequentially. For architects, virtual environments open up new possibilities. Besides designing for the movement of people through space, opportunities arise in the design of spatial elements themselves, incorporating time as a vital design element. As Benedikt emphasises, from sliding walls to interactive floors, although virtual spaces are not restricted by the laws of physics, they must be internally consistent, practical, and user-friendly, adhering to the principles of computer science while being anchored in the realities of ordinary space and time.[43] Doing so makes the MRA intuitive and navigable, thus lowering the learning curve while maintaining cognitive consistency to enable users to apply their real-world knowledge to the virtual environment, enhancing their sense of presence and immersion.

4.2 Conversation Between Body and Objects: Redefining the Domestic Theory of Affordances

"A house is nothing but a hollow shell."[44] It is the objects within and the act of inhabitation that breathe life into a house, transforming it from a mere structure into a home. As claimed by Banham, domestic hardware functions independently from the house, so why even have a house to hold it up? What purpose does the house serve other than hiding the mechanical components from public sight? Under the process of digitization, one begins to speculate: what if all items within the home transform into artefacts or, if still functional, are simplified to their bare minimum value only for their capacity to meet basic human needs? In the technosocial era, life is lived through bodies.[45] Evolving beyond mechanical and data intelligence, the future smart home typology may embrace mixed-reality as a medium while reconfiguring surrounding objects and spaces into interfaces and bodies into input devices to prompt a profound reconsideration of human interactions with hybrid artefacts—objects that serve as portals bridging the physical and digital worlds within future domestic living.

At their core, mixed-reality smart homes hinge on the fundamental relationship between the human body and the surrounding environment. Architectural theorist Karen A. Franck poses a pivotal question: "When I enter virtual reality, what body will I leave behind?"[46] Contrary to Cartesian notions of a mind-body split, Franck emphasises that the physical body is not abandoned, but rather it's freed from the real

41 *Mandy Rose, "Technologies of Seeing and Technologies of Corporeality: Currents in Nonfiction Virtual Reality," World Records, January 1, 2018, https://uwe-repository.worktribe.com/output/875778/technologies-of-seeing-and-technologies-of-corporeality-currents-in-nonfiction-virtual-reality.*

42 *Steve Benford and Gabriella Giannachi, Performing Mixed Reality (Cambridge, Mass: MIT Press, 2011).*

43 *"Cyberspace: Some Proposals: Imagining the Internet," Elon University, accessed May 31, 2024, https://www.elon.edu/u/imagining/expert_predictions/cyberspace-some-proposals/.*

44 *Reyner Banham and François Dallegret, A Home Is Not a House (New York, 1965).*

45 *Craig D. Murray and Judith Sixsmith, "The Corporeal Body in Virtual Reality," Ethos 27, no. 3 (September 1999): 315–43, https://doi.org/10.1525/eth.1999.27.3.315.*

46 *Liquid architectures in Cyberspace, Page 20, accessed May 31, 2024, https://www.evl.uic.edu/datsoupi/coding/readings/1991_Novak_Liquid.pdf.*

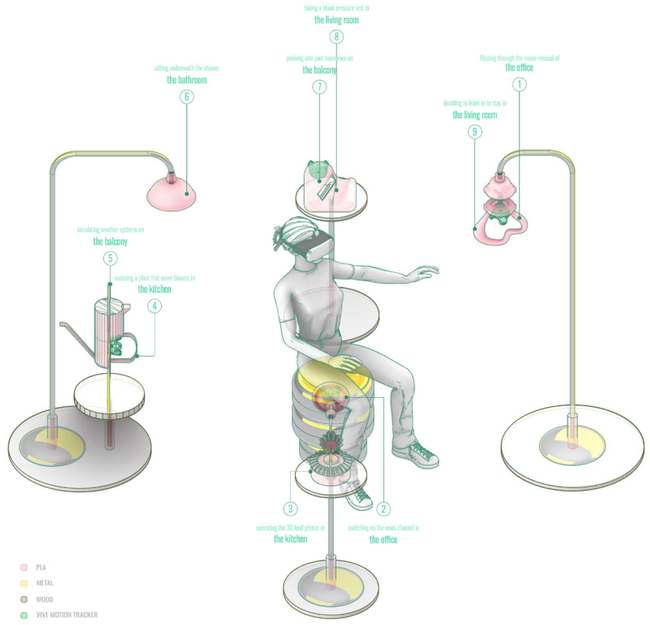

Figure 4.7 - A Perfect Day: Axonometric Drawing of Tactile Artefacts Encapsulating Virtual Spaces Upon Being Touched by the Immersant (Lisa Xiao, 2024)

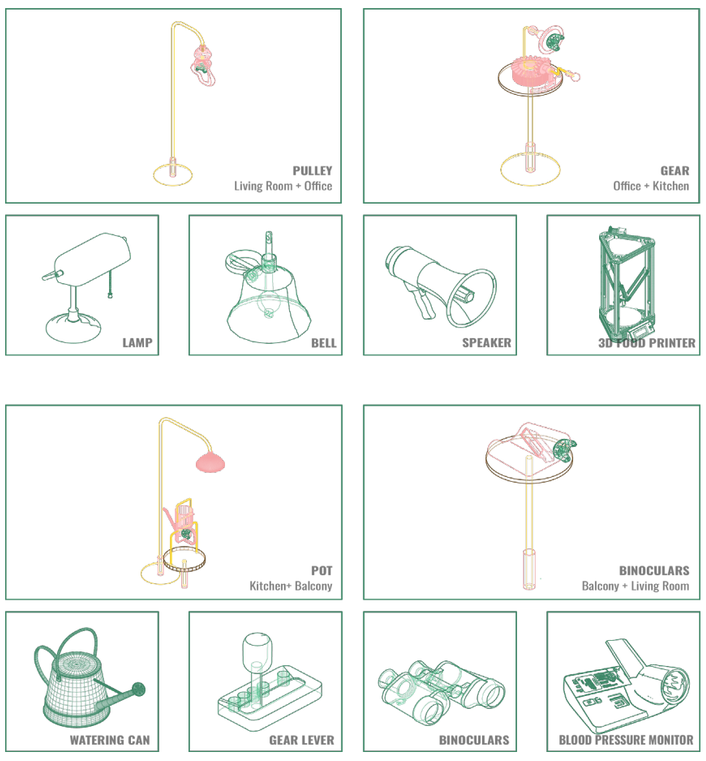

Figure 4.8 - A Perfect Day: Taxonomy of Physical Artefacts and their Virtual Affordances (Lisa Xiao, 2024)

environment's restrictive laws, since "without the body, I am in no world at all."[47] Merleau-Ponty's perspective underscores this symbiotic relationship, defining the body as a vehicle for sensory experience and inseparable from its surrounding world.[48] Just as tools become extensions of the body's sensory apparatus, like a cane for a blind person, objects within the home acquire a profound significance, serving as boundary markers of the symbolic configuration known as home. Thus, the interactions between the human body and hybrid artefacts illustrate the fusion of physical and digital realms, redefining the very essence of future domestic living, where spatial design emerges not from traditional constraints but from the bodily interaction between the immersant and hybrid portal-like artefacts.

Exploring the multisensory continuum of hybrid experiences involves a methodology that seamlessly integrates real-time spatial design with a user-centric approach, inspired by Paula Strunden's mixed-reality installation "Micro-Utopia". This interactive experience immerses participants in a journey through their five senses, investigating how individuals perceive and interact with their environment, thereby enriching their comprehension of space and reality.[49] Combining expertise from scenography, performance, and game design, an original interactive 1:1 extended-reality model (XRM) was developed under a project named "A Perfect Day". This model blends virtual technologies with physical objects and spaces, adapting to user behaviour by combining visual and auditory cues from virtual devices with kinesthetic and palpable experiences from physical artefacts. Within this immersive experience lies an exploration of the growing tension between human and artificial intelligence in domestic settings as it speculates alternative rituals of domestic living within a futuristic mixed-reality smart home, where the inhabitant's every move is observed and monitored by their AI roommate.

However, rather than focusing on the hardware and software employed to design and develop these models, the focus shifts towards the subjective experiences of the immersants and their unique interactions. From a phenomenological perspective, lived experience is understood as a highly subjective, embodied, and extended perceptual dimension and active practice of knowing. When users discover they can physically experience virtual effects, navigate, and control their environment, cognitive processes are triggered that reveal the intricate architectural relationships between body, mind, and psyche, thus initiating a new field of research inherent to the medium. Moreover, most knowledge regarding multimodal spatial perception resides deep in the unconscious.[50] The mixed-reality dwelling assists in uncovering embodied cognitive processes that were previously overlooked and brings to light the otherwise unconscious relationships between bodies, objects, and spaces within this nascent domain.

In the exploration of living within an immersive mixed-reality smart home, the theory of affordances, as introduced by Gibson, posits that the environment provides individuals with opportunities for action based on their capabilities.[51] The physical form of an interface determines its affordances while communicating possible modes of interaction to its users.[52] For example, areas covered in chenille resembling sofa cushions inherently imply the action 'sit down'. Tools are integrated into the body's sensory realm, a concept described by Leder as "phenomenological osmosis," where instruments merge with bodily experience. However, in the context of VR, compelling evidence demonstrates that individuals bring their familiar real-world perceptions and social interactions into novel virtual experiences. For example, an investigation conducted by Murray and Bowers observed participants predominantly adhered to ground and road structures while navigating through a virtual cityscape,

47 *Karen A. Franck and R. Bianca Lepori, Architecture from the inside out: From the Body, the Senses, the Site, and the Community (Chichester: Wiley-Academy, 2007).*
48 *Jacquelyn Ford Morie, "Performing in (Virtual) Spaces: Embodiment and Being in Virtual Environments," International Journal of Performance Arts and Digital Media 3, no. 2–3 (December 3, 2007): 123–38, https://doi.org/10.1386/padm.3.2-3.123_1.*
49 *Paula Strunden, accessed June 1, 2024, https://paulastrunden.com/.*
50 *Paula Strunden, "Touching, Licking, Tasting: Performing Multisensory Spatial Perception through Extended-reality Models," Architectural Design 93, no. 6 (November 2023): 48–55, https://doi.org/10.1002/ad.2993. Page 53.*
51 *James J. Gibson, The Ecological Approach to Visual Perception (New York: Psychology Press, 2015).*
52 *Steve Benford and Gabriella Giannachi, Performing Mixed Reality (Cambridge, Mass: MIT Press, 2011).*

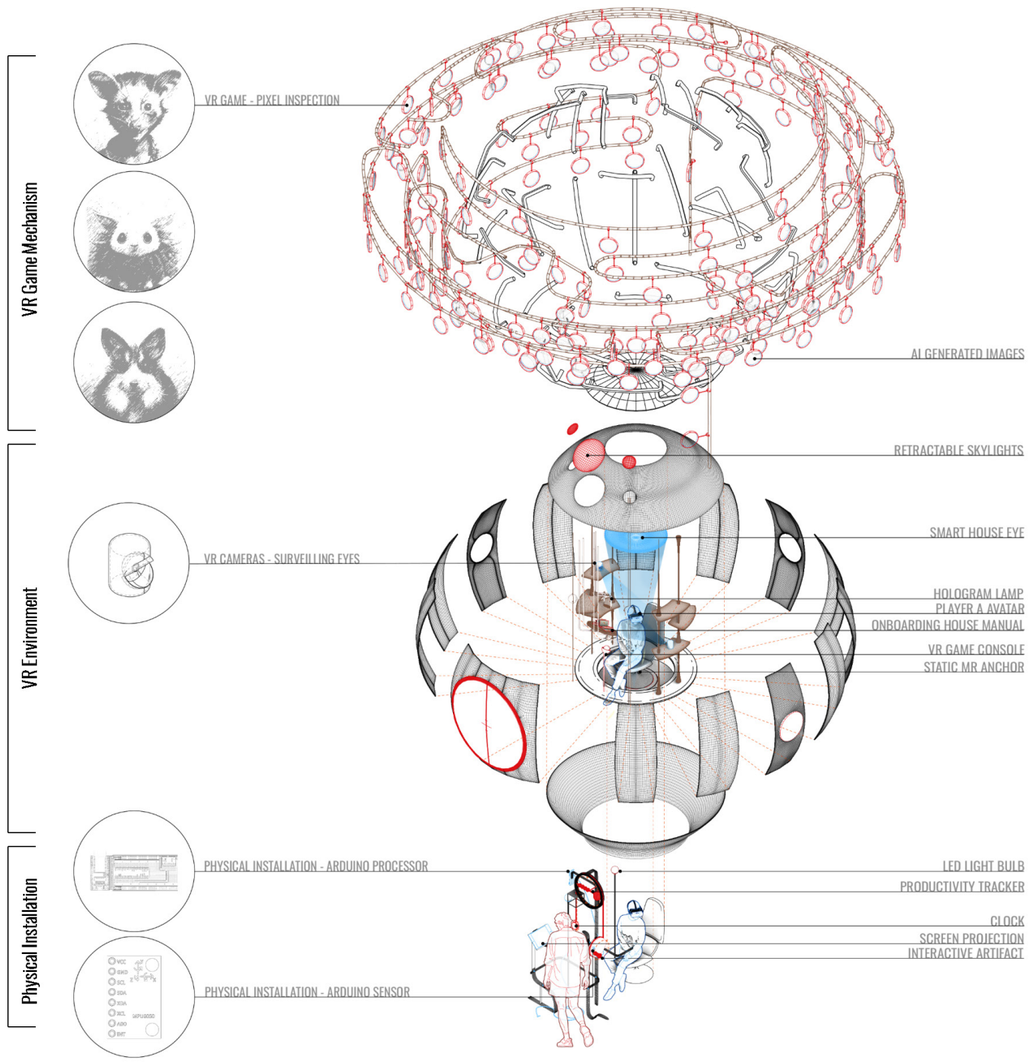

Figure 4.9 - A Perfect Day: Mixed Reality Spatial Anchor and Overllaping Dimensions (Lisa Xiao, 2024)

where they were afforded unrestricted movement.[53] This observation illustrates the preconceived affordances deeply rooted in embodied experiences as participants seldom exploited their expanded capability.

However, this capability is challenged in "A Perfect Day". Upon entering the virtual experience, physical artefacts such as stool and pulley serve as interactive triggers, activating individualised virtual spaces and pre-scripted stories within the home upon touch, thus expanding the previously minimal infrastructure into a myriad of overlapping virtual constellations. Furthermore, within the domestic sphere, architectural design becomes intertwined with habitual practices, transforming the home into a repository of memory and meaning, where everyday objects serve as extensions of the self. Exploiting the infinite possibilities of VR object affordances, the everyday objects become a kind of ruse.[54] A baby doll, seemingly a nostalgic relic from childhood, deceptively functions as one of many interconnected nodes that regulate the functions of the house. These objects transition into mechanisms that prompt interactions between the digital and physical realms. As ubiquitous gaming encourages the discovery of hidden affordances and promotes active engagement with the environment, the conversation between body and objects within a MR home emerges as a central theme in redefining the domestic theory of affordances.[55]

Within the MR smart home, the fusion of physical and virtual spaces via MR links—Vive trackers attached to interactable artefacts– allows for a tailored and personalised experience, dynamically adjusted based on user behaviour and preferences. Virtual spaces can be designed to be public or private, controlling access similarly to physical spaces through elements like walls and doors, and such customizability ensures unique interactions with the same virtual environment by different user groups, thus enhancing privacy and individualization.[56] Furthermore, the concept of MR portals also emphasises the fluidity of accessing different virtual layers within the MR home, with physical reality serving as the base layer. Users can explore various data layers within the MRA, ranging from the virtual rooms to their embedded game interfaces, choosing their level of interaction based on design permissions. This multi-layered approach allows for a deeper exploration of spatial relationships and affordances as users navigate through both physical and virtual elements in a hyper-functional machinery filled with references to our unconsciousness, forming a futuristic yet familiar world and a unique living experience.

4.3 The Objectified Phantom Body: Ethical Concerns of Mixed Reality Immersion

Standing on the brink of a new technological era, the advent of cyberspace promises to transform the routines of domestic living as we know it. However, caution is necessary. The shift to mixed-reality environments poses the risk of detachment from the physical community, as digital immersion fosters a new kind of dependency.[57] This digital codependency mirrors the nineteenth century's addiction to dwelling, with the immaterial web and social networks enclosing individuals more snugly than physical residential spaces ever did. While public spaces remain vital for human interaction and idea exchange, the allure of digital connectivity may increasingly isolate individuals from tangible community interactions.

On the other hand, the total human mastery of synthetic simulations underscores a significant ethical dilemma. As a world dominated by the mind, cyberspace epitomises Cartesian aspirations, allowing immersants to construct environments where we wield complete control, free from the realities of ageing bodies and the presence of other living beings or natural forces despite the current restriction on cumbersome stereoscopic head-mounted displays when accessing immersive virtual spaces. The simulated environments, while offering infinite possibilities, may ultimately seduce us away from the physical reality, leading to environmental neglect and a lack of reverence for the intrinsic value of other life forms. As Char Davies has warned, eventually, our society might come to view the simulated bird, which responds to our commands, as sufficient and potentially superior to the actual creature.[58] While the XRM reconfigures bodies, objects, and spaces in an interactive feedback loop, it's crucial to acknowledge that these constructs remain products of human coding and understanding as we caution from the construction of a world entirely disconnected from physical reality and devoid of a sense of reverence.

53 *Craig D. Murray and Judith Sixsmith, "The Corporeal Body in Virtual Reality," Ethos 27, no. 3 (September 1999): 315–43, https://doi.org/10.1525/eth.1999.27.3.315.*
54 *Georgina Born, Eric Lewis, and Will Straw, Improvisation and Social Aesthetics (Durham: Duke University Press, 2017), Page 106.*
55 *Steve Benford and Gabriella Giannachi, Performing Mixed Reality (Cambridge, Mass: MIT Press, 2011).*
56 *Mixed reality architecture: Concept, construction, use, accessed May 29, 2024, https://www.researchgate.net/publication/32885582_Mixed_Reality_Architecture_Concept_Construction_Use.*
57 *Oliver Herwig, Home Smart Home, Page 42.*
58 *Char Davies, "Osmose: Notes on Being in Immersive Virtual Space," Digital Creativity 9, no. 2 (January 1998): 65–74, https://doi.org/10.1080/14626269808567111.*

05
Privacy was Yesterday

3pm - The Wellness Sanctuary: The Balcony

I found myself stumbling onto the balcony islands as I entered a zone that oscillated between the apartment and the garden. The gentle sprinkler rain whirled up in golden splashes, filling the soft afternoon air with scatterings of brightness. The neon green artefact glimmered under the rays, waiting patiently for its next visitor. Drip. Drop. With a simple touch of the smooth handle, the sky darkens and weeps, transforming the serene scene into a tempestuous display of nature's power while having the reins of atmospheric control in my own hands. Tilting back the physical lever, the lake outside freezes and thaws. Pulling the handle closer to my chest, the radiant sunshine returns.

No one finds it odd that this little paradise is thoroughly artificially conjured solely for those who cannot find real nature in their walled-in daily routine. Reaching for the binoculars to my right, I peer into the past memories of the character I embody, delving into their personal history with each gaze. I witness moments of joy and sorrow, laughter and tears, all interwoven with the fabric of this character's life. Such a garden changes you. Slows you down. Immersing you in the world of mixed-reality living.

Figure 5.1
A Perfect Day - The Balcony

Figure 5.2 - Audience as Performer in a Mixed-Reality Experience (Collishaw, 2017)

Figure 5.3 - Home as an Arena Under Constant Observation (Schweder + Shelley, 2017)

Figure 5.4 - A Stage for Domestic Living and Performance (Acrojou, 2012)

5.1 Home as a Theatrical Stage

In the modern world, the boundaryless home mirrors a boundaryless society, where flexible work and thinking around the clock are ingrained in our daily routines, and where the private, even the intimate, becomes broadcastable.[59] The future of mixed-reality smart homes signifies a profound shift in domestic living, transforming our private spaces into theatrical stages where a multiplicity of realities can be inhabited within the four walls. This evolution effectively crushes the traditional concept of privacy, as the right to an exclusive and inviolable private sphere is increasingly eroded, often voluntarily in exchange for convenience and connectivity. The home, once a shelter that provided respite from the external world, has become an online stage for daily life, where one can no longer simply close the door to shut out the world; the twenty-first century's "un-private home" is born.

Mixed-reality technologies are reshaping future smart homes into theatrical stages where smart home IoTs and VR headsets are forever vigilant, acting as in-house audiences and tools of surveillance while feeding on our private lives. These devices, much like spectators in a mixed-reality performance, reveal manipulations by showing where users look and gesture, while other interfaces amplify these effects to make the interactions visible to all. Ranging from Collishaw's "Thresholds" to Schweder's "Your Turn," performance architecture blurs the line between public and private, inviting public interaction within temporary structures that serve as both living spaces and performance stages. Participants are transformed from passive observers to active creators of meaning, mirroring how smart home devices engage us in constant interaction. In Schweder and Shelley's work, these "houses" are not just living spaces but platforms for contemplation on the balance between freedom and control, cooperation and isolation, and the intersection between art and life.[60] As these technologies evolve, our homes become arenas where private moments are continuously being observed and interpreted. Similarly, "The Wheel House" by Acrojou exemplifies the transformation of a mobile structure into a stage for both living and performance. The wheel rotates through daily rhythms, and emphasising the continual passage of time, while the domestic realm becomes a site for both personal experience and public observation. The home thus becomes a space where the private self is constantly on display, a stage where every action can be observed and interpreted, fundamentally redefining the essence of domestic living. As Virginia Woolf noted, the lock on the door symbolises the power to think for oneself; however, in this new paradigm, the lock is metaphorically removed, making the interior life of the home inseparable from its external display.[61]

59 *Oliver Herwig, Home Smart Home, Page 13.*
60 *"Alex Schweder + Ward Shelley: My Turn - Announcements - e-Flux," e, accessed June 2, 2024, https://www.e-flux.com/announcements/173620/alex-schweder-ward-shelleymy-turn/*
61 *Virginia Woolf et al., Virginia Woolf: A Room of One's Own (Princeton, NJ: Films for the Humanities, 2015).*

06
Conclusion

8pm - Netflix and Chill: The Living Room

Eight o'clock. The living room fireplace warmed their hidden circuits, for nights were cool here. Digital modernism has swept away many habits and accessories as bridge tables emerged from the walls while playing cards descended onto pads in a cascade of dots. Music filled the air. The room pulses with an ethereal glow, casting shimmering hues across the sleek, minimalist furnishings.

An ambiguously shaped blood pressure monitor before me beckons as I extend my hand and activate the device, eager to uncover the mysteries hidden within my own body. Suddenly, the serene atmosphere of the smart home shattered as the alarmingly high digits flashed across the screen, serving as a stark reminder of the fragility of my own health. A voice spoke from the study ceiling, accusing me of deviating from the prescribed daily routine and failing to achieve the elusive perfection it so ardently seeks.

The day comes to an end, and I am faced with a choice. To continue living within the confines of this meticulously controlled domesticity or to venture out into the unpredictable chaos of the outside world. Entangled in a data-driven grid, memories of the smart house rooms flashed across my mind as I began to question: What has domestic living become? Do I want to spend my whole life living like this? What does it even mean to be alive?

Figure 6.1
A Perfect Day - The Living Room

Figure 6.2 - A Perfect Day: Inhabiting a Mixed-Reality Smart Home as a Theatrical Performance (Lisa Xiao, 2024)

Homebound: From Pixels to Portals

As the analog apartment era draws to a close, we stand at the threshold of a new age where homes seamlessly merge with cloud infrastructure, utilising extensive occupant data to customise experiences, services, and innovations. The exploration of living within an immersive mixed-reality smart home unveils a paradigm shift in the concept of domesticity, where spatial design transcends traditional constraints to become a dynamic interplay between human interaction and hybrid artefacts bridging physical and digital realms. Through an analysis of the historical evolution of homes, from mechanical and data intelligence to the mixed-reality prototype, the smart home transforms conventional spaces into interactive interfaces. Yet, what lies beneath these digital layers? A future where life is convenient, electrified, and interactive, but potentially isolating and intrusive. A direct trajectory can be traced from the modernist concept of a "machine for living," characterised by interconnected home gadgets, virtual assistants, and similar conveniences straddling the line between assistance and surveillance.

As the AI companions taken for granted begin to gain enough agency to interpret the 'needs' of humans in the room and autonomously design services in response to those 'needs', what roles are left for humans to play in a house that has a 'mind' of its own? The notion of a static home gives way to a customizable and programmable entity, swiftly accommodating contradictory expectations while seamlessly transitioning between different uses. Powered by mixed-reality technology, future urban dwellers are invited to immersively inhabit virtual environments that occupy minimal physical footprints but expand infinitely into virtual constellations. Consequently, the future smart home evolves into a stage where the demarcations between private and public realms blur, with surveilling eyes clinging like parasites to the walls, fixtures, and even our own bodies within the domestic sphere. This phenomenon leads to the intrusion of surveillance into the most intimate aspects of our lives.

Alongside extensive research and precedental architectural experiments, this paper offers direct experiences of mixed-reality living and spatial perception through the design, testing, and documentation of an original performative extended-reality model (XRM). By doing so, it highlights the intricate relationship between bodies, objects, and immersive spaces while speculating on alternative domestic rituals. Nonetheless, this preliminary exploration of smart home domesticity within the technological lens of mixed-reality aims to act as a prelude to a more comprehensive study, potentially opening numerous avenues for further investigation into the deeper poetics of living in virtual environments. Through incorporating elements from diverse experiences, including installations, theatre, and gaming, the research and design of mixed-reality performance span across both physical and virtual domains with the intention of empowering future architects to create spatial dimensions unconstrained by physical laws, potentially reshaping the sociopolitical agency of spatial production while being aware of potential ethical issues.

Overall, modern homes are supported by four main sociological perspectives: socially as the site of the bigenerational family; functionally as a place of shelter and reproduction; psychologically as a domain of intimacy; and economically as a tradable commodity. In contemporary society, only the final pillar—the residence in the form of real estate—remains intact today. This shift prompts critical questions about the future coexistence and relationships between humans and artificial intelligence on physical, emotional, and spiritual levels. Entangled in a data-driven grid, what does it even mean to be homebound?

07
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Figure 7.1
A Perfect Day - The Bathroom

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List of Figures