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RESEARCH ARTICLE

The Metaverse: Surveillant Physics, Virtual Realist Governance, and the Missing Commons

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Abstract

This paper argues that there are value and design-based problems in current ambitions for the Metaverse. With the Metaverse deepening longstanding commercial surveillance practices, the paper focuses on data protection harms from biometric and emotion data, the gauging of first-person perspectives, and sensitivities around profiling of avatars. The paper advances two notions to address harms and data protection: *surveillant physics* and *virtual realist governance*. *Surveillant physics* refers to surveillance informing the laws of how that reality operates: this is a useful concept given the granular control that platforms have over virtual worlds and the laws by which they function. *Virtual realist governance* builds on the longstanding principle of virtual realism and David Chalmer's recent theorising of Reality+ that demands that the virtual is taken to be real, meaning that experiences of virtual objects and what occurs in-world are treated as meaningful. The paper progresses to further consider governance questions, both around technical and ethical standards, but also data protection ideas such as personal data stores, and data trusts, that were not conceived as Metaverse-based ideas, but have greater chance of being realised as basic premises of the Metaverse are being designed. Although this paper is regretfully pessimistic, finding that a root problem of current ambitions for the Metaverse is that the public good and the commons are missing, it sees virtual realist scope for modes of resistance unseen in other digital realms.

Keywords Biometrics · Commons · Emotion · Metaverse · Surveillant physics · Virtual realist governance

Abbreviations

AR	Augmented reality
BBC	British Broadcasting Corporation
CDEI	Centre for Data Ethics and Innovation
CEN	European Committee for Standardisation

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CENELEC	European Committee for Electrotechnical Standardisation
DAO	Decentralised autonomous organisation
EDPS	European Data Protection Supervisor
ETSI	European Telecommunications Standards Institute
EU	European Union
GDPR	General Data Protection Regulation
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
ISO	International Organization for Standardization
MIIT	Ministry of Industry and Information Technology
OHCHR	Office of the United Nations High Commissioner for Human Rights
VR	Virtual reality
W3C	World Wide Web Consortium
XR	Extended reality

1 Introduction

The so-called Metaverse is widely advocated by much of the technology industry to involve three-dimensional Internet experiences, accessible by input devices such as cameras, augmented reality, virtual reality and biometrics. This paper avers that whilst it is not at all clear what the Metaverse will end up being named (if anything), what the hype and investment will amount to or whether the current Metaverse hype bubble will collapse back into an interest in mixed reality, nonetheless, the rhetoric and investment in the Metaverse signal changes in human-media interaction that should be taken seriously (Floridi, 2022; Turner, 2022). The reader, however, should be aware that this paper offers no predictions about the future, nor what the Metaverse will be like if it progresses to being part of everyday life. Rather, this paper is motivated by a wish to identify early problems that have scope to scale into being major concerns, should ambitions for the Metaverse cohere into something real. This quickly leads to another hype-based problem, as an anticipatory paper such as this requires self-questioning, most obviously about whether one is accepting corporate communications at face value, especially when these communications are created to attract investors and clients, mollify regulators and otherwise build brand reputation. The answer is not to outright reject the corporate communications, but to recognise the purpose of these communications and then consider them in context of wider social, technical, policy and moral dimensions.

The paper understands the Metaverse idea as a parental premise that conjoins functionally different informational universes by means of computational bits, hence the upper-case M to denote its singular nature (like the Internet, Web and Blockchain). Of course, despite the seemingly mystical otherness of the Metaverse, it runs on the same Internet infrastructure as all other online services. As a multi-dimensional media platform, it is accessible by smartphones, laptops, desktops, headsets and games consoles. Whilst the Metaverse certainly may be accessed by specialist equipment (goggles, glasses, lenses), that it is also accessible by webcams, screens and microphones suggests that it should be taken seriously, despite all the

hype. The overall significance of this should not be missed: the Metaverse represents an exponential immersive shift in the datafication and informatisation of human life. Emphasis on goggles, glasses, lenses or simply the ability to look at a room on a screen suggests that the Metaverse is a visually biased platform. Although this paper recognises visual bias, the prime interest of this paper on the Metaverse is the body, mediation of subjectivity and consequences thereof.

Focussing on commercial rather than state surveillant interests, the paper advances two notions with which to consider Metaverse developments: *surveillant physics* and *virtual realist governance*. Together, these concepts highlight the absence of separation between the physical and the digital, which has implications for the sorts of ethical questions that should be asked about the profiling of bodies in the Metaverse. The paper consequently argues that there is a fundamental values and design-based problem regarding absence of the common and public good from early design decisions. To make this argument, the paper considers broader governance questions, both around technical and ethical standards, but also data protection ideas such as personal data stores and data trusts, that were not conceived as Metaverse-based ideas, but have greater chance of being realised as basic premises of the Metaverse are still being designed. Although this paper is regretfully pessimistic, arguing that the root problem of the Metaverse is that the public good and the commons are missing from the core make-up of the Metaverse itself, it sees virtual realist scope for modes of resistance unseen in other digital realms.

2 Metaverse as an Empty Signifier

Definitions of the Metaverse vary, although those sampled do not contradict each other but foreground different elements of the catch-all concept. It is best approached through longstanding work on extended reality, which embraces augmented reality, virtual reality, immersive Web and spatial Web technologies (IEEE P7030 Working Group, 2022). Indeed, Apple has distanced itself from the word 'Metaverse', likely due to Facebook's rebranding in 2021 to Meta, although Apple is investing significantly in augmented reality. Alphabet uses the less bombastic term "ambient computing" to refer to persistently being online, rather than sitting down to purposefully access online content. Others, such as the start-up Lamina1, that features Neal Stephenson (who famously coined the term Metaverse in the 1992 novel *Snow Crash*) as a co-founder and claim to be designing a non-monopolistic open Metaverse, use the term "spatial computing". Although it is tempting to say that the Metaverse is an attempt to rebrand extended reality, it is better thought of as a signifier that contains mixed reality but is not reducible to it. To date, it is an *empty signifier*, one where the associated meaning of the word "Metaverse" is vague, variable and subject to whatever meaning interpreters want it to mean. Interpreters and advocates include games platforms, social networks, virtual workplaces, crypto-based identity management developers and online retailers, who all want to shape the meaning of the Metaverse. Unlike the Internet for example that represents a suite of packet switching technologies, the Web with its reliance on hypertext, or the Blockchain as a cryptographic global ledger, the Metaverse does not yet have a basic meaning to

which it refers. As a working premise, however, it might be conceived as use of AR, VR and traditional ways of accessing the Internet, to interact, work, school, socialise, transact and access services in immersive and interoperable environments.

One could write-off the Metaverse as hype, pastiche, another push to make VR popular or as a desperate effort to expand the frontiers of capital. There are other good reasons why it will not emerge as proponents assert, not least because of high bandwidth requirements of persistent worlds, network latencies and strain on the Internet, energy and environmental implications, inadequacy of current augmented reality, the difficulty of installing a fully functional computer in spectacles (or other lenses), and anti-trust and monopoly questions. Nevertheless, the size and scope of investment in the Metaverse from world-leading hardware and software companies are not easily dismissed. In-world cartoon-styled graphics are also likely to improve as headset hardware become more capable computers, with Meta's Oculus current hardware being more powerful than today's mid-range phones. With this paper written before the launch of Apple's AR/VR headset (slated for 2023), this promises capacity to switch between a view of the real-world and immersive content, helping to normalise usage for video conferencing. This paper regards the scale of this investment, diversity of applications, potentially intuitive interfaces not requiring keyboards and screens and the appeal of some of the use cases, as a sign that *something* is taking place although form and characteristics have yet to be established.

The core belief of the industry appears to be that a three-dimensional Internet, which one can be inside of and navigate with ease, is innately attractive to people. Whereas VR for example has struggled to catch-on, Metaverse advocates argue that three-dimensional environments will be more intuitive (Ball, 2022). Meta and Microsoft for example have not only invested in the Metaverse idea financially, but strategically, so being subject to judgement by investors. For Meta, this is quite literal, with Mark Zuckerberg stating that from the change in brand name onward, 'we will be Metaverse-first, not Facebook-first' (Meta, 2021). Metaverse fever reached mass prominence when, at Meta's annual Connect conference in October 2021, its Chief Executive Officer Mark Zuckerberg stated that the future of Meta is based on physical and digital worlds coming together. In his 'founder's letter, Zuckerberg identifies the Metaverse 'as an embodied internet where you're in the experience, not just looking at it,' also stating it 'it will touch every product we build' (Meta, 2021). It remains to be seen whether this effort will pay off for Meta, not least with Meta's Reality Labs (that develops their Metaverse technologies) posting record losses in 2023 (Vanian, 2023).

Whilst highly inspired by games and computer mediated communities such as EVE Online, Roblox, Minecraft and Fortnite, virtual worlds also include simulations that are not games or social spaces (although made with games hardware and software), such as simulations of cities where models and digital twins of real cities are updated through real-time feeds of physical events. Including mobile and locative media, games environments, social spaces, and virtual and augmented reality, proponents of the Metaverse argue that it will facilitate new experiences, modes of inter-personal connections, games, live events, recreation events, work practices, retail, leisure, theatre, artistic production and art display. Reminiscent of discourse on convergent media, a recurrent feature of the Metaverse

is that it operates across devices and platforms. It is typically held to include four principal characteristics: immersive realism, the ubiquity of access and identity, interoperability and scalability (Dionisio et al., 2013; Stephens, 2022). Whilst the word 'Metaverse' refers to 'beyond', indicating transcendence and separateness of reality beyond the one a person are usually in, it is better conceived as a *unifying layer* that sits above and beyond all individual computer-generated universes, as well as the real world (Ball, 2002: 43). A research piece for the European Parliament defines the Metaverse as an 'immersive and constant virtual 3D world where people interact by means of an avatar to carry out a wide range of activities' (Madiega et al., 2022: 1). This however is somewhat limited in that it focuses on the VR aspect of the Metaverse, whereas experts sampled for the Pew Research Center study on what the Metaverse might be in 2040 foreground augmented reality aspects of how one might interact with the Metaverse (Anderson and Raine, 2022). Another definition of the Metaverse is from the IEEE group on Ethics of Extended Reality (XR) who see it is 'an open-ended digital reality and culture that connects various virtual worlds by operating at multiple levels: parallel to, overlaid on, or interactive with the physical domain through increasing developments in interface technologies and real-time data sharing' (Stephens, 2022: 7). Highlighting the connection between the physical and the digital and the totalising ambitions for the Metaverse, the group adds that the Metaverse entails 'constant and seamless integration with existing physical reality' (Ibid). The value of this understanding is the absence of separation between the physical and the digital, which has implications for the sorts of ethical questions that should be asked about the profiling of bodies in the Metaverse.

3 Commercial Interests: the Cases of Meta and Microsoft

Despite the Metaverse being a gamble on whether people will prefer a three-dimensional Internet accessed primarily through worn devices, this paper avers that the Metaverse should, for the long-term, be taken seriously. The scale of investment is entirely unlike what has gone before and there is no reason why the status quo of screens, clicks and swipes, must remain the dominant mode of using services that function on the Internet. Indeed, if it proves easier to use services by being *within* an environment, this provides a motivation for lay users as well as technology enthusiasts to engage with the so-called Metaverse. Moreover, despite the ocular bias of the Metaverse, it is one involving real bodies with biometrics, as well as what will eventually be photorealistic avatars. The biometric dimension of the Metaverse has several inputs, including facial recognition, emotion recognition, haptics, bodily signals and even brain patterns. Meta, Microsoft, Apple, Amazon and Roblox all have expertise in emotion recognition, with Meta having invested significantly in brain-computer interfaces via their Research Labs programme. To help ground discussion of biometric dimensions of the Metaverse, it is useful to consider two leading (but very different) developers of the Metaverse: Meta and Microsoft. Whilst many companies and stakeholders might have been selected (potentially making this a much longer paper), they are very different businesses and revenue models help introduce the diversity of commercial interests in the Metaverse. In the case of Meta, this has

historically been programmatic advertising and in Microsoft's workplace analytics and licencing of services and software.

3.1 Meta

Some of the claims for the Metaverse and embodied Internet are wild. Meta, for example, uncontroversial in context of Metaverse claims, states that AR and VR will 'become as universal and essential as smartphones and personal computers are today'. They go on to state, however, that 'optics and displays, computer vision, audio, graphics, brain-computer interface, haptic interaction, full body tracking, perception science, and true telepresence' are also part of interaction with systems and other people in the Metaverse (Tech at Meta, 2021a, 2021b). Central to enabling interactions with objects, systems, synthetic agents and other people are attempts to render emotion as information. For instance, when Facebook demonstrated their social VR product at Oculus Connect 2016[1], the first topic of discussion between Zuckerberg and his in-world discussants was scope to read and express avatar emotions (such as smiles, surprise, confusion, laughter and shock). Analysis of one's expression may occur through remote cameras (such as those on a desktop), but also cameras in the mask of a VR unit, or through pressure sensitive goggles that may detect facial muscle movement. With Meta seeing a biometrically enabled Metaverse as inextricable from key sites of life such as the future of online interaction, an embodied Internet here involves sensing and measuring electrical impulses (such as through electromyography) in the body to gauge intention. In context of engagement with objects through VR and AR glasses, the goal is 'adaptive interfaces' that function through inferences and judgements made about need, want and intention, in relation to circumstances and surroundings. Here, Meta posits that 'the right thing may one day happen without you having to do anything at all' and promises that 'The glasses will see and hear the world from your perspective, just as you do, so they will have vastly more personal context than any previous interface has ever had' (Tech at Meta, 2021a). This signals that biometrics and mixed reality systems would transform the real by the virtual. The goal is not simply to watch but, important from the point of automating empathy (McStay, 2023), to understand people from a first-person perspective and to use computer cognition to empathise. What is missing from the outlining of these developments is Meta's statement of its corporate vision of the Metaverse and how it will make revenue, beyond the selling of headsets. Meta's website for example lists diverse impacts and applications (including healthcare, the workplace, urban planning and education) (Meta, 2023), but it is clearly uncomfortable with the idea of discussing its core business: behavioural and programmatic advertising. Elsewhere, however, Nick Clegg, the President of Global Affairs at Meta, defends Meta's advertising model because ad-supported media 'have made it possible for people to express themselves, reach like-minded people, and start businesses in ways that simply weren't possible before, which in turn benefited those who have historically been marginalised or

[1] Available from https://www.youtube.com/watch?v=YuIgyKLPt3s

discriminated against', progressing to state that: 'We don't know what the Metaverse economy will look like yet. But it's hard to imagine the direction of travel will change' (Clegg, 2022). When one adds technical, biometric and perspectival ambition to the continuity of advertising as a vital if not prime part of Meta's business, one sees that powerful social safeguards are required.

3.2 Microsoft

Microsoft is a multifaceted company with powerful cloud computing and workplace analytics capabilities. Also having expertise in AR through its HoloLens, longstanding interest in facial recognition and biometrics, development and ownership of Xbox and acquisitions of games and gaming companies (such as Minecraft, Bungie[2] and potentially Activision Blizzard[3]), it is well positioned for the Metaverse. Although gaming and social networking are key parts of the proposed Metaverse, areas such as education and work also have clear application. It is telling too that Microsoft is not alone in foregrounding work-based applications, as Apple's mixed reality headset is focused on videoconferencing and the virtual workplace, also using cameras to read facial expressions and body movements (Gurman, 2023). Microsoft has three prongs of relevant experience: their mixed reality 'HoloLens' is widely used in manufacturing and engineering environments, giving Microsoft practical experience; they have invested significantly in informational emotion and empathy research; and they have long-standing expertise in workplace and education analytics (Microsoft, 2023a, b, c).

Microsoft (2022), for example, articulates mixed reality in terms of 'instinctual interactions' that 'liberate' people from screen-bound experiences. Operating on a continuum of augmented reality to virtual reality, workers will be represented in synthetic space by profiling their real bodies and expressions. Whilst we are now very familiar with Microsoft Teams, Mesh for Teams is the Metaverse-based workspace. With avatars represented in a synthetic meeting room, this was astutely launched without need for headsets to smooth transition (so allowing for traditional input devices such personal computer cameras, phones and tablets), the goal being to mirror physical facial expressions in synthetic environments (Roach, 2021). Corporate strategy is thus one of bridging, using traditional devices as a bridge to more immersive experiences. The rendering of bodily behaviour and facial expressions in synthetic terms requires some critical subtlety. This paper does not see rendering of facial expressions as innately wrong, as it will make avatar-based interactions more natural (such as rendering of a smile at a joke). Problems begin when expressions and avatar behaviour, for example, are labelled and processed by surveillant systems, for diverse ends (such as human resources and employee profiling, or in the case of Meta to understand people and reactivity).

[2] Bungie developed the gaming franchise Halo and was acquired by Microsoft in 2000.

[3] An acquisition that would make Microsoft the world's third-largest gaming company by revenue, behind Tencent and Sony. At the time of writing the US Federal Trade Commission is looking to block the acquisition (FTC, 2023)

Similarly, in education, Microsoft's application of cross-reality learning analytics has scope to draw upon multiple realities (virtual and augmented, as well as assignment scores and teacher notes). Work-based analytics would function similarly, with Microsoft already holding multiple patents for analysis of worker interaction with the real world physics of meeting rooms (such as heat and air quality, as well as observation of interactions), location within buildings, email activity, and scope to run analytics on biometric, augmented, and virtual behaviour and interaction. Importantly, although biometric, interactional and contextual data is collected for Metaverse service purposes, the revenue model is different, so whilst programmatic advertising must surely be a key feature of the Metaverse, there are other surveillant business models. To this, the paper turns now to advance two notions that help us understand the significance of Metaverse developments: *surveillant physics* and *virtual realist governance*.

4 Surveillant Physics

With the rush for incumbent technology platforms to acquire and merge with competition (Madiega et al., 2022), there is a clear risk not only of monopoly but a pervasive cross-reality *surveillant physics*. This most obviously connects with Zuboff's (2019) 'surveillance capitalism' and the commodification of personal data via the Web, wearables and so-called smart cities, but the idea of surveillant physics accentuates that collection and processing of highly intimate data increasingly will inform the laws of how that Metaverse reality operates. The difference is that surveillance does not just take place in and through the Metaverse but that it is rendered into the very nature of the laws and protocols that guide its existence. The point is best made in reference to the natural rather than Web-based environment. As the reader of this paper sits or stands, looks away from this paper for relief from concentration, takes a breath, feels the brain calm, touches a device, looks at different parts of the physical environment and objects therein, possibly being aware of the presence of others, the reader is now encouraged to port that understanding into a photorealistic synthetic environment and consider that behaviour, gaze, biometrics and interactions are all profiled to enable services and the strategic intentions that lay behind them. Thus, whereas it is common to speak of camera-based surveillance in everyday life as "ubiquitous" and to refer to cities as "living labs", the difference is that the laws and particles of the Metaverse may be designed for commercially oriented surveillance. To make the point through theory rather than vignette, whereas control systems inspired by cybernetics are feedback-oriented systems that operate *in* reference to an environment (Ashby, 1956), Metaverse environments *themselves* may be control systems. If forced to use a Web-based analogy it would be 1×1 pixel-level tracking, where the most basic elements and functioning of an online environment are designed for surveillance (i.e., to manage and control for a given purpose). Surveillant physics perfects Internet and Web privatisation that has long pushed digital life into enclosures 'where interactions are governed by secret and proprietary algorithms' (Tarnoff, 2022: 188). The difference is that the Metaverse, as enclosed but conjoined environments, is intended at the outset as private and rented by default.

To summarise, surveillant physics will be irresistible given the longstanding relationship between legacy media and advertising, meaning that guardrails (and law) to protect our mental integrity need to be applied and further conceived sooner rather than later.

Surveillant physics is the outcome of when data collected about biometrics, neural activity, behaviour, gaze, history and avatar behaviour is added to data about situational context to inform the laws of how that reality operates. This includes general laws of environments, but also objects that exist to attract attention (most obviously, ads). Madiega et al.'s (2022) EU policy briefing paper pays particular attention to the intensification of Metaverse surveillance, highlighting biometric inferencing of emotion for behaviour-reactive advertising, eye-trackers to gauge in-world attention and amplified consumer manipulation. This may seem far-fetched, but consider the early 2015 justification by Andrew Bosworth, who at the time led the Facebook Reality Lab (now Reality Lab). Interviewed for CNN Business, he remarked that 'that experience should include ads, because life includes ads. So to not have ads would make it less lifelike' (Kelly, 2015). This comment is significant because (at a minimum) it signals that it would be risky to suggest that programmatic advertising and ad-supported environments will not feature in the Metaverse. Unsurprisingly, Meta is not alone in their interest in advertising, with game-worlds and sector leaders such as Roblox attempting to create an adult user-base and planning for Metaverse-based immersive advertising. This includes 3-dimensional (3D) ad units (so a person is "in" an ad) and paid-for portals to branded spaces (Sato, 2022).

Advertising is highlighted due to a tradition of programmatic advertising that uses behavioural and contextual means to automate the process of buying and selling advertising spaces, targeting people, in some cases creating the advertising, engaging attention, and monitoring reactivity to inform the programmatic enterprise. Other everyday instances where digital environments would be control systems (i.e., where diverse data inputs inform how that reality functions, with that reality then influencing behaviour in some way) include education, workplaces, gaming, entertainment, market research and usability testing, live events, retail, leisure, theatre, art production and display. These examples show potentially ambivalent uses of surveillant physics. On ambivalence, as shown through discussion of Microsoft, work-based applications might heighten the experience of presence in virtual meetings, where interpersonal productivity would be easier and more pleasurable, also enhancing regional and global collaboration. Conversely, surveillant physics in the workplace has scope to realise the nightmare of every neo-Taylorist take on digital labour. In a surveillant physics Metaverse context, this is one based on trackable reciprocity between people, sensors, actuators and the laws of virtual environments, through tracking of attention, intention, interaction, behaviour and reactions to people, objects and spaces. As tempting as it might be to see this solely in terms of VR, access to virtual spaces is enabled through both personal computer cameras and augmented reality, as well immersive headsets. For entertainment, one could consider the future of Disney's Pixar, one not just based on *looking at* screens, but *being in*, and *being with*, fantastical worlds, content and avatars. Again, this is not just VR, which is only one instance where screens give way to immersion. Persisting Pixar worlds may be best enjoyed by media that close off other senses, but

they will be accessible at children's breakfast tables (just as tablets and YouTube are today). Even in this highly domestic context, surveillant physics applies as data about a range of reactions and interactions will co-author the laws of how that reality operates in those immediate interactions, but also later interactions in the day—perhaps more fully immersed. We are clearly in speculative territory, but the scale of investment and creative opportunities (for good and ill) tells us that *something* is taking place, even if there not yet a form that can be properly delineated and dissected. Moreover, it is hard to argue that synthetic realities and characters will *not* involve data collected from cameras, microphones and in some instances biometrics, to inform how those realities function.

The principle of cross-reality surveillant physics indirectly builds on Konrad Zuse's (1969) suggestion of a digital physics, where the entire universe is supposedly capable of being computed on a computer. Ted Nelson's observation in *Computer Lib* also stands out, where he states that we 'must design the media, design the molecules of our new water, and I believe the details of this design matter very deeply. They will be with us for a very long time, perhaps as long as man [sic] has left…' (2003 [1974]: 306). Recollecting that a molecule is two or more atoms connected by chemical bonds, deep care is needed about the emergence of not only an in-world VR-based surveillant physics, but one that spans multiple realities and modes of human profiling. This is a surveillant physics where connections and arrangements of digital bits—and the objects, environments and interactions therein—may be processed, labelled, replayed and otherwise available for digital inspection. In practice, this has scope to be highly physical, perceptual and affective, as the experience of coupled and co-productive relations (people + system) facilitates moving experiences. It is sophisticated because of the surveillant physics (understanding and labelling of molecules and bits), memory and behavioural histories, profiling of emotion and biometrics, first-person perspective, potential for synaesthesia, and rapid prototyping and A/B testing enabled by automated means.

The surveillant physics of a Metaverse environment also grants insight into first-person perspective, which arguably begins to automate the process of cognitive empathy. This "seeing-seeing" and inside-out perspective allows intimate insight not just of the object of a person's vision, or even of biometric (internal) and behavioural (external) emotional reactions, but how a person sees and arrives at the object of attention. Both Meta's 2022 headset Quest Pro and Apple's mixed reality headset for example feature cameras inside the headset that track facial expressions and eye movements, the latter facilitating a perspectival surveillance through understanding of not only what is seen, but how it is seen. Commercial interest in use of simulating technologies to monitor attention, and what and how a person sees in virtual spaces, has a history. Virtual walk-throughs of digital retail outlets have long allowed marketers to understand what features capture consumer attention and how a person flits between options. This allows for rapid prototyping and testing of physical layouts and designs that would be otherwise expensive to build. Similarly, companies such as Motorola build technologies for the police that allow their remote commanders to see in real-time what their officers see (through officer smart-glasses) but also to record officer first-person perspective for further analysis (McStay, 2018). A fundamental premise of surveillant physics across the modalities of the Metaverse is a persistent ability to

computationally see first-person perspective and that environments may allow for on-the-fly changes to those environments, just as behavioural/programmatic ads change for individuals. This is tantamount to cognitive, mediated and automated empathy, this reflecting an interest in the datafication of the first-person perspective and the increasingly diverse ways that algorithmic systems profile, judge and interact with intimate dimensions of human life (McStay, 2023).

5 Virtual Realist Governance

At first glance the placing together of 'virtual' and 'realism' is an oxymoron, until one accepts that virtual experiences are real experiences. The principle of *virtual realism* was first argued by Heim (1998) and addressed by Chalmers (2022: 105), where virtual entities are indeed real, in part by their coherence and capacity to effect change in some way. This is a support argument for Chalmers' insistence that 'virtual realities are genuine realities', they are not fictions, what takes place in them matters, and that life in them can be meaningful (2022: xvii). In assessment of augmented reality experiences and 'augmented qualia', Turner (2022) makes a similar point through the notion of affordances, defined as 'dispositional properties that offer different courses of action to a perceiving subject'. A familiar principle in product and service design, Norman refers to an affordance as 'the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used' (2002 [1988]: 9). Gibson similarly articulates that an affordance of something is 'a specific combination of the properties of its substance and its surfaces taken with reference to an animal' (1977: 67). To consider worlds and environments, as well as objects therein, Bachelard's seminal *The Poetics of Space* (1994 [1958]) is significant because it softens understanding of physical space to one based on affect and emotion-laden environments. An important heuristic then is that the virtual and physical are not opposed, due to principles of affordances and scope to affect a person. Virtual realism is not only phenomenological (i.e., affect and experience-based) but may be approached through physics. Simulation and artificial intelligence theorists such as Bostrom (2003), Tegmark (2017) and Chalmers (2022) would agree, pointing out that reality is ultimately informational and propositional, where it is differences in states that make up reality, rather than a supposed underlying materiality. For this section's interest in valuing experience of virtual things and interactions, it is sufficient to say that virtual realities are not somehow fake realities, but that they are simply realities of a different sort. Certainly, in the case of virtual and augmented realities, immersive media is different from other media experiences because it involves a more affective experience of presence in a synthetic environment, sense of separateness from the real world, feelings of inclusion in the synthetic reality, the illusion of extension, in-world realism, perceptions of scale, reactions to gesture, tactile feedback, and presence and interaction with others.

Data protection in this context is required to respond to this degree of affectivity and intimacy, beyond for example tracking that takes place across the Web and related platforms and devices. Whilst in-world tracking and their avatars may have similar

characteristics to the Web, such as cookies and those snippets of computer text that identify a browser to a server, the experience of in-world profiling promises to be very different. This variance of affective experience needs to be factored for in all levels of Metaverse governance (corporate culture, design, standards, human rights, ethics and law). Indeed, the broadening of reality to encompass the virtual means that in-world harms are seen as closer in nature to physical harms. In other words, tempting as it is to write-off the Metaverse as a reboot of *Second Life*, if the eventual destination is cross-realities and three-dimensional photorealistic universes with novel objects and means of interaction, the affective and experiential differences warrant consideration, especially by those with a professional interest in data protection. Due to virtual realism, in-world profiling and abuses of privacy have scope to feel different. Consider for example a photorealistic avatar chatbot, enabled with natural language abilities, that places a hard to rid tracking device on a user to follow that person across the Metaverse to try and convince them to a Metaverse store. The principle is akin to Web cookies but, if placed on an experience continuum, aversion to Metaverse tracking would be at least somewhat closer to physical reality.

Virtual realist governance is, of course, not just about privacy, but also: design techniques that nudge people into actions that they would not otherwise choose (such as allowing access to personal data); in-world abuse; need for content moderation; avatar and situation deepfakes; deceptive use of chatbots to convince a person they are dealing with another real person; and disorienting and leading people to believe that they are other than where they believe they are. As Chalmers (2022) recognises, the question of the virtual is necessarily political (involving questions of democracy, anarchy and corporate rule), but it is also about the specifics of how governance is done, especially when the virtual is seen as inextricably connected to historical concerns of data protection. The argument being made here is that in-world profiling of people and interaction with things is important from the point of view of data protection and mental integrity, a term referring to subject-centred concern for privacy, cognitive freedom, self-determination and first-person perspective (Lavazza, 2018; McStay, 2023). Consequently, this paper argues that *virtual realist governance should factor for the immersive and affective qualities of virtual realism.* Importantly however, whilst virtual realist governance is concerned about scope for harm, it is also conceived with an enabling quality. For example, in the case of consent, rather than referring a person to terms and conditions (that are notoriously written in compliance-based legalese), a company might have an avatar bot explain in simple terms *and* take questions (assisted by advances in natural language processing) about how data would be processed on entering a service or space. This both closes the gap between physical and virtual life in that the interaction is much less taxing, and it makes use of advances in conversational AI to provide detailed information, without the bot too busy to answer questions.

6 The Missing Commons

When the World Wide Web was publicly launched on August 6th, 1991, it was decentralised by default. The Web was a way of linking and accessing information that could be browsed through a single interface, the web browser. Notably, even

at its proposal stage, the Web was seen as being able to include other media, having the capacity for growth written into it at proposal stage (Berners-Lee and Cailliau, 1990). Although within a few years the dot.com boom turned the Web into a site of commerce as well as a multimedia knowledge repository, the initial Web was built with the public good in mind, although Berners-Lee (2019) himself admits that the Web's design led to perverse outcomes in the form of programmatic advertising and algorithmically amplified misinformation. Indeed, as Tarnoff puts it, today 'the internet is broken because the internet is a business' (2022: 15), an observation that does not bode well for an Internet future where private interests are baked into the inception and most basic laws of the Metaverse. Whilst we should be careful not to over-romanticise commons properties of the early Internet and Web (not least due to historic and existing inequality of access to the Internet), it is significant that spaces in the Metaverse are foreseen as being owned and rented.

Developed by corporations, the Metaverse does not currently have the public good in mind, in so far as the public good is understood in reference to the commons. Developments so far promise a plutocratic future, one taking its cue from dominance of existing Internet platforms. However, as a reviewer for this paper generously observed, there is a counter argument of a libertarian sort that should be explored. This is one inspired by Locke's theory of property in Chapter 5 of the *Second Treatise on Government* (Locke, 1980 [1690]), where labour and transformation of that found in nature begets the principle of property. Applied, given the scale of investment (and therefore risk) in the Metaverse, worlds are the property of the technology corporations that create them and hence are not and should not be part of the common good. There are problems with this, however, not least that Locke's theory of property is about the exertion of labour upon natural resources (Locke cites acorns, apples and produce of land). The resources in question for the Metaverse and surveillant physics are people, which are not natural resources in Locke's terms. There are two principal criticisms of the Metaverse as property argument, where transformation begets property: first is that property is a poor prism through which to see people and data traces of their behaviour, bodies and subjectivity, due to people not being natural resources; second is that Locke is careful to ensure that property ownership does not impact on the common good, noting in §31 and §32 of the *Second Treatise on Government* that property ownership have limits, bound by not spoiling, destroying or enclosing without consent what is otherwise communal. These two criticisms do not amount to an argument for the Metaverse as public property, but given that the Metaverse entails environments for work, leisure, politics and other key aspects of everyday life, Locke would likely agree that at a minimum there is a common interest in the shaping and functioning of this initiative.

If Chalmers (2022) is even half right about the significance of contemporary simulation technologies and their potential pre-eminence in everyday life, there is then a clear public interest in the development of Metaverse (or what Chalmers phrases as Reality+), due to the potential centrality of the Metaverse to everyday life. The question of how to govern virtual communities is as old as virtual communities themselves, with Guadamuz (2007) some time ago distilling the question to whether they should be regulated by public sector control of the new environment; whether they should be left to private entities to self-regulate via the existence of a social

contract between stakeholders; whether regulation might be hard-wired into the system; or if the new technology warrants a "hands-off" approach from regulators. One can already see a hands-off preference emerging, perhaps due in part to the scale of the challenge in complying with multiple legal jurisdictions. Art. 3§2 of the EU's General Data Protection Regulation (GDPR), for example, applies to any business located anywhere on the planet offering offers goods or services in the European Union or that monitors the behaviour of EU citizens. A music gig in the Metaverse would likely be attended by people from all over the world, leading Artzt (2022) to suggest that terms of service could include a 'privacy law selection clause' where people would choose which region applies to them. Enforcement would be difficult, however, given that data controllers may not disclose their identity nor comply with data subject access requests. In addition to desired avoidance of legal complexity is nimbleness and the management of technicalities of virtual worlds. Writing for IEEE about Metaverse governance, Stephens (2022) argues that governance should be led by *systems design* in terms of how domains are built, and ethical questions are answered therein (tantamount to code as governance), due in large part to the complexity of designing, hosting, maintaining and interacting with domains. Broadly aligning with this view, when asked about governance for the Metaverse, Mark Zuckerberg suggested that it would be governed by technical standards groups (such as the World Wide Web Consortium) and a consortium of large technology companies (Newton, 2021), notably omitting to voluntarily mention international rights or regional law. When asked about the role of government spaces in the Metaverse, Zuckerberg remarked that whereas historically it was governments that built infrastructure that would underpin innovation, this has changed. Governments would be allowed parks and spaces, but not a governance role (Newton, 2021). The public good and the commons are thus reduced to an allocated play area.

It is worth reflecting precisely on what standards are and what constitutes a standard group. In context of technologies, a standard is a set of norms, requirements or features of a technology, process, or method. They shape most products that people use, be this screw threads, computer and telephone networking, cryptography or natural language models (Yates and Murphy, 2019). Relevant standards bodies include the International Organization for Standardization (ISO), World Wide Web Consortium (W3C), Institute of Electrical and Electronics Engineers (IEEE) and Internet Engineering Task Force (IETF), amongst many other international and regional standards groups. There are also standard groups for ethical use of technology, which try to establish salient concerns, and what applications, technologies, and uses thereof, should and should not do. Standards are soft governance in that they are non-binding measures and, critically, working groups are populated by volunteers, all with different sets of values that they bring to the question of how the Metaverse should be designed. These may come from the technology industry, but they may include anyone with relevant expertise, such as academics, not-for-profits or otherwise independent members. Given the extensive time commitment involved in such work, however, standards risk being shaped by corporations with self-interest in determining technical and ethical protocols by which a technology and/or application functions. In the context of the Metaverse, standards address 'hardware, software, internet protocols, payment protocols and data standards' (Stephens, 2022:

17). As per Mark Zuckerberg's intervention, in the case of the Metaverse, technical standards are seen as a solution to reach consensus about good governance without recourse to national governments. Whilst people working for governments may join standards groups, they are voices amongst others trying to reach a consensus about how something should work.

Standards which are open by default, and designed for all developers to use, run counter to firms that use their own standards to lock users into their own services. The idea that companies would sacrifice monopolistic self-interest in the name of openness is a difficult premise, making good governance by standards unlikely. Whilst some Metaverse standards such as computer languages to build worlds may be open, such as NVIDIA's adoption of the universal scene description language (invented by Pixar), openness becomes harder to envisage where it more directly impacts on a business model, such as data portability and identity interoperability involving behavioural histories. Nevertheless, it should not be missed that important discussions are currently taking place about how the Metaverse should function, which would benefit from alternative understandings from champions of decentralisation and cooperatives. This is unlikely to eject all influence and likely corporate dominance of conjoined mixed realities and the Metaverse, but there is scope to intervene on the protocols that link domains. The risk that champions of cooperatives face is that in trying to envision spaces where people may self-govern is that world self-governance and surveillant physics are simultaneously possible, just as one can have political control over a physical domain but be subject to laws of nature. Tarnoff (2022: 186-7) for example asks us to consider that 'Instead of Facebook, imagine millions of social media communities, each with their own rules and custom', but that is what Meta and the Metaverse are offering: scope to build, self-govern and otherwise have cooperative control over what goes on in open photorealistic worlds, on the condition that one accepts very basic laws of how those domains work. Whilst authors such as Tarnoff fight for the obliteration of platforms such as Meta, to make way for community-level self-governance, the risk argued here is that creative visions for self-governance may be co-opted and appropriated.

Whether one believes that the Metaverse is a desperate attempt by Mark Zuckerberg to save Meta, or a point of human evolution into post-human life as simulated entities (as suggested by Nick Bostrom and advocated by Elon Musk), that the Metaverse is an empty signifier and unformed, provides a unique ground-floor to build and debate influential standards. For example, amongst the standards for world-building, avatars, currency, and interoperability, are the seemingly small but potentially profound questions of standards for emotion expressions. This is not a strange proposition given the role that emotion expressions play in human interaction, but it is one that raises the problem of how to have a standard when the thing to which the standard refers is ambiguous. (This paper's position on this takes its cue from virtual realist governance, advocating for no labelling of emotion, so whereas cameras may render physical faces and voices in-world through avatars, those expressions are fleeting and *not recorded*—just as in the physical world in non-surveillant states.)

Standards and "hard" governance are not incommensurable, especially as the draft EU AI Act is favourable to standards, with Europe developing standards for

how legally compliant AI should function. At the time of writing, the European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardisation (CENELEC) and the European Telecommunications Standards Institute (ETSI) will develop the technical standards for the AI Act. For the Metaverse, the European Parliament takes a different view in that it does not seek to develop its own standards although, to complicate matters, there will be overlap due to AI applications in the Metaverse (not least emotion recognition technologies). It stresses that that 'the metaverse is subject to relevant legislative frameworks, such as the privacy and data protection framework, digital legislation and the competition framework' and calls on the Commission 'to actively ensure that companies and entities working on and in the metaverse are abiding by the abovementioned legislative frameworks' (European Parliament, 2022, §55). Other regions foreground other concerns, with China's government seeing mental health risks to young people and having already banned decentralised cryptocurrencies. Whilst having huge Metaverse-interested platforms such as Tencent, NetEase, ByteDance, Alibaba and Baidu, these will be subject to standards developed by a committee called The Metaverse Industry Professional Committee that will create industry roadmaps, support start-ups and explore socially beneficial use cases (GlobalData Thematic Research, 2022). This is supported by related initiatives, with China's Ministry of Industry and Information Technology (MIIT) pressuring Chinese digital platforms to make their products interoperable (Brown, 2022). For a paper that is keenly interested in the public good and that is concerned about the role corporations play in defining the physics and protocols of the Metaverse, the active role of the Chinese state in curtailing the reach of corporations has initial appeal. The concern of course then becomes one of a state surveillant physics of the Metaverse, one where surveillance through digital atoms and bits is legitimised under the guise of safety, prevention of Metaverse addiction, and maintenance of overall social stability through observation and censorship. Critically for a paper interested in the public good, this would serve to quash collective citizen action. Consequently, whilst this paper is deeply sceptical of commercial views of the Metaverse that seek to deny governments a governance role, the opposite is utterly unpalatable too, one involving state design of surveillant physics. What the best solution for Metaverse governance is cannot be resolved here. It will however take its cue from longstanding Internet governance debates, especially those interested in state-directed versus multistakeholder participation perspectives (Flyverbom et al. 2019). The beginnings of an answer for Metaverse governance will be similar, one that sees citizens as best served by absence of centralisation of power yet, ongoing, balances this imperative for restricted power with need for public safety and risk mitigation.

7 Data Stewardship

The two sections on governance above have considered need: (1) to factor for the immersive and affective qualities of virtual realism (virtual realist governance) and (2) to be aware of the plutocratic nature of Metaverse ambitions at the outset (with commons ideals being very much absent in these). Keys to plutocratic ambition are

technical standards. An overlapping question is that of data stewardship. Investigation is needed because if Metaverse environments emerge that allow for movement and sharing of personal data and "assets" across owned domains, there will be a need to resolve both moral and practical terms of data stewardship and portability. Central to this is interoperability, which is the capacity for computer systems or software to exchange and make use of information. Interoperability in the Metaverse would allow a person to be recognised and to present themselves as they see fit as data about identity and a person's digital assets are ported and transferred across domains within the Metaverse. This is not only a technical initiative, but a values-based initiative, one where perceived value in avatar and data portability is deemed acceptable even given likely security and privacy risks. This is not to suggest that walled gardens in the Metaverse will not exist, but that the rush of technical standards working on identity interoperability signals a keen belief in reusing digital objects in different domains and a common language for identity (Metaverse Standards Forum, 2022). Interoperability however begs the question of who hosts and sets the rules in the first place. Applied to the Metaverse, interoperability is about ability to take data, property and content, from one domain to another. This requires common standards for cooperation, frameworks for data to be able to read and be written to service provider databases, meaningful consent mechanisms, ability to withdraw and move currency and assets, scope to use objects in multiple worlds, and for services in general to "inter-operate". If a person's avatar for example becomes a source of pride and identity to that person as they play games, go to gigs, attend classes, go to conferences and so on, then there is clear interest in the avatar being able to carry clothing and property function across different domains, especially if a person behind that avatar has spent money curating their avatar. This speaks to questions of common standards, economics, identity, who designs the standards for interoperability between these domains, and how personal data about that avatar and its assets is managed.

7.1 Personal Data Stores

Although the Metaverse functions on the Internet and is subject to the same diverse data protection rules as other applications that run on the Internet, the idea of the Metaverse contains some unique attributes regarding identity. One way of addressing the question of interoperability and personal data is for people to manage and even own their data. This premise is controversial and not new, with 'infomediaries' having origins in the dot.com boom of the late 1990s/early 2000s (Hagel and Singer 1999) and there being many failed initiatives to assist how people manage consent decisions through one interface (Lehtiniemi and Kortesniemi, 2017; Janssen et al., 2020). Nevertheless, given surveillant physics and the interoperability question, the issue of who should manage one's identity and personal data is going to be a recuring one if Metaverse ambitions cohere. Given this paper's aversion to concentration of power, if people are set to be more responsible for their identities and personal data, the governance goal should be to sever the link between companies that own key parts of the Metaverse (e.g., Meta) and where personal data is stored,

such as through Tim Berners-Lee's Solid platform where data would be under a user's control. Speaking practically, those working with ethically oriented decentralised identity technologies for the Web should be as follows: (1) aware and engaging in Metaverse interoperability standards development discussed above in §6; (2) considering and making alternative cases in standards groups for what a conjoined but federated mixed reality/Metaverse might consist of; and (3) having discussions with governments and regional governance bodies about realising ethically-oriented decentralised identity technologies for the Metaverse, or at least mixed reality where interoperability in relation to identity is a key component, as developed below.

Whereas personal data stewardship in the Web and mobile era have faced the impossible challenge of persuading incumbents such as Alphabet and Meta to agree to a new arrangement of personal data processing, the ground-floor uncertainty of how interoperability standards would function in a Metaverse context provides opportunity for some sort of personal data stewardship to be a core feature of interoperability. The premise is straightforward: a Metaverse user would store data locally and smart contracts would be issued for access (if the user agrees) to their personal data. Connected, access to data could be revoked by the user when the transaction is over. As per virtual realism, a real or digital doorperson does not need to retain details about identity and age once identity has been verified, and nor should verification be a burdensome process amongst intelligent agents. Interfaces might vary, potentially looking like a games-based list of avatar health and games possessions for some, and a banking interface for others, featuring lists of stocks and reserves. Whilst this might still read as horribly complex for the lay citizen, public organisations such as the British Broadcasting Corporation (BBC) are already introducing Solid-based systems where people can control access to the data in their personal data store (Sharp, 2022). This shows that with time initially strange ideas may become more familiar and that personal identity management can be decentralised with assistance of trustworthy intermediaries.

There are however at least three glaring questions: does this begin to resemble a market model with privacy haves/have nots (Archer et al. 2019); why would platforms attack their own business model to allow citizens agency over their own data; and what of new modes of plutocratic data centralisation that are seemingly inherent in personal data store design stewardship models (Draper, 2019)? The answer to the first is yes, greater decentralised self-determination and choice over exchange does begin to resemble the market model. This raises criticisms, most important that universal human rights such as privacy (physical and digital) could be contingent on financial income (OHCHR, 2021). As developed below, there is scope to mitigate the market criticism through greater involvement of public bodies, rather than framing citizens as free-market players. The argument here is less about the desirability of this as a governance option than its availability, and perhaps even inevitability, if Metaverse identity interoperability becomes a feature of digital life. The moral direction is less about enabling markets and compensation, than decentralised ownership as a means of tackling power, market abuse and realising long term policy goals of data portability. On why platforms would allow citizens agency over data, as developed below, without regulator stick and perhaps also incentive, they will not. The answer to the third question on the problem of new modes of data centralisation

is to work with those (such as the Solid community and cooperatives) whose solutions are decentralised and not contingent upon being paid by platforms or other parties for access to a user's data. However, even given this suggestion, the Metaverse interoperability question does raise need for caution about new forms of centralisation where individuals and organisations alike could be beholden to new intermediary actors facilitating movement of personal data and assets between Metaverse domains.

On stick and incentive, redistribution of data stewardship (and power) aligns well with key regional policies. Albeit without the Metaverse in mind, the EU's GDPR was, for example, conceived in part to create a digital single market enabled by transparency, rights of access, data portability through interoperability and allowing users greater control over their data. Indeed, through Art. 20(1) of the GDPR, data subjects have the right to receive personal data concerning them in a structured, commonly used and machine-readable format and have the right to transmit that data to another controller. Seen one way, the Metaverse has scope to be portable by default. Connected, the European Data Protection Supervisor sees data stewardship and self-management as a highly practical and human-centric way of delivering on the GDPR's promises of data rights whilst enabling new business models (EDPS, 2020). Despite the seeming novelty of the Metaverse and personal data stewardship, there are of course longstanding precedents for balancing self-management of assets, institutions, and governance. Banks for example have long done this and make for obvious candidates to facilitate personal identity management, especially given the growth of app-based banking that allows for management of stock, money and other assets. There is also scope for Internet service providers to play a greater role. Mobile operators such as Safaricom have for some time provided trusted payment capabilities in places such as Kenya, lending an additional dimension to the discussion and standards development on data identity/asset interoperability. When the utility-based remit of telecommunications is extended, this however brings its own risks of abuse of power and improper use of communications data. This, for example, happened when Internet service providers worked to collaborate with Adtech firms to mine Internet traffic though inspection of data packets in their networks to serve targeted advertising (Marsden, 2010).

Despite corporate Metaverse aversion to governments, governments have the clout to contribute significantly to data stewardship through practicalities of identity management and public service communications to citizens. India for example has instituted electronic identification systems, also collecting biometric data (Rao & Nair, 2019). This has, however, raised concerns about mass surveillance that would be exacerbated by the surveillant physics of the Metaverse. Whilst not seeking to be directly involved, Europe is interested in data intermediaries. The EU's draft Data Governance Act is significant in that it seeks to enable the reuse of certain categories of protected public-sector data and promote 'data altruism' across the EU through personal data sharing intermediaries (such as a personal data store) (European Commission, 2020). Although the latter is about pro-social uses such as donation of personal data for health research or locative data for urban improvement projects, there is interest and appetite to amend how people relate to data about themselves. The UK has similar interests, with its National Data Strategy championing the principle

of data intermediaries, so citizens may import 'personal data from providers such as social media companies, banks, hospitals, and the government, amongst others', and 'granting or revoking access to organisations such as GPs [General Practitioners], banks, and online retailers, amongst others' (CDEI, 2021a). There are two additional key policy points in that the European Union is 'against renumeration in any form' (European Commission, 2020a: §1, 1); and it seeks to move from the status quo of 'integrated tech platforms' to one based on 'neutral data intermediaries' (European Commission, 2020: 6). The word 'neutral' is important given scope for new forms of centralisation, but it also raises questions of what neutral and impartial would mean in practice. Rephrased, intermediaries might not be neutral, but explicitly tasked with serving the commons and public good. If so, personal data stewardship would involve raising of technology literacy amongst citizenry, demanding input from trusted organisations. Again, relevant in this regard, is the UK's public service media organisation, BBC, that has trialled usage of personal data stores using the Solid platform to normalise what is currently a difficult idea: managing one's own stores of personal data, digital assets, and having a greater role in what happens to them (Sharp, 2021). Applied to the Metaverse the goal is not to further a free-market model but to curb the centralisation of power that would happen if the Metaverse coheres as companies such as Meta hope.

7.2 Decentralised Autonomous Organisations as Data Trusts

Another option is *data trusts* in the Metaverse, which are much more collectively minded. A data trust is 'a structure whereby data is placed under the control of a board of trustees with a fiduciary responsibility to look after the interests of the beneficiaries—you, me, society' (Ruhaak, 2019). Given scope for the Metaverse to have a feudal-like character (based on ownership of space and living off the labour of others), Lawrence's (2016) definition of data trusts as 'data governance by the people, for the people and with their consent' and his likening of current data-sharing arrangements to feudalism are notable. One clear advantage to trusts over personal management is scope to change the terms of arrangement with a platform. Whereas an individual may manage their own data wallet in a personal data store, ultimately, the terms of trade would still be dictated by powerful others. A data trust instead would have collective power that would function for the common good (Viljoen, 2020). However, data trusts suffer from similar problems to personal data stores, not least the question of what interest platforms have in engaging with this process. There is also an additional question regarding the role of law and data protection, which seen one way is already a government-backed data trust. Curiously a Metaverse-based data trust would look different, perhaps taking a bizarre but rightful mix of trade unionism and techniques of decentralised autonomous organisations (DAOs).

In relation to the Metaverse, this for example could involve picketing and demonstrations against those who abuse users' data, likely assisted by in-world and real-world media coverage. This would not simply be demonstrations of a handful or a hundred users and their avatars, but with coordinated effort, potentially billions.

The principle of virtual realist governance argued above applies here too in that this would be a deeply affective expression of solidarity against abuse of personal data. It would be closer to a physical demonstration than signing and sharing on social media petitions for political change. Demonstrations by billions, of course, may not simply be a case of occupying a virtual space, but might also be a site of action. This might be to disrupt the normal business of that space (work, shopping, education, socialising), but it also might be to flood the hardware infrastructure that underpins that virtual space (akin to a Distributed Denial-of-Service attack). If a problem with user privacy has been asymmetry between the self and assemblage that supports exploitative personal data processing, the affective and cognitive comprehension won through virtual realist governance facilitates a rebalancing towards a better symmetry. This is one in which collective action is up to the task of challenging a surveillance assemblage in the Metaverse simply by showing up and being visible. The other possibility for data trusts in the Metaverse is they function as a DAO, which are 'collectives that use automation and crowdsourcing to make decisions' (The Economist, 2022). Fundamental is they do not rely on a single central authority but, as Jonah Erlich of ConstitutionDAO, which tried to buy one of the original copies of the US Constitution at auction, defines them: they are akin to a group chat with a bank account (Ibid). A DAO uses smart contracts which means that a programme will only execute itself under certain conditions, such as transference of funds only if most token-holders have digitally signed off on a transaction. Although DAOs are organisations for investment and profit, there is scope to automate and collectivise data trusts through the same tools as DAOs, but for a very different reason: to democratically coordinate governance, preferences and arrangements, especially in responses to changes in services, situations where applicability of law is questionable, and where there is little case law to guide regulators.

8 Conclusion

The so-called Metaverse is widely advocated by the technology industry to be an interoperable three-dimensional Internet, accessible by traditional input devices such as cameras, augmented reality and virtual reality. Beyond pre-existing mixed reality interests, the Metaverse is seen in this paper as an empty signifier. Contrasting with the Internet, Web and Blockchain, the word does not have a stable thing to which it refers. Consequently, there is a vacuum that diverse stakeholders and their interests have rushed to fill. The paper however avers that *something* is taking place given interest from some of the world's richest companies, but also because that virtual and other modes of mediated reality have scope to be interesting, pleasurable, enriching, enabling and otherwise valuable.

This of course is an inherently risky paper because it is highly probable that the Metaverse hype bubble will collapse, although it takes the view that this will be replaced by steadier growth of mixed reality and interoperable services and experiences. The risk was taken because the Metaverse is being positioned to involve diverse biometric inputs with view to mediating and gauging bodies, behaviour, emotion and first-person perspective, to computationally see what people see.

Metaverse ambitions were consequently argued to involve what this paper advances as a *surveillant physics*, one that involves deeper profiling of people, digital molecules, and laws and make-up of environments. Advertising and marketing, for example, have interest in manipulating physics engines and virtual environmental laws to optimise emotion and attention to advance brand interests, as well as profiling avatar and therefore biometric responses to ads in relation to contexts in which ads are served. The premise of surveillant physics however has farther reach, with this paper also noting work-based analytics for in-world worker interaction, digital objects and the molecular make-up of meeting rooms.

Sensitivities about the types of data that input into the Metaverse, but especially the nature of Metaverse experience, led the paper to argue for *virtual realist governance*. These sensitivities recognise affective differences from other media, such as the unique sense of presence in a synthetic environment, separateness from the real world, inclusion in the synthetic reality, illusion of environmental extension, in-world realism (eventually photorealistic), perceptions of scale, in-world reaction to user gesture, tactile feedback, and potentially deceptive avatars who may be bots equipped with powerful conversational AI. Virtual realist governance serves to remind that virtual experience is real experience. The concept also functions to flag to those with a professional interest in data protection that the Metaverse promises to be experientially more powerful than other media and that this must be factored for in formal governance discussion.

The paper also finds that *the commons and the public good are missing* in early visions of the Metaverse. Whilst one must be careful not to over-romanticise commons properties of the early Internet and Web (and potentially the Blockchain), early Metaverse ambitions differ from these by being plutocratic at the outset. Moreover, with corporations (especially Meta) seeing standards developers rather than traditional law-making as the best means of governance, there is clear need for regulators to engage with standards developers more actively and those shaping key principles behind the Metaverse. This is less about acquiescence to corporations than proactively ensuring that Metaverse standards respect human rights and regional law. Notably, standards and formal governance are not incommensurable, with the EU's draft AI Act creating regulatory interest in standards-based approaches to governance, meaning that active intervention is possible before key principles of operation are decided.

Overlapping with these two governance observations (virtual realist governance and the missing public good) is the need to consider governance of interoperability factors of Metaverse ambitions. Solutions here emerge in part from the Metaverse itself, especially personal data stores and data trusts. Despite wide interest in infomediaries since the 1990s, these have failed to catch on, but that the Metaverse is conceived by some in connection to games suggests scope to use data wallets akin to how one manages assets in games. If advanced, this too would require regulator and government input to ensure that redistribution of data agency does not inadvertently create new plutocratic actors. Data trusts may also borrow technique and form from modern forms of investment, through the working practices of decentralised autonomous organisations. With trusts being akin to unionisation, this also raised the question of what protest and collective action might look like in the Metaverse.

Recollecting that a photorealistic Metaverse would involve virtual realism, sense of presence, scope for global solidarity and ability to be seen by the world, there is clear opportunity for political action in the Metaverse. Whilst the Metaverse is not currently being built with the public good and commons in mind, the visibility of collective action in the Metaverse provides scope for hope and change to not just the Metaverse, but the entire human data ecology. Although it remains to be seen what form the Metaverse will take, if any, this paper concludes that if the public good is to be defended there is good reason to anticipate challenges before decisions and technology standards are developed and deployed.

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References

Archer, A., Wildman, N., Brouwer, H., & Cawston, A. (2019). The ethics of data acquisition: Protecting privacy and autonomy while harnessing the potential of big data. In *Centre for the governance of change*. Retrieved January 4, 2022, https://pure.uvt.nl/ws/portalfiles/portal/39360210/CGC_Data_Privacy_The_Individual_Paper_2._The_Ethics_of_Data_Acquisition_1.pdf

Artzt, M. (2022) Metaverse and privacy. Retrieved September 9, 2022, from https://iapp.org/news/a/metaverse-and-privacy-2/

Ashby, W. R. (1956). *An introduction to cybernetics*. Chapman and Hall.

Bachelard, G. (1994 [1958]). The poetics of space.

Ball, M. (2022). *The metaverse: And how it will revolutionize everything*. Norton & Company.

Berners-Lee, T. (2019). 30 years on, what's next #ForTheWeb? *Worldwide Web Foundation*. Retrieved January 4, 2023, from https://webfoundation.org/2019/03/web-birthday-30/

Berners-Lee, T., & Cailliau, R. (1990). WorldWideWeb: Proposal for a HyperText Project. Retrieved September, 2022.
Bostrom, N. (2003). Are we living in a computer simulation? *The Philosophical Quarterly, 53*(211), 243–255. https://doi.org/10.1111/1467-9213.00309
Brown, I. (2022) China. Retrieved September 9, 2022, from https://www.ianbrown.tech/digital-competition-briefing-1/china/
CDEI (2021) Unlocking the value of data: Exploring the role of data intermediaries. Retrieved September 9, 2022, from https://www.gov.uk/government/publications/unlocking-the-value-of-data-exploring-the-role-of-data-intermediaries/unlocking-the-value-of-data-exploring-the-role-of-data-intermediaries
Chalmers, D. (2022). *Reality+: Virtual worlds and the problems of philosophy*. Allen Lane.
Clegg, N. (2022) Making the metaverse: What it is, how it will be built, and why it matters. Retrieved January 4, 2023, from https://nickclegg.medium.com/making-the-metaverse-what-it-is-how-it-will-be-built-and-why-it-matters-3710f7570b04
Dionisio, J. D. N., Burns, W. G., & III., & Gilbert, R. (2013). 3D virtual worlds and the Metaverse: current status and future possibilities. *ACM Computing Surveys, 45*(3), 1–38. https://doi.org/10.1145/2480741.2480751
Draper, N. A. (2019). *The identity trade: Selling privacy and reputation online*. New York University Press.
EDPS. (2020) Data protection. Retrieved September 9, 2022, from https://edps.europa.eu/data-protection_en
Elker, J. (2020) World of Warcraft experienced a pandemic in 2005. That experience may help coronavirus researchers. *The Washington Post*. Retrieved September 9, 2022, from https://www.washingtonpost.com/video-games/2020/04/09/world-warcraft-experienced-pandemic-2005-that-experience-may-help-coronavirus-researchers/
Esposito, B., & A., & Gori, M. (2021). Early blindness limits the head-trunk coordination development for horizontal reorientation. *Frontiers in Human Neuroscience, 15*, 699312.
European Commission. (2020) Proposal for a regulation of the European Parliament and of the council on European data governance (Data Governance Act). Retrieved September 9, 2022, from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0767
European Parliament. (2022). European Parliament resolution of 5 May 2022 on competition policy – annual report 2021. Retrieved September 9, 2022, from https://www.europarl.europa.eu/doceo/document/TA-9-2022-0202_EN.html
Floridi, L. (2022). Metaverse: a matter of experience. *Philosophy & Technology, 35*(3), 73.
Flyverbom, M., Deibert, R., & Matten, D. (2019). The governance of digital technology, big data, and the Internet: New roles and responsibilities for business. *Business & Society, 58*(1), 3–19.
FTC. (2023). Microsoft/activision Blizzard, in the matter of. Retrieved February 6, 2023. https://www.ftc.gov/legal-library/browse/cases-proceedings/2210077-microsoftactivision-blizzard-matter
GlobalData Thematic Research. (2022). China's metaverse industry will evolve differently. *Verdict*. Retrieved September 9, 2022, from https://www.verdict.co.uk/china-metaverse-industry/
Guadamuz, A. (2007). Back to the future: Regulation of virtual worlds. *SCRIPTed, 4*(3), 242–245. https://doi.org/10.2966/scrip.040307.242
Gurman, M. (2023) Apple delays AR glasses, plans cheaper mixed-reality headset. *Bloomberg*. Retrieved Feb 6, 2023, https://www.bloomberg.com/news/articles/2023-01-18/apple-postpones-ar-glasses-plans-cheaper-mixed-reality-headset
Heim, M. (1998). *Virtual realism*. Oxford University Press.
IEEE P7030 Working Group. (2022). IEEE P7030 - Global XR Ethics Working Group. Retrieved September 9, 2022, from https://sagroups.ieee.org/7030/
Janssen, H., Cobbe, J., & Singh, J. (2020). Personal information management systems: A user-centric privacy Utopia? *Internet Policy Review, 9*(4), 1–25.
Kelly, H. (2015). *How Facebook plans to make money on Messenger*. CNN Business. Retrieved September 9, 2022, from https://money.cnn.com/2015/09/22/technology/facebook-messenger-disrupt/index.html
Lavazza, A. (2018). Freedom of thought and mental integrity: The moral requirements for any neural prosthesis. *Frontiers in Neuroscience, 12*(82). https://doi.org/10.3389/fnins.2018.00082
Lawrence, N. (2016) Data trusts could allay our privacy fears. *The Guardian*. Retrieved September 9, 2022, from https://www.theguardian.com/media-network/2016/jun/03/data-trusts-privacy-fears-feudalism-democracy

Lehtiniemi, T., & Kortesniemi, Y. (2017). Can the obstacles to privacy self-management be overcome? Exploring the consent intermediary approach. *Big Data & Society, 4*(2). https://doi.org/10.1177/2053951717721935
Lessig, L. (2006). *Code version 2.0*. Basic Books.
Locke, J. (1980 [1690]) *Second treatise of government*. Hackett Publishing Company
Madiega, T., Car, P., Niestadt, M., & Van de Pol, L. (2022) Metaverse opportunities, risks and policy implications. *EPRS*. Retrieved September 9, 2022, from https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733557/EPRS_BRI(2022)733557_EN.pdf
Marsden, C. (2010). *Net neutrality: Towards a co-regulatory solution*. Bloomsbury.
McStay, A. (2018). *Emotional AI: The rise of empathic media*. Sage.
McStay, A. (2023/in press). *Automating empathy: When technologies are claimed to feel-into everyday life*. Oxford University Press.
Meta. (2021). Founder's letter, 2021. Retrieved September 9, 2022, from https://about.fb.com/news/2021/10/founders-letter/
Meta. (2023). The metaverse may be virtual, but the impact will be real. Retrieved January 4, 2023, from https://about.meta.com/uk/metaverse/impact
Metaverse Standards Forum. (2022). Leading standards organizations and companies unite to drive open metaverse interoperability. Retrieved January 4, 2023, from https://metaverse-standards.org/news/press-releases/leading-standards-organizations-and-companies-unite-to-drive-open-metaverse-interoperability/
Microsoft. (2022). What is mixed reality? Retrieved September 9, 2022, from https://docs.microsoft.com/en-us/windows/mixed-reality/discover/mixed-reality
Microsoft. (2023a). Boost your organization's productivity. Retrieved February 6, 2023, from https://www.microsoft.com/en-us/hololens/industry-manufacturing
Microsoft. (2023b). HUE: Human understanding and empathy. Retrieved February 6, 2023, from https://www.microsoft.com/en-us/research/group/human-understanding-and-empathy/
Microsoft. (2023c). Microsoft Viva Insights. Retrieved February 6, 2023, from https://www.microsoft.com/en-gb/microsoft-viva/insights
Newton, C. (2021). Mark in the metaverse. Retrieved September 9, 2022. https://www.theverge.com/22588022/mark-zuckerberg-facebook-ceo-metaverse-interview
Nourian, S., Shen, X., & Georganas, N. D. (2006). XPHEVE: An extensible physics engine for virtual environments. In *2006 Canadian Conference on Electrical and Computer Engineering* (pp. 1546–1549). https://doi.org/10.1109/CCECE.2006.277848
OHCHR. (2021). OHCHR and privacy in the digital age. Retrieved January 4, 2022. https://www.ohchr.org/en/issues/digitalage/pages/digitalageindex.aspx
Rao, U., & Nair, V. (2019). Aadhaar: governing with biometrics. *South Asia: Journal of South Asian Studies, 42*(3), 469–481. https://doi.org/10.1080/00856401.2019.1595343
Roach, J. (2021) Mesh for Microsoft Teams aims to make collaboration in the 'metaverse' personal and fun. Retrieved September 9, 2022, from https://news.microsoft.com/innovation-stories/mesh-for-microsoft-teams/
Ruhaak, A. (2019). Data trusts: Why, what and how. Retrieved September 9, 2022, from https://medium.com/@anoukruhaak/data-trusts-why-what-and-how-a8b53b53d34
Sato, M. (2022). Roblox is ready to grow up. *The Verge*. Retrieved January 4, 2023, from https://www.theverge.com/2022/9/9/23343459/roblox-age-guidelines-metaverse-ads-developer-conference-announcements
Sharp, E. (2021). Personal data stores: building and trialling trusted data services. *BBC Research & Development*. Retrieved September 9, 2022, from https://www.bbc.co.uk/rd/blog/2021-09-personal-data-store-research
Sharp, E. (2022). Social TV and the future of data. *BBC Research & Development*. Retrieved January 3, 2023, from https://www.bbc.co.uk/rd/blog/2022-10-social-tv-and-personal-data
Stephens, M. (2022). The IEEE global initiative on ethics of extended reality (XR) report. Retrieved September 9, 2022, from https://standards.ieee.org/wp-content/uploads/2022/06/XR_Metaverse_Governance.pdf
The Economist. (2022). What are DAOs, or decentralised autonomous organisations? *The Economist*. Retrieved September 9, 2022, from https://www.economist.com/the-economist-explains/2022/01/26/what-are-daos-or-decentralised-autonomous-organisations?
Tarnoff, B. (2022). *Internet for the people*. Verso.
Tech at Meta. (2021a). Reality labs. Retrieved September 9, 2022, from https://tech.fb.com/ar-vr/

Tech at Meta. (2021b). Inside Facebook Reality Labs: The next era of human-computer interaction. Retrieved September 9, 2022, from https://tech.fb.com/ar-vr/2021b

Tegmark, M. (2017). *Life 3.0*. Penguin.

Turner, C. (2022). Augmented reality, augmented epistemology, and the real-world Web. *Philosophy & Technology, 35*(19). https://doi.org/10.1007/s13347-022-00496-5

Vanian, J. (2023). *Meta lost $13.7 billion on Reality Labs in 2022 as Zuckerberg's metaverse bet gets pricier*. CNBC. Retrieved February 6, 2023, from https://www.cnbc.com/2023/02/01/meta-lost-13point7-billion-on-reality-labs-in-2022-after-metaverse-pivot.html

Viljoen, S. (2020). Data as property? *Phenomenal World*. Retrieved September 9, 2022, from https://phenomenalworld.org/analysis/data-as-property

Yates, J., & Murphy, C. N. (2019). *Engineering rules: Global standard setting since 1980*. John Hopkins University Press.

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. Profile.

Zuse, K. (1969). *Rechnender Raum*. Springer Vieweg.