Between Intensity and Scale: Finding our place in digital transformations

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In the last decade of the last millennium, Tim Berners-Lee instituted the World Wide Web Foundation (1989)[1], premised on a romantic idea of democratising digital connectivity and building a poised-to-fail utopia which imaged an egalitarian, equal world created by digital connections. Berners-Lee's manifesto for the WWW was almost a call for a reboot of all the inequities in the world, to create a network that presents all of us as nodes with equivalent access and capacity to share in the new information circuits. This idea that the Internet can be a universal network is an incredible leap-frogging of the conversations that were happening in the democratisation of technologies during that period. It was definitely a huge fast forwarding from the notoriously popular statement by Thomas Watson, the chair of IBM, who had announced in 1943, 'I think there's perhaps a world market for five computers'[2].

We have had almost three decades to witness both the affordances and the downfalls of the global digital interaction network that we call the Internet, and in this we have seen the radical transformation of both the technological architectures and protocols as well as the social and cultural uses of these technological advances that have put a digital device in every hand, more powerful than the computers that launched the first human beings into space[3]. The increase in processing power, the introduction of the graphical user interface, the evolution of human language programming, and the progression of interface driven interactions, have resulted into an unprecedented network that is still getting more complex with the arrival of Internet of Things and the expansion of telecommunication platforms.

However, through the technological changes and advances, there is one unquestioned impulse of the digital that has remained sacred: The promise of expanse. Deep inside Berners-Lee's vision was the idea that the Internet will connect us in an ever expanding grid of interlaced

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[1] Tim Berners-Lee's proposal for an information management system through digital networking is available at https://cds.cern.ch/record/369245/files/dd-89-001.pdf

[2] The infamous quote by Watson has often been questioned, particularly by Eric Weiss, the editor of the *Annals of the History of Computing* in ACS letters in 1985, but continues to persist in urban legends of Internet history. https://doi.org/10.1145%2F2465.314899

[3] Tibi Puiu (2021), does a fascinating write-up about how computer technology has increased in processing speed and storage capacities over the decades since the first use of computers in extra-terrestrial endeavours. https://www.zmescience.com/science/news-science/smartphone-power-compared-to-apollo-432/

networks that create a 'digital earth'[4] for us to occupy in the future. The almost neo-colonial impulse for expansion and conquering digital territories and re-discovering 'native lands' to transform into digital modernity has been at the heart of global digital infrastructure and Information and Communication Technology for Development (ICT4D)[5] portfolios around the world. The idea of the expanse – of connecting more people, mapping more places, visualising the ever expanding horizons, mining more data, creating more traffic – has been foundational and unchallenged in our imagination of digital futures.

Hence, it is quite common, almost naturalized that conversations about digital challenges and digital opportunities, are essentially presented in the language of bigness. Big data, large volume of traffic, increased number of interactions, expanded conditions of storage, and a world of perpetual databases, immediately come to mind. Bigness is also often presented as an antithesis to human perceptions, capacity, and ability[6]. The bigness of data, for example, makes it necessary to create opaque decision making practices that delegate the responsibilities of information processing to data sorting algorithms that pretend to be neutral but are very clearly political expressions coded into machines. The large traffic volume enables regulation around information overload, creating filters of 'useful' and 'spam'[7] information, or real and fake information, through filtering and traffic shaping, that discriminate and dismiss alternative and dissident voices. The expanded conditions of storage are presented as a form of historiography, where data narratives are centralised and shared beyond consent and information, to invisible data brokers and actors who create new profiles for exploitation and extraction. Database governance that depends on creating massive data banks of indiscriminate collections, enable new forms of surveillance and domination, that present the database as neutral but do not make the intentions of its usage transparent[8].

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[4] The idea of a 'digital earth', as both the new frontiers of emancipation and the new modes of colonising resources and communities of the planet, has been explored by art-technology fellows in the Digital Earth programme. https://www.digitalearth.art/

[5] Asha Achuthan (2009), presents a historical overview and antecedents for understanding ICT4D missions in India, and the ways in which they intersect with the making of the new digital subjects, in her monograph *Rewiring Bodies.* https://cis-india.org/raw/re-wiring-bodies.pdf

[6] There are many popular writings around big data that offer, 3, 5, and 7 V's of Big data, trying to capture all of its complexity and presenting it as a foundationally new mode of thinking. However, Rob Kitchin and Gavin McArdle (2016), in their analysis of comparative big data sets show that these characteristics are misleading and often irrelevant to the understanding of big data. "What makes Big Data, Big Data? Exploring the ontological characteristics of 26 datasets", Big Data & Society: 3: 1-10. doi:10.1177/2053951716631130

[7] Finn Brunton (2013) has one of the most fascinating re-telling of Internet histories in the material archeology of his book *SPAM: A Shadow History of the Internet*, Cambridge: MIT Press.

[8] Way back in 2000, Simson Garfinkel, in his landmark book *Database Nation* (O'Reilly Media), was already warning us about the dangers of database driven surveillance practices and the challenges of data governance even before Big Data was coined as a term.

Bigness is presented as a machine function that escapes and defies human conception. Bigness is question of scale, and both human memory and storage are presented as diminished when faced with the bigness of digital information that we now live with. Scale is the answer to the compromised or downgraded human presence and action in the digital networks that we live with and live in. However, as we drill down to various genealogies of scale, we realise that the definition of scale as well as its architecture, are not the de facto conditions of digitality. Contrarily the notions of scale and expanse are both rhetorical devices deployed in order to cancel critique and to favour specific principles of financial expansion and extraction over others. In this essay, I offer 3 interventions to resist the formulation of scalar expanse as natural, and also to identify other potential impulses in digital networks and technologies, to create alternative modes of measuring and engaging with the promise of expanse.

1. Scale Free Networks

It is sometimes difficult to remember that beneath the veneer of our glossy interfaces, contemporary computation is a logical closed-loop system that uses 'small worlds' and 'scale free' statistical modelling to build the giant network. Duncan Watts (1993), who first proposed the 'small worlds' theory, draws upon the work of the social psychologist Stanley Milgram (1960). Milgram had hypothesised that everybody on the planet, no matter how widely distributed, is connected through 'six degrees of separation'. Or very simply speaking, through just six social relationships, any two individuals on this planet can find a direct line to each other. We are all just six links away from becoming connected.

While Miligram's hypothesis was less conclusive than its authority in popular cultures, Watts' model of link analysis in computational network, gave new life to the project, while also unearthing a new theory of value creation that has become critical to the ideas of scale-based societies we live in. Watts' analysis of how we are linked together and how certain nodes accrue attention, power, and value, has less to do with the value of the node, and more to do with the amount of links they generate. His small-world theory suggests a model that has now been dubbed as the 'rich get richer' phenomenon in both systems theory and financial modelling.

In a small world, there are some nodes that become 'influencers'- they achieve breakthrough status where they continue to thrive because they are thriving. It might sound self-referential, but it in fact brings to our attention, the science of linking and the ways in which attention economies work. Perhaps the most ironic illustration of this 'influencer' theory of small worlds

is the iconic digital culture phenomenon called the 'Streissand Effect'[9]. The famous performer and cultural icon Barbara Streissand, reportedly bought a mansion in Malibu and she wanted it to be private. Some drone images of the mansion made their way into tabloid media online. Streissand, unhappy with this incursion on her privacy, filed a legal injunction to stop people from seeing pictures of her house. Her legal challenge made more people to write about her home, and more people got to know of this, so that the more she brought attention to her house, the more websites started linking to her house, creating a cascade of links that made her house the centre of attraction and attention, whether she liked it or not.

Across the worlds, there are perhaps larger mansions, owned by big celebrities, and none of them became the centre of attention as Streissand's Malibu estate. They exist in isolation and obscurity, with nobody knowing where they are or finding them as spots of interest. The Streissand Effect illustrates that there is a power in linking that creates these small worlds where only certain nodes in a network become influencers or hubs, and the more they become popular, the more popular they become[10]. This small world phenomenon, perhaps brings to the fore, an exciting paradox: While the amount of links and traffics around a small number of nodes in a computation network (like the Internet) might be very high, almost tending to infinity, the bigness of these nodes is not because of volume, but because of intensity. What creates value in digital networks is not expanse which is measured in terms of number of connections, but the intensity that catalyses a Streissand effect and create a small-world network of intense attention.

This is a critical insight into the workings of digital networks because it essentially argues that our Internet networks are 'scale free' networks. These networks cannot be mapped or measured through a progressive distribution of value or data around a median. In fact, the median scaled model, which presumes that the minimal and maximal attention nodes will be the outliers where as a large majority of the nodes will remain on an 'average' does not map the Internet at all. Instead, what we see is organic clusters of dynamic nodes, where each central node becomes the centre of its own small world, and retaining that centre as long as the intensity is sustained. And once the intensity curve dies, the hub gets reduced to becoming

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[9] The term was coined by Mike Masnick (2015), and has since become popular to describing the cascading effects of attention economies in contemporary digital cultures. https://www.techdirt.com/articles/20150107/13292829624/10-years-everyones-been-using-streisand-effectwithout-paying-now-im-going-to-start-issuing-takedowns.shtml

[10] While the Streissand Effect in the original case seems innocuous, it has extremely political and violent manifestations when it comes to questions of online gender based violence and populist persecutions. In my book *Really Fake* (2021), I look at the case study of Bettina Wulff and the ways in which algorithmic attention turned a conspiracy theory into a full-blown 'fake news' story around a popular public figure in Germany. https://meson.press/books/reallyfake/

a node again, committed to storage, no longer present in memory, and replaced by the next big thing.

The influencers, podcasters, digital celebrities, and vloggers know this. They might not have theorised it or analysed it in terms of scientific modelling, but they instinctively know that their followers and their centrality in their small-worlds is because of the intensity of their engagement. They more they engage with their secondary followers, the more links they create with their tertiary audiences. They retain their intensity by sharing value with their followers, and this intensity in turn brings other nodes to link back to them. They also know that intensity of events is a state of permanent decay, and hence there is a need to continually update the feed, and stage intense and dramatic encounters that keep on feeding that moment of intensity with their ever expanding connections with other nodes.

This might also help explain why influencer nodes in social media networks do not necessarily produce new or innovative material. A flip through your favourite instagrammer or tiktokker will immediately tell you that their information is 'same same, but different'[11]. They update their feeds not with a new template of information or aesthetic, but a formulaic repetition of information – where each image is like the other, each video, a repackaging of the same intensity – because the updating of the stream is not to create new content but to create new engagement. They update, as Wendy Chun points out, to remain the same.

Bigness, in small world, scale-free networks then, is not really about volume or size. It is, in fact about intensity of engagement and the capacity of intensity to generate attention, which can be translated into links, that create more connections, which in turn, perpetuate the engagement cycle to give the illusion of numbers but is essentially about a linked generation and sustenance of intensity.

2. Mining Affect

Another facet of big data has also been about collating, synthesising, processing, and dissemination of information in order to produce engagement, which in network terms, is the creation of traffic. There is no doubt that the digitalization of the world has led to the generation of massive digital data. The investment in infrastructure to 'store and organise all human information' has led to the production of information giants like Google on the one hand, and

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[11] With its origins in Thai tourist cultures, associated often with knock-off designer objects and Intellectual Property rights infringement, the phrase also gives a glimpse in the Shanzhai cultures in China and Jugaad practices in India, where the constant replacement of one thing that is exactly like the other but still different, is quite in vogue. In a monograph *Whose Change is it, Anyway?* (Shah, 2013) analysing theories of digital change practice, I have written more about these practices of irony, parody, and shanzhai, to understand the repetitive and memetic nature of the social web. https://cis-india.org/digital-natives/blog/whose-change-is-it-anyway.pdf

collaborative encyclopaedic sites like Wikipedia on the other. The task of digitizing the world is daunting enough, but the scale at which born digital objects are being created is almost paralysing. As estimates go, we produce daily, in all our micro narratives, more information than was ever created in 10,000 years of documented human history[12]. This does not even include all the machine data that is created of us, by different algorithms and databases that tag us with metadata, like books in a library, creating profiles that are both unforgetting and unforgiving.

The challenges of data mining, and then subsequent sorting and processing, are the holy grails of big data universes. It is a scale of information that is incomprehensible by human faculties of temporalities, and hence, is presented as machinic overruling of consent, interpretation, or ownership of the human beings involved in it. However, in recent years, as we continue to spiral down the rabbit hole of fake news and information fragility, we start experiencing something else. The processing and sorting of data might be an infrastructure project but the intention and the end-point of data mining seems to be affective.

In a notorious exposure, it was brought to our attention that Facebook, which was then the largest social media platform in the world, in 2012, had started conducting A-B testing experiments on its subjects without their consent[13]. In this testing, which is the basis to train algorithms on data sets, Facebook's algorithms randomly selected trial subjects and sorted them into 3 groups. One group's timeline was curated by an overwhelming set of positive messages from their friends' posts, whereas the other group was exposed to an overwhelmingly negative set of posts, and a control group was presented with a random mix.

This training experiment was met with a lot of backlash as it violated the users' perception of the neutrality of their timeline but it also exposed something else: Facebook, in its development of algorithmic sorting of information, was not looking for scale or numbers. It was looking for affect.

Affect is the pre-thought response that comes from habit and instinct when faced with stimuli in a known environment. An affective response is triggered response. It does not invite rationalisation or thinking. It is instantaneous, and it follows the social media engagement

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[12] Eric Schmidt, the ex CEO of Google, in his analysis of volume of digital information first proposed in 2010, that every 2 days, we create as much information as we did up to 2003. The amount has more than doubled since he first made that proposition. As cited here:
https://blog.seagate.com/intelligent/the-world-of-data-as-weknow-it-keepsgrowing/#:~:text=We've%20all%20heard%20the,and%20the%20pace%20is%20increasing.%E2%80%9D

[13] Michelle N. Meyer (2014) does a comprehensive deep dive into these experiments and shows the potential ramifications of this 'emotion experiment'https://www.wired.com/2014/06/everything-you-need-to-knowabout-facebooks-manipulative-experiment/

where small attention time means that most people comprehend information not for itself but because of the way it is packaged. If it comes from somebody I consider a friend, if it is in a medium that I am familiar with, if it has news that corroborates my world-view, and it moves me emotionally (happy, sad, angry), then I will engage with that information. The threshold for information engagement to generate traffic, is not popularity or volume, but affect[14].

Since the first Facebook experiments were revealed, we have seen the rise of a variety of affective organisations of community, where users have been mobilised into uncharacteristic actions by manipulating how they receive information and how they engage with it. The misinformation cycles that led to Brexit, the Whatsapp lynch mobs in India, the anti vaccination riots in the USA, are all examples of regular, normal people mobilised by affective information into action that preceded thought or rational processing. We have seen an increase in affective mapping and tracking even in financial mapping of user profiles, where the large amount of data around user behaviour and habits is exploited by advertisers to nudge people into action (buying) at specific times or periods in life, thus shaping their behaviour through insidious messaging.

It is important to realise that while the bigness of big data is indeed undeniable, the end point of that big data is actually affective computing[15]. The largest experiments in big data deployment are to map affective and emotional patterns that can train algorithms to trigger the user into specific behaviours and engagement, thus manipulating them based on information about them that they themselves might not be familiar with. This entire industry of affective programming is also the reason why social media platforms continue to circulate hate, refuse to remove material that is non-consensual and harms women and non-confirming bodies, and adopt a guise of neutrality while promoting information that is no longer grounded in proof but is tailored straight for affective engagement which translates into links, clicks, and profits[16].

Recognising that affective mining is one of the goal posts of big data, but never included in either its definition of deployment is valuable for us to recognise that the intensity that we are looking for, in big data universes and digital networks, is in the realm of the affective, emotional,

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[14] In a critical introduction to the work of performance and multi-media artist Valia Fetisov who explores China's social credit systems and the ways by which intensive governance manifests itself, I make a distinction between extensive and intensive systems of measurement of trust and expand upon this idea https://medium.com/digital-earth/the-measure-of-trust-from-analogue-extensivity-to-digital-intensity- 4dbf5d74efc5

[15] Rosalind Picard's book *Affective Computing* (1997: MIT Press) was the first instance where the coin was termed and was extending the Alan Turing proposal that not only would we come to trust our machines but will also be emotionally and affectively invested in them.

[16] Cathy O'Neil's (2016) significant explanation of how the model of links and networks create the engagement traffic, in her book *Weapons of Math Destruction* (Crown Books), is one of the most exhaustive entry points into this conversation.

sensory, and experiential. It is, in fact, the domain of arts and culture, which is performatively dismissed as antithetical or misaligned to the big data futures, but is the endpoint of big data networks.

3. Doing things with stories

Perhaps the biggest paradigm shift forced by the naturalisation of these big data futures is the dismantling of stories as a way of making meaning. Under the guise of data correlations and pattern recognition performed by querying algorithms, the idea of the story – a human scale function – has often been discarded as either too unstable or too small to be of importance. Data, it would seem, does not follow the human need for linearity, causality, and comprehension. Data is often presented as a discrete abstraction, extracted from the messy realities that it corresponds to, and containing small kernels of indisputable truths. Data integrity is measured by its replicability – veracity is in duplication without loss of information or signal. Stories, by their very nature, change, and are mutable. They are evolving and adapting, and as they pass through different voices and places, they get contaminated by extraneous information that is no longer verifiable, and leads to the biggest war-cry of our times – fake news[17].

However, to think of data as the antithesis of stories – the machinic interpretation of the world that can no longer safely be left in the hands of human collectives – is a misnomer. The very creation of digital data is an act of intention and interpretation. Data is not just a random extraction of information but is in fact documentation and testimony to a specific narrative that is being monitored, tracked, and consolidated, in the making of data. Take the infamous Google Arts and Culture lab's 'art doppleganger' project. In 2018, Google launched its 'Is your portrait in a museum?' campaign, that invited its millions of users to take a selfie, which was matched with a data set of art images by a machine learning algorithm. It didn't take long for social media users to point out that the app was clearly biased towards Caucasian faces.

The question was posed, why, Google's algorithms were able to bring iconic and humane expressions from the annals of art archives for Caucasian users but was suggesting largely colonised, caricatured, and objectified images for users of other ethnic origin. The algorithm, some suggested, was being racist[18].

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[17] In our recent book *Really Fake* (Meson Press), Alexandra Juhasz, Ganele Langlois, and I (2021) argue that we need to find a way to distinguish fake from untruths. Fakery has a long tradition in fiction, in evolving information sets, and different modalities of meaning making which might not be proved as a fact but we know them to be the truth. https://meson.press/books/reallyfake/

[18] Michael Nunez does a great job of explaining what exactly the problem is with the app's racist outputs and how it is the dataset and its limitations and biases that make algorithms process 'racist' results. https://mashable.com/article/google-arts-culture-app-race-problem-racist

That is a fanciful and a misguided attribution. The algorithm was merely doing the best probability mapping that it could do, given the corpus of data that it was trained on. The algorithm wasn't the one telling stories of racial inequity, it was laying bear the fact that the data that was considered artistic was skewed in the favour of the white portraiture arts, thus resulting in this strange phenomenon. The gold standard in machine learning has always been, that your algorithm is only as good as the data set that it is trained on. Train the algorithm to identify only specific kinds of patterns, and it will amplify the biases in that data set. Train the algorithm on white museums which continue to favour some faces as humans and some as incidental objects of curiosity, and you get a global app that continues to represent only some selfies as worthy of humanity.

It is important to realise that data is not, then, just a neutral abstraction, but an intentional extraction. It is a testimony frozen in time, and while it might not tell stories, it definitely is a part of story-telling that is being hidden under the matrices of informatics that digital computation technologies have come to inherit.

Even more telling is the fact that data is interpretive in nature. While engineers and policy makers might want to buy into the fantasy of immutable data, it is a known secret that data decays, degenerates, and devolves in purely physical sense. For example, almost all the initial digital data of the world, stored on hard-drives and floppy discs which can no longer be read, has already been assigned to digital death. Material and physical obsolescence of technology and the rapid leap-frogging of digital formats has resulted into unfathomable loss of information written in machine languages nobody can read, and stored on devices which are now treated as e-waste. As Linda Hilfling (2020)[19] points out in her fantastic work on the material history of the programming language Cobol – which is now considered to be a dead language – more than 80% of the world's internet architecture is still running in Cobol and nobody knows how to touch or change it any more, so we just continue to let it run. We hear similar stories of large archaic computer data centres, written in almost forgotten languages, continuing to communicate with satellites and extra-terrestrial automated vehicles which left earth a few decades ago, and have never been updated to be able to talk to most contemporary devices.

Data dies. And in its dying, it tells many stories and is open for multiple interpretations. Especially when data is narrativized, deployed, or weaponised to make policies, implement rules, enact laws, and establish forms of surveillance and profiling, it is essential to realise that

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[19] In her PhD thesis, Hilfling introduces the term of 'crisis computing' that shows the ways by which computation practices themselves are in a state of crisis, because the promise of indefinite storage and infinite memory are continually being undermined by the obsolescence and forgetting of older formats and forms of information storage. http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1455515&dswid=7278

data is an interpretive act. It is an act of expression and clearly encodes opinions, ideas, and biases that are implicit and tacit in the engineering intentions. Data is not antithetical to story telling. The presentation of data as anti-stories, is in fact an attempt to replace the human authority and sovereignty at making meaning and creating narratives by machinic actors that follow scripted coda of intention and control. It is important to emphasise that datafication is a process of story-telling and the best counter to the black-box of datafication is story-telling.

Story-telling becomes an important tool to not only counter the narratives framed by data, but also to question the framings that are naturalised by the volume and velocity of data[20]. Stories are a way of creating conditions of change and practices of transformation which are no longer just responding to the worlds created by these database realities. They become a way of crafting and capturing our own narratives, within which data is implicated but does not have the unquestioned authority to establish its story as the dominant status quo. We need to not just tell stories, but do things with them, and reclaim the space to offer our own stories, with different kinds of measures and evidences, affects and ideas, which do not have to treat datasets as the de facto addressee, and thus create new narrative futures that can rely on but do not centre around the intentions and interpretations of big data.

An apology for intensity

It has been my attempt, through this essay, to champion for a framework that understands digital engagement through the lens of intensity. Across the different genealogies of computing, I have shown how intensity, affect, and story-telling are essential parts of digital expansion and in fact the key areas that are exploited and deployed by technology actors who keep on insisting data and scale as the de facto measures of digital life. I present this 'apology' for intensity, because it is important for arts and culture organisations to realise that while the digital forms of measuring and generating intensity might use new tools and formats for mapping it, the very processes of human interaction and engagement are not necessarily new.

In fact, it becomes evident, when thinking through the rhetoric of scale, that the holy grail of scale is still intensity, and intensity needs to be the focus of our digital attention. This is not to say that there can be no measures and that intensity can no longer be measured. Instead, I propose that we concentrate on developing a language, syntax, grammar, and measures by

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[20] In the global residency 'Doing Things with Stories", along with my collaborators at Radboud University and Oxfam, we have been arguing that stories are a way of not just countering information but also imagining futures. We call for a narrative change practice that leads to collective action and the centrality of story-telling in this space to support civil society activists working on particular social change concerns. https://www.artez.nl/en/research/projects/doing-things-with-stories

which we can make sense of and shape intensities within our practice. Over the last few years, I have developed touchstones to measure these intensities, and to map them across multiple domains. I offer these touchstones as a way of thinking through our measure and investment in digital intensities.

I propose that we think through digital intensity as...

Social – Digital intensity is distributed across various social networks, actors, and transactions. We need to be able to map out the sociality and the context within which intensity exists and where it can be harnessed.

Technological – Intensity is not just an organic experience but also engineered and manipulated by technological contexts – think of misinformation or emotional manipulation that happens through UIX engineering and information shaping online.

Embodied – We need to bring the question of the body back into conversations around digital scale and intensity. The transformation of the embodied self, and its emotional expressions, are powerful tools which can be documented and curated to form new conditions of collective action.

Affective – The bread and butter of digital technologies is affective action. The pre-thought, almost instinctive, wired behaviour that is shaped and can be nudged through different provocations and triggers is critical to think through.

Material – Intensity is not just an abstract emotion. It is material, both in its capacity to generate new actions and collectives, as well as the resources that are required to sustain it.

Laborious – The work of digital is necessarily laborious. It is important, when thinking through intensity, where the hidden labour is, who performs it, and how can we support them to continue doing that work so that the intensity that holds a community together can be sustained.

Political – Digital technologies often present themselves as neutral, and it is necessary to emphasise that they are expressions of political intent and biases. Treating the measures of scale and expansion as political agendas, and finding new distributed located and situated forms of expression can offer us a new way of thinking through this spectrum.

These touchstones help in unpacking the landscape of digital intensities and shift our focus from digital technologies of scale and data to digital engagements of intensity and stories. And in doing so, we move from putting the technologies as things that the human has to measure up to and instead think of technologies as ways of measuring new ways of being human.