

A practitioner's objects: reflections on a slow data practice

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Abstract

A creative practice that entangles the digital medium with consumer-oriented data and experience will invariably engage with notions of efficiency and the consequent brevity of digital data presentation. This is particularly the case when said digital data is consumed through the all-too-familiar digital screen. The vernacular of digitally augmented design processes emphasises this quality – a heavy lean towards succinct, contextually aware, ubiquitous experience and the promise of the everywhere, made even more possible by mobile and touchscreen-bound computing devices. As a counterpoint to this focus on interaction brevity, the notion of slow data encourages a rethinking of this strategy, suggesting the introduction of temporal-centric intents and layers of expressing data. This intervention speaks to a technologically backgrounded motif of the *everywhen*, and encourages creative practitioners to engage, through various outcomes, strategies and frameworks, the significance of slow data thinking in the human-computer interfaces that we create. This is supported by a reflective account and discussion of three works that have contributed towards an understanding of slow data practice.

Keywords

Temporal dynamics, Temporal aesthetics, Slow data, Interaction brevity, Human-computer interaction, Tangible embodied interaction

Interaction brevity - the precursor to slow data

This paper engages with the temporality of digital data by considering how slowness exists as an entanglement of data, materiality, and human interaction as part of a creative practice.

When we encounter digital data, most people expect speed (or the lack thereof in situations when we experience outages). However, *data itself has no speed*. Rather, the immediacy of how we interpret this message reflects the expectations of digital content consumption that has been nurtured through an ever-compacting evolution of technological form factors. The premise of slow data is not to generate discourse on this technological, observable

bandwidth of electronic transmissions, but to draw attention to how we interact with digital information. Interaction brevity hints at the relatively low perceived 'cost' of digital interface operations that compel one to participate in or repeat further interactions. [1] The influence and "technological veneer" of the human-computer interface, intentional or otherwise, shapes how we live, work and play. [2] The user interface (UI) design of digital screen interfaces is ostensibly bereft of any consideration towards a holistic theme, since purpose has been 'baked in' as far as the definition of the digital application is concerned, and the homogenisation of UI best practices have paved a relatively narrow path of innovation within this space. Mobile interfaces, which evolved from first and second-wave notions of HCI, exert a residual influence from its desk-bound computing roots. [3] This has roots not in design practice, but in computer science, and scientific management (or Taylorism, named after its founder Frederick Winslow Taylor). [4] A resurgence of this interest, espoused through discussions such as Digital Taylorism, continues to apply the similar rationalisation and standardisation processes of scientific management that contribute to interaction brevity. [5]

Essentially, these are fast interactions embodied through the details of UI design and information architecture. A quick review of 'best practices' in mobile device-centric design supports this specific design hegemony: maximising efficiency, micro-task and goal orientation, and minimal interaction gestures (taps, swipes) to reach the desired content. In addition, given the physically compact nature of mobile computing, we are in turn limited by our cognitive loads through its naturally distracting physiological parameters. [6] Being in motion, our constant periphery senses, always in connection to our surroundings and activities, lend a "technology-induced continuous partial attention" in both the physical and digital worlds. [7] This has contributed to the perfect storm for interaction brevity – a model for practicality.

There have been a range of responses to the perceived ills of modern mobile computing. There is the relatable lament of an ever-isolating, addictive digital environment. [8] This is fuelled by the pursuit of relatively shallow interaction

transactions. [9] Within the specification of mobile computing devices, such interactions are often subtly designed to mitigate cognitive load. As an example, UI interaction design patterns leverage the subtle cues of colour, different intensities and locations of notifications to enable faster processing, another nod towards the normative practice of interaction brevity. [10] This is not to suggest that interaction brevity is flawed. While the intended purpose of mobile computing has a compatible congruence with the pace of interactions we design for it, the concern of its ubiquity and demand for near-perpetual attention leaves plenty of room to explore alternative interfaces for experiencing digital information. To again emphasise this point, digital data has no speed until we experience it through the interface, and it is through the epistemology of data's perceived speed that we can evaluate hegemonic practices in interaction brevity.

Where is the slow?

Henri Bergson's notion of *la durée*, duration, frames a perception of time not as concrete, measurable units, but a heterogeneous multiplicity informed by our feelings and memories. [11] Through this lens of duration, technologically oriented discussions around the aspects of the slow have seen re-visitations over the past two decades. Lars Hallnäs and Johan Redström's earlier discussions on slow technology spoke to the evolution of technology as enduring beyond work environments. [12] William Odom's expansion of the Slow Technology design agenda has demonstrated its salience across multiple issues in design practice. [13] Further on, Mazé and Redström's notion of the computational object drew specific attention towards materiality as a contribution of the aforementioned aesthetic experience with digitally augmented artefacts. [14] Slow data draws attention towards the crafting of data-connected interfaces to engage with these articulations. To better understand *where* slow data is, we can unpack it into two frames pertinent to our discussion: in practice, and in experience.

Practice of slow data

Data visualisation offers a useful parallel to this phenomenon of interaction brevity, slow data and the latter's 'locations'. Print-based information graphics, or infographics, an early example of data visualisation, was a communication design challenge to transform static, complex data into an easily understood narrative. The task of distilling and translating data into the visual cues of an infographic is the domain of the communication designer. An understanding of the editorial statement drives the communication designer's agenda to pre-process and filter data to a level suitable for the audience. This is a nuanced process that counts on the experience and skill of the creative practitioner. Even though both 'fast' and 'slow'

engagements contribute to the act of producing visualisations, it is the crafting of the consolidated visual outcome where a focussed practice of slow data may be explored during execution. [15] Further accounts of this slow data practice are unpacked through the three projects shared in the discussion below.

Phenomenon of slow data

Following on the above example using print-based infographics, the reader is typically not privy to the process of curation, interpretation and coupling with the context of the accompanying written article. That said, the significance of the reader needing to unpack the infographic's curated, simplified view of the data was nonetheless a cue summation of multimodal content. [16] This is a cognitive effort that enhances the reader's learning experience through a more compellingly assembled body of information. This assemblage is where slow data is experienced, as a phenomenon of Hall's encoding/decoding model. [17] It is one that emerges from the designer's imprint and arrives at the receiver's interpretation, shaped by the receiver's own reading and semantic translation of the visualisation. The aesthetic experience, as described by Hans Ulrich Gumbrecht, represents the moment of connection of the semiotical language borrowed that amplifies a reflective moment. [18]

Returning to our context of digital data, there should be new challenges in producing aesthetic experiences beyond the mobile computer's interface. This is related to disrupting the hegemony of interaction brevity in existing practice, but more helpfully, it is to discover opportunities that engage with the fluidity of digital data when interacted with in the 'real', physical world: a rich matrix of static, live-streamed, hyperlinked/expandable, multimedia content, against the backdrop of multi-sensorial input and feedback. This is not to suggest that slow data practice will always lead to an artistic artefact, but instead, it can pave the way for slow data interventions to rethink interaction brevity in this mobile computing era. Gumbrecht's call for a "re-enchantment" through the embedding and discovery of narratives reflects our desire to encounter compelling, sometimes surprising moments of reflection and insight. In this case, it is about engaging past the limitations of an 'art gallery artefact', coffee table curiosity, and crucially, beyond a manifestation of academic postulation.

The following three artefacts contributed to the accumulation of the above slow data reflections, experienced through the entire journey of making them – from discovery, crafting and lived experiences accrued. They represent the creative, critical design methodologies that dovetailed with the theme to present slow data practice as an intervention across artistic and design fields. [19]

Thing-onna-Stick



Figure 1. A Thing-onna-Stick, sitting in a home environment by the hallway. © 2015 Author.

The Thing-onna-Stick (Figure 1) is an indoor luminaire that emits dynamically animated washes of coloured light that respond to a positivity/negativity sentiment analysis algorithm, tasked with perpetually processing Twitter Tweets (currently known as posts on X) in the locality. Named to reflect my intention in this speculative design work so as not to grant it any predefined usage contextualisation, the Thing-onna-Stick was a demonstration of how personal and/or relevant digital data might be distilled and manifested as textured light and made to ‘live’ and endure over time. [20] Sustainable timber used in the body provided a less technological presentation as a departure from consumer electronics (Figure 2). It sought ‘completion’ through further consideration of the luminaire’s spatial location, the digital data stream(s) to analyse, and the preference of colour mappings to suit the owner’s curation of the luminaire’s location and data feed. A distance sensor, incidentally (and perhaps with a sense of irony) found in smartphones to detect ear-to-phone placement, was integrated into the custom hardware to detect objects and people approaching the Thing-onna-Stick, triggering a visually rewarding response in the form of a brightness and saturation ‘bloom’. The addition of this gesture of simple presence posits two key points – of presence and performative exertion serving as a component of slow data, and how relatively unfamiliar interactions contribute to slow data’s elusive, ephemeral existence.

While it started as a speculative thought experiment meant to understand the technology matrix requirements and to discover and evaluate critical making processes, the notion of a long-term lived experience with a perpetual, slow data expression device took root in this project. [21] The artefact has ‘lived’, since 2015, as a signifier of localised digital sentiment, insofar as the reach of the algorithm is concerned. The data backend has since gone through multiple upgrades and is also utilised to drive other similar data expressions through various sensory modalities.

[1] The significance of designing a fluid technological framework laid the foundation of discovering what slow data is, and where it could exist.

As with any digitally augmented project, the flexibility of the Thing-onna-Stick’s digital text processing engine allowed it to be capable of expressing any data stream, or a federated collection of streams, thereby increasing its ability to analyse more data sources simultaneously. Besides this ‘live’ nature of working with real-time data streams, it can also express a fixed body of text: a looping playback of precious correspondences, a favourite book, using varying sections of text set by the owner. In that regard, it was a looping time machine that could ostensibly allow for a tolerable repetition of textual content. This configurability was an example of Umberto Eco’s Open Work and brought in the agency of the person who will spend, hopefully, extended periods cohabitating with their Thing-onna-Stick. [22]



Figure 2. A section of LEDs inlaid on a Thing-onna-Stick. © 2015 Author.

Beyond the technical work done to refine the visual aesthetics of wave-like light patterns, the significance of the dynamic data analysis engine led to what is to become a key enabler and model for slow data practitioners. This is to provide a sufficiently ‘open’ portal for active experimentation and to define the parameters of a slow data model for dynamic adjustment and reconfigurability. Consequently, the practitioner’s scaffolding of data configurability came to be just as viable as a research and discovery tool as it is to expose this self-curation of translated data behaviour for the owners of slow data artefacts.

A version of the Thing-onna-Stick, configured to my preferences, provided a wide spectrum of moments: coming home to it downcast in deep cool hues lends curiosity or the occasional companionship; major past events in Melbourne, Australia in the past years saw the colours transform in recognition of these moments. While the data streams (Twitter, now X, and local newspaper RSS feeds) it was connected to demonstrate its limited accuracy at the time, it nonetheless precipitated the same reflective triggers when compared to sharing responses with a person in this setting.

It offered just as valuable as the points of conversation we have with others on current affairs. For the curious, it also brought on discussions of what and why these data sources are translated into the tangible domain of light energy.

The Wind at Byaduk



Figure 3. The Wind at Byaduk artefacts. © 2018 Author.

Taking on elements of sensory ethnography, the Wind at Byaduk were artefacts (Figure 3) crafted as a result of a creative residency spent in the town of Byaduk, in the Western District of Victoria, Australia. [23; 24]. The assemblage of found objects (discarded glass bottles), electronic componentry and wood evoke a hand-crafted aesthetic that conveys the magnitude of wind, noise and UV light levels captured and transmitted wirelessly through a bespoke weather station installed at the Old Church of Byaduk.

These artefacts were made after a series of stays and interviews with the proprietor of the Byaduk Old Church. The artefacts are an amalgamation of old and new materials to produce the semiotically rich representation of Wind and other related weather effects of the town.

Miniature electric fans sit atop the necks of discarded glass bottles picked up from the town. Mounted on vertically articulating brass stems, the fans alter their rotation speed and vertical reciprocation depending on a fusion of wind, noise and UV sensor levels as received from the weather station (not pictured). Via a Wi-Fi network, weather information is first processed on a server before instructions on fan speeds and stem articulation intervals are transmitted to each Wind artefact. A stepper motor and driver, selected for quiet operation, were paired to the rest of the electronics concealed within the plywood base. Other than the fans, the power connector becomes the only other obvious hint to its electronic core (Figure 4).

An example of affective telepresence, while these Wind artefacts could transmit empirical weather information, the

work intentionally leveraged the same technologies used in a digital weather station panel to convey an endearing connection to place. [24]



Figure 4. Various technological components augmented the found glass bottles, from top to bottom: electric fans on the reciprocating stems; 3D printed fan housing and stepper motor holders; the use of wood to complement the glass bottle and brass stem, and the appliance-like power connector to convey ease of use. © 2018 Author.

As Ken Goldberg's definition of telepresence discusses, the aesthetic implications of telerobotics forms a pathway towards us making connections to the affective qualities of digital data. [25] By encapsulating the phenomena of wind, noise, and UV Index as the gentle howls of air movement generated over these discarded bottles, a semiotically-rich connection is built, awaiting encounter, and allowing the poetics of this representation to be enjoyed.

The Wind at Byaduk artefacts helped form another key point as to what slow data could mean and could do: to discover mappings that use incumbent technological infrastructure to communicate additional layers of authenticity, sincerity, and affect. They also presented a challenge in how such semiotical mappings could be re-told succinctly, bringing in the significance of 'fast' data

interfaces to afford these explanations. For example, if the artefacts are ‘scannable’ via QR code, RFID tags or AR marker, additional layers of information could then be revealed on demand. This sets up a future conversation around the intertwined relationship between interaction brevity and slow data.

Pixel Locket



Figure 5. The Pixel Locket, seen here held above its wireless charging base. © 2022 Author.

The Pixel Locket (Figure 5) is an electronic pendant co-created with Emma Luke, a jewellery designer and design researcher, conceptualised and prototyped during the peak of the COVID-19 pandemic. This period presented salient reflections on the digital disconnect, isolation and humanity’s yearning for meaning and support in these times.



Figure 6. An illustration demonstrating the simple image processing used to map image pixels into sequential light output, shown here as an electronic breadboard prototype. © 2022 Author.

The Pixel Locket is a wearable device that unpacks digital imagery – in this case, Instagram image posts – and plays back each constituent colour of the image through a coloured LED emanating from the device (Figure 6). Paired or grouped lockets connect to the same Instagram account, allowing collaboration from multiple owners to upload new images. It takes 24 hours for each image to play through, a literally slow experience. Other than checking one’s actual Instagram account, the wearer is left to wonder about the sequence of colours that diffuse into the locket’s ‘shard’ – a stylised module cast in sterling silver from which an LED is set in the bottom and connected to the main electronics body via electrical contact ‘pogo pins’. A wireless charging base allowed the wearable to be ‘docked’ and therefore ‘replenish’ its battery charge and download new daily image data to ‘animate’. The mnemonics of hand-oriented interactions set the tone of the initial discovery stages of the project: tumbling, rolling, an absent-minded fussing over a worry stone. This led to the sensation of the clasped hand and hand temperature waking and triggering the saturated glow effect of the coloured light via capacitive and body temperature sensors, allowing the moments of attention and backgrounded activity to be chosen by the wearer.

There was a significance in borrowing the nomenclature used in jewellery-making to guide our conceptual development: we talked about setting precious jewels (in our case LED and sensors taking the place of gemstones), bespoke crafting (the integration of custom circuitry and shared Instagram feed with code written specifically for the project), discussed lost-wax casting methods out of 3D printed ‘shards’, and considered how this intersection of ‘precious’ electronic wearables might convey enduring qualities – a *data heirloom*, a play on the intangible embedding of our lived experience through a digitally-augmented physical form. This helped us highlight, during practice, the significance of materiality, craft and interactivity through the largely technological discovery and experimentation phase.



Figure 7. The Pixel Locket’s prototyping journey, documenting the various experiments and approaches in the form and lighting integration.
© 2022 Author.

The COVID-19 pandemic limited our interactions as collaborators on the project. Yet, this disjoint helped clarify the many different layers and intensities of digital experience between the ‘Weiserian’ notions of the periphery (our Pixel Locket concept) and the focal/instantaneous (the digital collaboration tools used to support our process). [26] Despite the Pixel Locket ultimately presenting a literally slow interface with an extremely low-resolution but meaningful exchange of digital imagery, the interaction design spoke to the crafting of techno-cultural rituals that drew on the haste of digital platforms: the uploading of Instagram images, charging, synchronising, anticipating, clasping and guessing of colour sequence were gestures not dissimilar to the technological frameworks used to design interaction brevity. [1] This emphasised the positioning of slow data practice not necessarily as a rejection of interaction brevity, but as an assessment and experimentation of more embodied interactions to diffuse layers of information through the tangible environment.

Slow data as a thematic approach

In summary, Thing-onna-Stick, the Wind at Byaduk and Pixel Locket were a practitioner’s objects that helped reveal a slow data practice. Through their different modes of intentional and backgrounded interaction, they explored our reaction and appreciation of bespoke digital-tangible

translations as formative to the experience of slow data. The significance of the owner’s agency, the foregrounding of lived experience and tangible interactions drove the design of these semiotically-rich mappings. They invited the slow to surface from the otherwise unobservable velocity of data.

In addition, the Pixel Locket explores slow data as a collaborative endeavour, working with a digital data format (imagery) that can be viscerally intertwined and collaborated on through the notion of preciousness. Out of the three projects, it also offered the most literal manifestation of slow data, in the way it took time for an image’s colours to unfold on the pendant. Slow data practice is not necessarily about literally slowed expressions. All three examples rely on a digital ‘substrate’, connote a desire for authenticity, and present subtle nuances as to the presence (and therefore reflection) of a slow data practice. The care towards form and materiality, and the time needed to attend to their development, presented an appreciable extension of time in which to find semiotic mappings (Figure 7), something which might be easily overlooked in a digitally centric endeavour.

What slow data attempts to engage with is not so much of a polar opposition against interaction brevity, but to leverage the same technologies used in digital data transmission to produce layered interpretations of data-centric design. Early manifestations of this might be firmly

rooted in tangible, electronically mediated works, but it is not to say that interactionally brief interface design cannot adopt this approach to feather out different rates of engagement. This might offer a future ‘reconciliation’ of interaction brevity and slow data.

The projects have suggested that slow data complements, and never replaces, the significance of interaction brevity, the adversarial position being an easy misunderstanding. These projects are not portals for large data sets, or if it were the case, they have utilised some form of temporal treatment to express the narrative over time, which was seen to be an effective technique in bringing out reflection.

It is also important to note that while these artefacts all incorporate an aesthetic form of temporal modification in how the data is expressed, this gesture is not merely a superficial layering of a set of design and interaction gestalt rules that engage with temporality. [27; 28] Instead, they build on a heuristic of semiotics that is discovered, nurtured and encouraged to grow – both from the perspective of the practitioner and of the interactant(s).

On the side of creative practice, slow data introduces a way for practitioners to take on meaning making using the same tools and frameworks that have made interaction brevity successful. Through this lens of slow data, we can encourage a culture of reflection and discovery to further our exploration of digital data narratives.

As a phenomenon, slow data is a mechanism to highlight our conditioning towards interaction brevity and to encounter a wider diversity of data interfaces that work alongside the mobile computer. May we continue to co-exist with our mobile computer doom-scrolling, and at the same time, seek nuanced, meaningful experiences with our digital data in the *everywhen*.

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Chuan Khoo is an interdisciplinary digital media artist, interaction designer and educator. His research interest revolves around the notion of slow data – the creation of alternative interfaces that engender critical reflection around our usage of digital data. Chuan explores the consequences of computing and interrogates the twin edges of technology – its optimism, the darker side of its velocity, and the ethereal nature of our digital entanglements.