Title

સ્વ- (Pronunciation: /svá/ | Translation: Self-)

Author

Nishra Ranpura

Introduction

"Augmentation is what the gradual knowledge of the mystical unknown does to the process of discovery."
(inspired by the story of Akata Witch by Nnedi Okorafor while thinking about the notion of Augmentation)

<u>What does'સ્વ- / *Self-'* mean?</u>
સ્વ is a word taken from Gujarati language (from Western India) meaning *Self*, pronounced as /svá/. The hyphen (-) following સ્વ is indicative of it being a prefix, and there is more to follow. What more? That is what the research is about.

The research behind 'સ્વ- / *Self-'* is about discoveries about the *Self*, how the *Self* is seen, represented, and understood. The concept of *Self* or *Identity* is a debated one. The ontology of *'Self'* for the sake of this research is kept quite open-ended. *Self,* here, can be broadly understood as an individual, a community, a social or cultural circle, an agency, a country, a species, the planet, or anything else that the *Self* identifies with. And 'સ્વ- / *Self-'* is about understanding and being aware of the *Self* and the *Self's* actions. In today's time when we have little power over how the *Self* comes to exist, whether it is the *Self's* personality based on historical and cultural influence, a reflection and interpretation of the *Self* from 'other' perspective, or representation of the *Self* as a small data point in a large dataset. As Foucault said, *"The individual is not the vis-a-vis of power; it is, I believe, one of its prime effects."* (Foucault 1994). Thus, one of the integral questions addressed through this research is, "How can the *Self* have power and agency over their own Narration?"

The question is primarily addressed through scholarly research, experiments and prototypes that explore the dialogue about representation of the *Self* through data visualization; and consequently challenges the naturalised practices of representation in data visualisation, such as illegibility and lack of understanding of data translation, opaque processes, absence of pluralism, ocularcentric objectivity, and most importantly, lack of inclusion and power of the narrator.

The research also briefly touches upon the responsibilities of the narrator, while having agency for their own narration. What more can the *Self* discover while taking part in the process of their own narration and representation? What are the consequences of the *Self's* actions through these discoveries?

[A novel vision](#) is realised while trying to address aforementioned themes and questions.

Context

'સ્વ- / *Self-'* attempts to touch upon and address the following key themes.

Representation of the Self

The past couple of decades witnessed the idea of the *Self* emerge to the forefront of academic discussions in the Social Sciences and Humanities (Callero 2003). Moreover, sociological forces outside of academia, such as global incidents dealing with racial inequality (for instance, Black Lives Matter Movement), intersectionality, feminism, gender identity, and more, in the past few years alone, spurred the eruption of this need to understand the *Self*. To quote Callero, "*as the globalization processes of late capitalism continue to destabilize traditional practices and cultural assumptions, the self is exposed in various ways. We see, for example, an increasing individualization of social life (Beck & Beck-Gernsheim 2002), a proliferation of roles (Frank & Meyer 2002), and the emergence of "identity projects" (Giddens 1991), where personal meaning and social location become a matter of effort and conscious 'choice'*". The widespread interest in the notion of the *Self* has given birth to multidisciplinary practices and researches (Callero 2003).

The onset of the fourth industrial revolution is *"a fusion of technologies that is blurring the lines between digital, physical, and biological spheres"* (Schwab 2016). The emergence of these technologies i.e. artificial intelligence, 3-D printing, internet of things, machine intelligence, data science, quantum computing, robotics, etcetera, looks at *Identity* and *Self* in a novel, other-than-*Self* lens. The ability to visualise brain activity through an EEG scanner, for instance, unlocks the black box of the mind in an unprecedented way and uncovers new facets of identity. Artificial Intelligence and Machine Learning attempts to represent *Selves* in ways that uncover the *Self* more than the *Self* ever has, but might leave behind the integral aspects of identity. And, Data Science, on one hand, is used to uncover the hidden patterns of masses, improve health care, expose injustice, and build or topple governments; whereas, on the other hand, it remains far from transparent, is biased, and is also used to surveil and discriminate (D'Ignazio and Klein 2020). Today, one or the other technology plays one of the most significant roles in defining the *Self*. We and others see ourselves as our digital presence. Our likes, posts, attention to content, targeted advertisements, clicks, online purchases, credit card swipes, screen time, and even possible conversations are represented somewhere as mere datasets and data visualizations. However, 'Representation of the *Self'* in the age of data science and automation, is often reduced to being a data point lost in the translation of algorithms that are opaque, biased, discriminative, and the data itself 'never truly speak for the *Selves'* (D'Ignazio and Klein 2020).

While talking about Representation of the Self in the form of datasets or data visualizations, how much control do we have over the narration? How much do we even understand of the process of translation of our complex identities into quantitative algorithms? Representation without inclusion is often about power, about who has it and who doesn't, and about how those differentials of power can be challenged and changed (D'Ignazio and Klein 2020). *The research explores the question of 'how can we have more power and agency over our own narration?'*

<u>Data Visualization</u>

Representation in the form of data, is often met with anxiety due to illegibility of the outcomes and lack of understanding about the mechanisms of how the information is manufactured (Resch 2019). 'Grammar of Graphics', for instance, by Leland Wilkinson, is an attempt at a set of universal rules for the language of information visualization. However, while the need for a universal language to understand the systems of data is evident, it also raises questions about absence of pluralism, inclusivity, accessibility, novelty, and legibility for laypersons. In Giorgia Lupi's words, *"the visual representation of information plays an increasingly critical role in every situation where data and quantitative information need to be translated into more digestible stories, both for the general public and for professionals who need to make sense out of numbers." (Lupi 2014)* The more universality one tries to reach, the more difficult it gets to have a say or have control. The process of representation through data (which is often in the form of data visualization) has been naturalised and aleinised at the same time. What exactly is the concern surrounding representation through data (visualization)?

- *The View from Nowhere-*
  The "view from nowhere" is famously described by Haraway as arising "from simplicity," a "god-trick of seeing everything."(Haraway 1991) Universality and Simplicity presents potential for negative effects due to neutrality. Universal Objectivity limits plurality of perspectives, presents information biased by the researcher's perception, and loses critical information when data simplicity is given preference over narratives with a neo-positivist orientation (Resch 2019).

- *Ocularcentric Objectivity-*
  "Visual representation mediates virtually every knowledge practice. It entails the use of photographs, abstract images, physical objects, sketches, animated videos, engineering diagrams, and data graphics in the interpretation, display, and demonstration of evidence. The contemporary infovis practices and tools naturalize specific representational forms and

modes of interactions. Other representational forms that do not adhere to exclusively visual modes - audio and tactile objects, for example - are occasionally deployed in evidence-making practices, but the visual dominates, residue of epistemological conventions that avow ocularcentric objectivity as a paramount virtue." (Resch 2019)

- *Grammar of Gibberish-*
  While having a set of rules for the Visual language makes the communication easier, it also limits the expressiveness. Just as our primal reactions, emotions, and senses are too complex to articulate in our spoken languages, and miscommunication occurs, similarly, miscommunication is bound to happen by following the visual graphic's grammar. And what about the ones who do not understand the language? Are they not allowed to share the narrative or be part of one? To them (to us all at some point), the universal visual language is nothing but gibberish. This research is proposing anarchy here, by having no rules and no grammar. Instead of a language with rules of grammar, it proposes the representation and narration of the *Self* be like an artwork- individual, not universal.

Another key questions that 'સ્વ- / *Self-'* aims to explore is about "*the scope for the Self's narration and the process of its representation to be more inclusive, accessible, and legible.*"

Future Potentials
The Coronavirus pandemic has fast-forwarded a shift in time that usually happens over several years and even decades. This shift begins at an individual level, with major and sudden change in lifestyles, impacting our mental perspectives, and physical habituation. Evolution of over several centuries has enabled life to adjust and adapt, so how can a sudden shift affect the process of adaptation? We are experiencing the downside of our actions in the form of universal crises at individual, interpersonal, social, societal, economic, and global level. If adaptive actions can lead to the Present as we know it, what might actions taken during this

period of shift do to our futures? The future of this exploration involves a Provocation to be aware and mindful of our actions. If we have the power to choose how our selves are being narrated, is it not fair that we use it to be aware and mindful of our selves? *Can we discover more about our own selves through the process of representation, and can the process make us more aware about our own selves?*

Methods

The diverse nature of key areas for the research touches upon various different disciplines, thus, the intent of different experimentations, explorations, and prototypes is to understand, expand upon, learn about, question, and/or challenge the concepts of these fields.

Prototype: On My Mind

The notion and narrative of the *Self* is often metaphysical and abstract. To understand the complexity of translating these abstract concepts into a visible form, one of the initial explorations includes a mind map of mind! *On My Mind* (Fig. 01) is an oversimplified representation of personal thoughts on a random afternoon on February 25th, 2021, between 02:22 PM to 04:00 PM. While writing down one's mind's thoughts, and journaling is a seemingly simple concept, it does not remain untainted from an audience, even if it is the *Self*. The mere action of consciously observing one's personal thoughts disturbs the natural patterns. The infinite connections are almost impossible to replicate. While medical machines can scan the neural connections and the data can represent scientific facts, what part of the narration (memories, feelings, and more) is being left off? *On My Mind* is a first step at understanding the process of data translation.
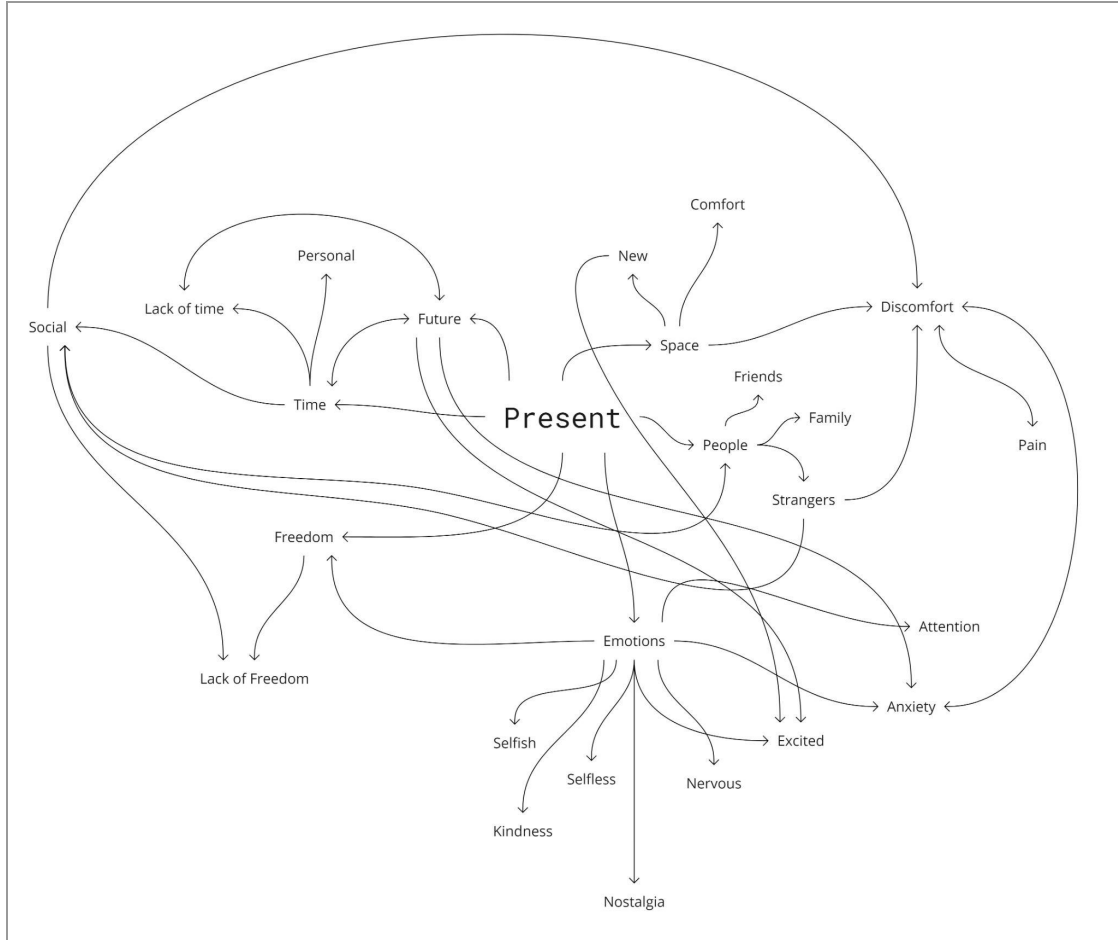
Comfort

New

Personal

Lack of time

Social

Future

Discomfort

Space

Time

Friends

Present

Family

People

Pain

Strangers

Freedom

Attention

Lack of Freedom

Emotions

Anxiety

Selfish

Excited

Selfless

Nervous

Kindness

Nostalgia

Fig. 01

Prototype: Poetics of Pattern

While challenging the Ocularcentric Objectivity, it is simultaneously crucial to understand, acknowledge, and address the causes for the same. *"As a scholarly act, interpretation has almost always been textual, based on close reading, and intimately bound to the graphic form of the work to which it attaches"* (Drucker 2014). [Poetics of Pattern](#) (Fig. 02) is another attempt to translate the abstraction of the *Self* through patterns that prevail in both visuals and poetry. It aims to ask the question, how effective is the visual language that is not universal? How clearly are the abstract feelings such as anxiety, numbness, release, frequency, adaptation, and warping conveyed if I do not follow any universal language of visuals?

Moreover, *Poetics of Pattern* is an attempt to understand the process of translation through creation. It is about taking part in the process of translation. It addresses the concern regarding legibility and black box of data science. This proved to be an important part in the research, as it introduced the concept of 'Research through Design' or RtD: *"A research methodology where the act of designing artifacts or prototypes (whether it be an object, system, or tool) are used to reflect and engage with theories, technologies, and models from various disciplines and operationalize how they can be used in industry and design practitioners."* (Torres 2019). While composing the poetry, I was able to dig deep into my association of the topics. While trying to find rhyming words or continuing sentences, the discoveries turned out to be introspective in unexpected ways, discovering hidden memories. While the translation of the words can be composed in countless combinations of phrases, the ones here are a reflection of my *Self's* narrative. The subconscious choices of colors in the visuals, and the free flowing hand drawing unplanned patterns reflect the abstract feelings and emotions almost instantaneously. As opposed to the *On My Mind* exploration, this is much less tainted by own conscious observation.
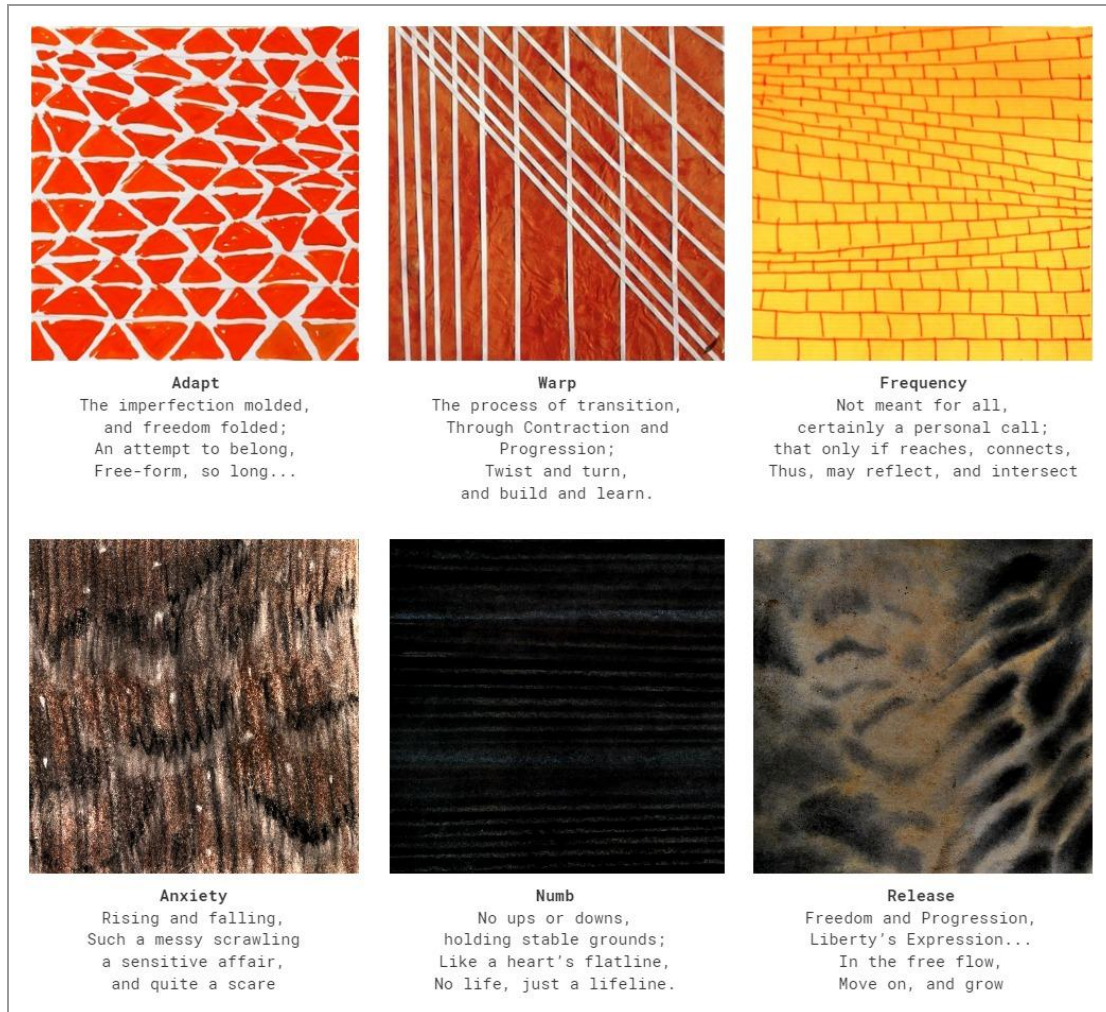
Fig. 02

Prototype: Pain Portrait

Building upon Torres's idea of Research through Design (RtD), *The Pain Portrait* (Fig. 03) is an attempt to understand data through crafting. Why the craft of weaving? The worlds of computation and textiles share histories and origins through code. The invention of the Jacquard loom in the early 1800s is said to be the ancestor of computers because of its capability to programme a pattern using punched hole cards with a binary system of hole, no hole or 0 and 1 (Essinger 2007). The prototype is a translation of the conversations that mentions my pain, and that I encountered in the 24 hours on the day I fractured my elbow. Each weft (horizontal stripe) represents an hour, and the color distinguishes the intensity of

pain. Weaving my own data was to understand the role the materiality plays in the process of *Self* discovery.

Fig. 03

Prototype: Self Fabrication

Torres, in his 2019 dissertation introduces the concept of *"Crafting Proxies: A material, tool, or machine that is part of a larger network of a creative environment, which mediates interactions with a material facilitating interpretation, manipulation, and evaluation of emerging or potential forms as a part of a creative process.". Self Fabrication* (Fig. 04a, b, c) is a study of repetition of patterns through the rules of weaving, using my personal data about the timings of calls and messages to my home country, India (FIg. 04a), and Meals I had in a month (Fig. 04b, c), both in the month of February. The left grid in each figure is a digital loom mock-up with drafting and peg-plan details, the right grid in each figure is a zoomed-out version to give the simulation of a fabric. Fig. 04a is a representation of real-life events in the form of a straight draft. In Fig. 04b, the events are mirrored. This is to speculate the ideas about what happens if, after

dinner one day, instead of breakfast the next day, I have supper, or lunch? How does it affect my schedule, or health? The loom can propose infinite possibilities of variations to speculate on. Our actions have consequences, and this exercise was a method to see the outcomes of our actions, manipulate them, and speculate on the unorthodox outcomes. This further speaks about the materiality of data. If the same thing is converted into a physical fabric, the cluster of patterns will result in yarn breakage, snagging, and other technical and physical difficulties. This poses many questions surrounding embodying our actions to replicate materiality, and how sustaining or devastating such relations might be.
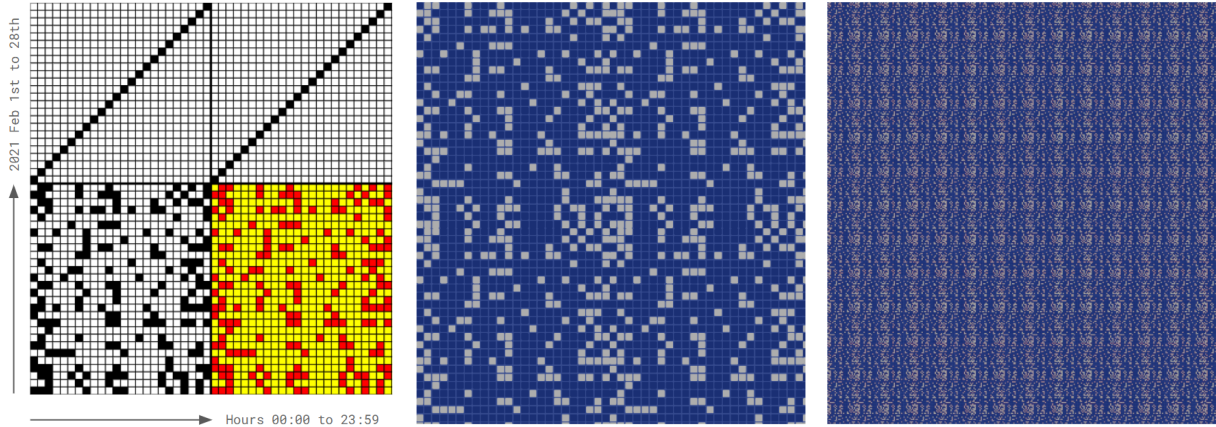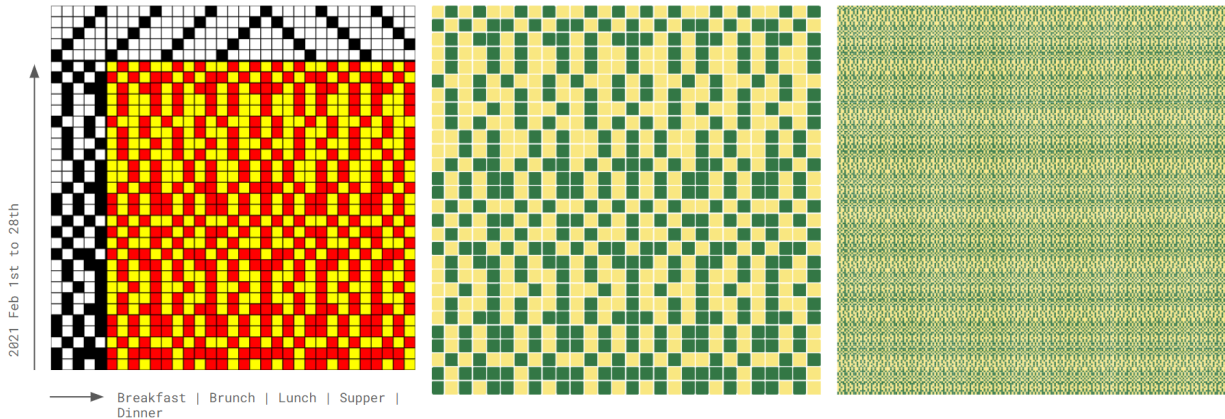

Fig. 04a: Calls and Messages to India in February 2021
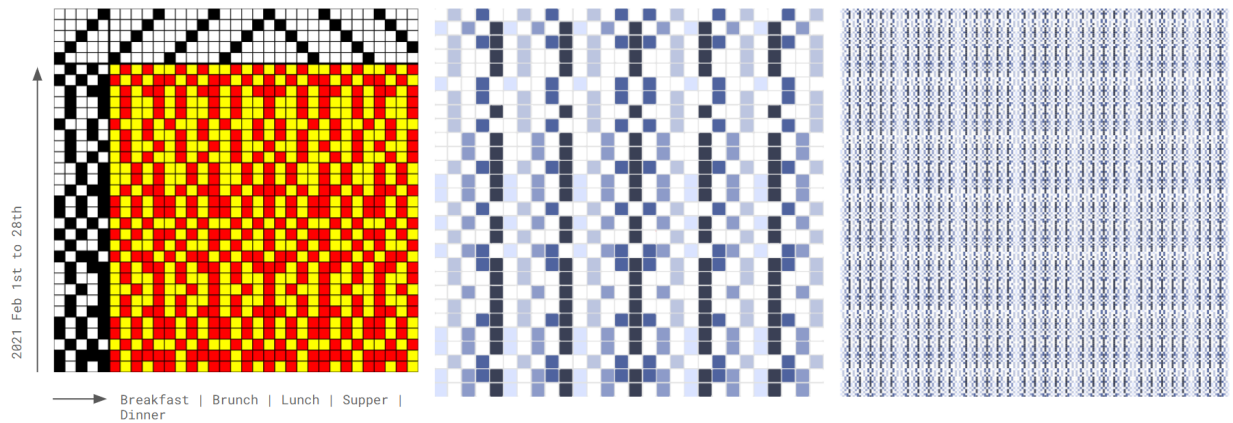

Fig. 04b: Meals in February 2021

Fig. 04b: Meals in February 2021 (Color coded)

Prototype: Morphogenetic Making

"A type of making where a practitioner engages in wayfaring, where encounters with materials influence decisions and actions of where to take the design, evolving the form over time." (Torres, 2019).

Building on the idea of moulding material properties into personal actions, the prototype *Morphogenetic Making* (Fig. 05) was an exercise of two weeks to study effects of material embodiment in real life. A week's data of phone's screen time was translated into a technique of an Indian woven craft called *Tangalia*. The disturbances of the material reflect the irregularities of phone usage. For instance, heavy usage at night and early in the morning, and the disturbance in the weft created by that with relation to the timings of light usages. For the second week, speculative hours of phone usage were planned to be followed, this was done to even out the weaving disturbances. Then, effects of these actions were predicted, planned hours were followed, and actual effects were compared to understand how much do I understand the consequences of my actions, and how much do I miss. Fig. 05b shows the comparative predictions.

Fig. 05: (Bottom) Week 1 translation of my phone's screen time. (Top) Predicted weaving to even out the disturbances.

Prototype: That's what She says

That's what She says is a first person narrative of an Indian Textile Craft: *Ashavali Brocades.* This is an empathetic approach to hear the craft's story, what influenced it's designs, weaves, and identity. Here, it is about the craft's *Self.* It is a reminder to understand and acknowledge the cultural and historical contribution to a craft.

It is no secret that the civilization has narrated their tales through history in the form of various crafts. The oldest narrations are believed to be cave paintings. Sculpting, painting, weaving, pottery, metalwork, and every other craft has been about narrative, whether direct or indirect, through the visual representations, through the use of materials, through the reach of the crafts, through the techniques used, or through the consumers or admirers of the crafts. They have some narrative in them; whether it is about the creators through their designs, or about the community and geography through their materials used. Today, in valuing product over process, the knowledge remains blackboxed. Hence, Crafts are a way of emphasizing the processes. When you build something rather than

witnessing it, the clarity behind knowledge and understanding can be much more profound. The ability to live through the process of creation, and be part of the creation gives us the power to be more aware of our own ecosystem as well as acknowledge the histories behind the craft we are engaged in, the communities that curated and sustained them, and the evolution they witnessed.

"History has drawn fault lines dividing practice and theory, technique and expression, craftsman and artist, maker and user; modern society suffers from this historical inheritance. But the past life of craft and craftsmen also suggests ways of using tools, organizing work, and thinking about materials that remain alternative, viable proposals about how to conduct life with skill" (Sennett 2008)

Prototype: Notes to Self
Notes to Self was an exercise to organise the research, highlight key points, answer crucial questions posed by peers and critiques and formulate the basis of the written research.

Discoveries
The Process of exploring the areas of '*Representation of the Self'*, '*Data Visualization*', and '*Future Potentials*' through the various prototypes opened up dialogues about various multidisciplinary research practices to incorporate- whether it is about understanding the translation of qualitative data, associating *Self* with that data, or being responsible for the knowledge and outcomes observed through these practices.

The Prototypes, in addition to certain literature references, also addressed the concerns surrounding Data Visualization:

- *The View from Somewhere* (from *The View from Nowhere*)-
  Since we cannot be omnipresent (yet), let us begrudgingly accept the fact that we are not all-knowing. So, why even aim for a representation that is universal? How can there be a universal perspective? The term perspective

itself embodies subjectivity. Instead of aiming for a universal representation, a decentralized one and a subjective one, might give more insights and a rather accurate perspective. Share your narratives however you want (Anarchy! But not really), and give others space to do the same. But then does that mean there will only be autobiographical representations since we might not have the vision of other/others' perspectives? Not necessarily. In the words of the filmmaker Trinh T. Minh-ha, rather than "speaking about" a culture (or any subject for that matter) outside your experience, the filmmaker Trinh T. Minh-ha suggests we "speak nearby." In an interview for Artforum, Trinh says: *"When you decide to speak nearby, rather than speak about, the first thing you need to do is to acknowledge the possible gap between you and those who populate your film: in other words, to leave the space of representation open so that, although you're very close to your subject, you're also committed to not speaking on their behalf, in their place or on top of them. You can only speak nearby, in proximity (whether the other is physically present or absent), which requires that you deliberately suspend meaning, preventing it from merely closing and hence leaving a gap in the formation process. This allows the other person to come in and fill that space as they wish. Such an approach gives freedom to both sides and this may account for it being taken up by filmmakers who recognize in it a strong ethical stance. By not trying to assume a position of authority in relation to the other, you are actually freeing yourself from the endless criteria generated with such an all-knowing claim and its hierarchies in knowledge."* (Hong 2020)

- *Data Physicalization* (from [*Ocularcentric Objectivity*](#))-
  To denaturalize the ecosystem of Visualization and Representation, the most privileged and biased sensory systems, the Ocularcentric Objectivity needs to be challenged. Data Physicalization is an alternative mode of Representation that can engage other senses such as haptic, aural, olfactory, and/or gustatory (and maybe also the ones not limited to physical bodies). Everything from collected data that is mostly in the form of numbers or text, to the tools to organize these data, to the end visualization results, are engaging visual senses the most. Data Physicalization has ongoing and future applications and potentials of a more diverse means of Representation that moves beyond the digital realms, and opens the gates to materiality and physicality of data!

- *Data Crafting* (from [*Grammar of Gibberish*](#))-
  This talks about understanding the data or information through hands. When we build each of our data points, define our own parameters, curate our own grammar of representations (because let us move away from graphics), is the data understood better? What do we notice? What do we care about? Are these things available to capture? In the conjoined processes of building a data capture apparatus and collecting and cleaning messy data from it, there is an opportunity to pay attention to the materiality of data making. What is the data physically made of? Does it have a duration? A location? Is it ephemeral or embodied?

The following themes, as quoted in Torres's 2019 dissertation, realised through the prototypes contributed to a start of something novel:

- *Crafting Proxy: A material, tool, or machine that is part of a larger network of a creative environment, which mediates interactions with a material facilitating interpretation, manipulation, and evaluation of emerging or potential forms as a part of a creative process.*
- *Research through Design (RtD): A research methodology where the act of designing artifacts or prototypes (whether it be an object, system, or tool) is*

used to reflect and engage with theories, technologies, and models from various disciplines and operationalize how they can be used in industry and design practitioners.

- *Morphogenetic making: A type of making where a practitioner engages in wayfaring, where encounters with materials influence decisions and actions of where to take the design, evolving the form over time.*

- *Material API: The material application programming interface. The API is a material's set of allowable inputs (e.g., paper can be cut, folded, and scored) and the corresponding material manipulation space (e.g., the forms of origami)*

- *Maker-bias: Bias introduced into a tool, especially a computational tool, that forces a practitioner into the way of thinking of the maker.*

- *Immaterial: Physical, virtual, or conceptual elements that during the creative process cannot be formed. Immaterials have properties of lacking tangibility as well as decomposability. As an example, although electricity is a physical phenomenon, the presence of electricity in electronics is invisible without transducers that convert this energy into light, heat, or motion.*

- *Hybrid aesthetics: The beliefs, concepts, and theories implicit in the creation, experience, interpretation, or critique of artifacts that are made from digital or physical materials or via physical or digital processes.*

- *Ethnocomputing: The study of interactions between computing and culture.*

Future

The birth of a novel curation, as stated above:

EthnoCrafting:

A Pedagogical and Phenomenological engagement of the user and the creator, as narrators, in the process of creating a Representation that is reflective of the respective Selves (through narration or skills).

Ethnocrafters:

Ones involved in the process of *Ethnocrafting*, through contributing their stories, skills, histories, information, and so on.

Ethnocrafted Narratives:

The Narrative outcome through *Ethnocrafting*.

ੴ- / Self-': The Platform:

[*ੴ- / Self-': The Platform*](#) is a vision of a platform (an app or a software), where the Narrators and Curators can participate in the practice of creating, through understanding the respective stories, crafts, and histories. The speculative framework goes as following:

- You can learn about the roles of different [key themes](#) behind the research.
- You can choose a specific craft for your narration.
- Get an introduction from the artisans and makers of the craft.
- Choose a form of narration, whether it is text, graphic, or data based.
- Manually translate your story into technical specifications feasible for the craft.
- Understand the process of weaving, discover how your story behaves physically.
- Learn about the resources, raw materials, and socioeconomic factors related to your narration.
- Engage with the artisans.
- And get a physical sample from the authentic source. There is potential for incorporating blockchain-like technology as well, to give credit to the *EthnoCrafters*.

This is, however, the very first vision towards such a practice, with flaws and potential to failures. The framework can be explored [here](#).

Evaluation

Quantitative evaluation of this research based project will be a stark contradiction to everything the research stands for. Quality of the impact of the research,

however, can be studied through contribution of the prototypes in building the research forward and the value addition through these experiments. While the prototypes effectively conveyed the purpose to the viewers (peers, faculties and critiques witnessing the project) and progressed the discoveries further, they also raised valuable questions to build up on for the future. And, the questions raised surrounding liaisons with the artisan communities, while discussing the vision- ['स्व-/ Self-' as the collaborative platform](#), can be one of the initial steps to be addressed in the future. Moreover, now that the initial groundwork has been laid, which till now had room for flexible movement, the navigation further on, of key themes from multiple disciplines under one umbrella, can certainly be tackled in a more efficient way.

Conclusion

What initiated as an abstract notion about *Self* escalated into multiple disciplines, and evolved into an embodied research practice, and a potential pedagogical application. 'स्व- / *Self-*' however, is in its initial conceptualization stages with a lot of room to grow, as well as fail. As the research preaches, about inclusion and plural perspectives, even though the theories related to 'स्व- / *Self-*' were born in the form of this research, the future of it can only be shaped by contribution of 'other' *Selves* and their perspectives.

References

- Beck U, Beck-Gernsheim E. "Individualization: Institutionalized Individualism and its Social and Political Consequences". Sage. London, UK. 2002.
- Callero, Peter L. "The Sociology of the Self". Annual Review of Sociology. 2003.
- D'Ignazio, Catherine; Klein, Lauren F. "Data Feminism". MIT Press. Cambridge. 2020.
- Drucker, Johanna. "Graphesis : visual forms of knowledge production". Harvard University Press. Cambridge, Massachusetts. 2014.
- Essinger, James. "Jacquard's Web: How a Hand-loom Led to the Birth of the Information Age". Oxford University Press; pp. 35–40. Oxford. 2007.

- Haraway, Donna. "A Cyborg Manifesto: Science, Technology, and Socialist Feminism in the Late Twentieth Century". Simians, Cyborgs and Women: The Reinvention of Nature, pp.149-181. Routledge. New York. 1991.
- Hong, Cathay Park. "Minor feelings: an Asian American reckoning". New York: One World. 2020.
- Foucault M. Two lectures. "In Culture, Power, History: A Reader in Contemporary Social Theory", ed. NB Dirks, G Eley, SB Ortner, pp. 200-221. Princeton University Press. Princeton, NJ. 1994.
- Frank DJ, Meyer JW. "The profusion of individual roles and identities in the postwar period". Sociological Theory Vol. 20, pp 86-105. 2002.
- Giddens A. "Modernity and Self-Identity: Self and Society in the Late Modern Age". Stanford University Press. Stanford, CA. 1991.
- Lupi, Georgia. "Sketching with Data Opens the Mind's Eye". Edited Version of Data Points Blog on National Geographic. 2014.
- Resch, Gabriel. "Denaturalizing Information Visualization". University of Toronto, ProQuest Dissertations Publishing. 2019.
- Schwab, Klaus. "The Fourth Industrial Revolution: What It Means and How to Respond". World Economic Forum, 2016. https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond
- Sennett, Richard. "The Craftsman". Yale University Press, p. 11. 2008.
- Torres, Cesar Armando. "Hybrid Aesthetics: Bridging Material Practices and Digital Fabrication through Computational Crafting Proxies". University of California, Berkeley; ProQuest Dissertations Publishing. 2019.

References for 'સ્વ- / Self-'- the platform
- https://amandinedavid.com/Weaving-code#:~:text=Weaving%20code%20aims%20to%20make,in%20a%20single%20enhanced%20gesture.
- https://spaeted.wordpress.com/2019/08/05/morse-code-scarves/
- http://www.worlddesignconsortium.com/work.php?WORK=103945329
- https://www.textronic.com/design-jacquard.html
- https://www.textronic.com/design-jacquard.html

- https://textilegenesis.com/
- https://unleash.org/solutions/weaving-code/

Additional References

- Clark, Andy. "Re-Inventing Ourselves: The Plasticity of Embodiment, Sensing, and Mind". Journal of Medicine and Philosophy Volume 32. Issue 3. Page 263 - 282. University of Edinburgh, © Taylor & Francis Group, LLC. Edinburgh, Scotland, United Kingdom. 2007.
- Candlin, Fiona. "Don't Touch! Hands Off! Art, Blindness and the Conservation of Expertise". Journal Body and Society. Volume 10. Issue 1. Page 71 - 90. SAGE Publications. London, Thousand Oaks, and New Delhi. 2004.