Towards a quantified artwork

a MFA thesis project

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20.09.2023

Summary

This is a comprehensive overview of my two exhibited works in the Kuvan Kevät 2023 exhibition and surrounding ideas.

We start with the work Untitled (Semantic Bounds Violation) in the first part. This work is constituted by combination of painting, laser cutting, and programming techniques. It attempts to address and examine the problem of semantic interpretation of different artworks by various audiences.
In the theoretical section of this part, I cover the origin of the idea along with thorough deliberation on a selection of the medium and composition of chosen elements within the medium.
The section concerned with the process of making delves into all the intricacies required for creating composite object of this kind, including sketching, 3D modeling, coding, laser-cutting, 3D printing, sculpting, and painting.
The final section concludes, firstly, with my evaluation of the finished product and ideas for enhancements in possibly related works in the future. And secondly with additional research into associated efforts in theory, artistic projects and empirical research.

The second part of the thesis describes the All Shapes artwork, where I aimed to create a container of all possible shapes within its own physical constraints.
We begin again with a characterization of my initial motivations for creating the work and reasoning behind choices in both the physical (scale, materials, and ways of showcasing the digital core) and digital domains (ways in which shapes are presented and necessary limitations).
The realization section includes both the making of the physical container and development of the program itself with all the decisions faced along the way prior to the exhibition.
I conclude the practical part in the following “Work In Progress” section, where I theoretically lay out the rest of the steps required in order to produce All Shapes.
In the last section of this part, I again assess the state of the project and any points that emerged during it and then go on to name other artists, I found, working within a similar medium.

The final brief part “Overarching efforts“ expounds on the unifying motivation behind the two works.

The works were exhibited at the master of fine arts exhibition Kuvan Kevät 2023 in Kuva/Tila gallery (Sörnäisten rantatie 19, Helsinki, Finland):

Untitled (Semantic Bounds Violation) **2022–2023**

Unity engine, laser-cut plywood/acrylic, LCD screen, modeling paste, acrylic paint, transparent silicon sealant, computer

48.2 x 40.9 x 5 cm

All Shapes **2023**

Processing, LCD screen, aluminium, laser-engraved acrylic, Raspberry Pi 4

39.7 x 33.5 x 15.4 cm

Supervised by Erich Berger & Albert Laine
To be examined by Oliver Kochta-Kalleinen & Harri Mikael Mäcklin

One cannot enjoy Y before experiencing and remembering X. One might appreciate B because they have not come across a rather similar A. Appreciation is for the most part based on prior experience.

I wish to no longer leave the external appreciation of art up to chance dependent above all on the artists' preferential alignment with that of the variable spectator. Let's abandon the shortcomings of the present paradigm, the production of similar experience-instances/artworks caused by the limitations of the human condition.

And instead leap upwards to the newly accessible heights on top of the current ways of artmaking. Empirically calculating the artwork's effects, optimal audience and its place in the world. With the pinnacle being superlative experiences built upon the individual's current neural configurations. After all, art should be entertaining, should it not?

Presented here are the intermediate products in pursuit of this future. Exploring its particular facets of capturing all available visual forms of a two-dimensional shape and the possibility of a visual, yet nonsymbolic, universal language.

Related entry in the Kuvan Kevät 2023 catalogue text.

Untitled (Semantic Bounds Violation)[1]

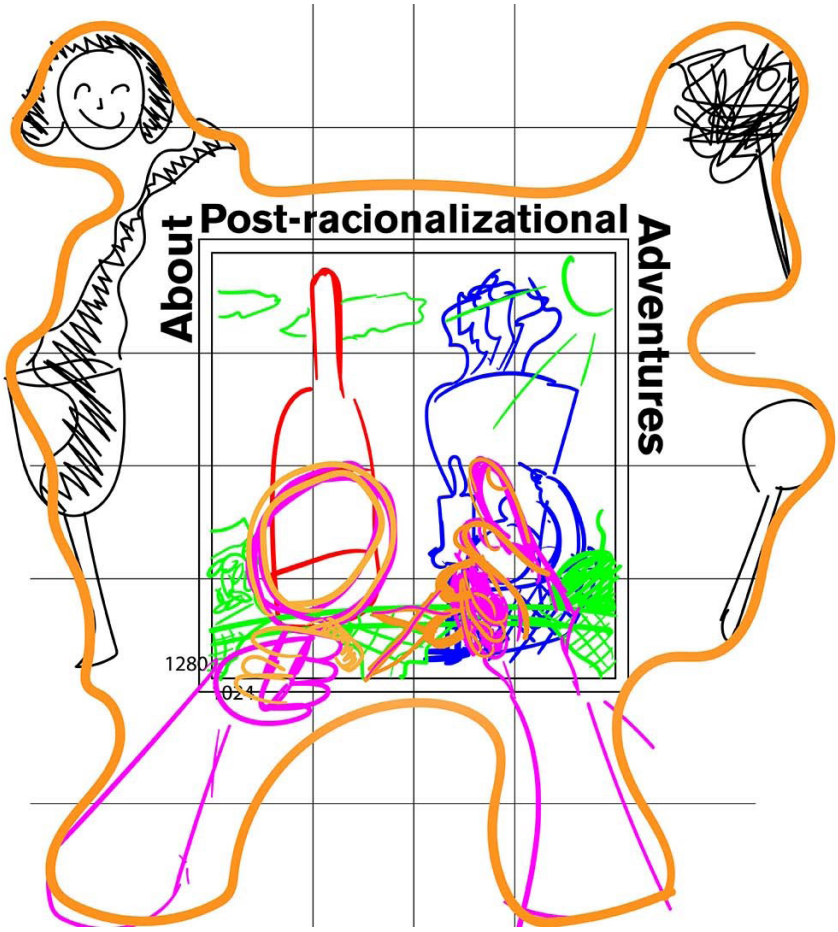
Theoretical processes

Origins of the presented artwork lie in simplification of another in order to get to the “minimum viable product” quicker and see whether my expectations and capabilities match the reality.

The initial artwork was identical to the present one with the difference of text around the painting stating: “about post-rationalizational adventures” and subtle slits and holes in the painting uncovering the screen beside the two main cutout shapes. Lastly, it also featured an addition of

1. video documentation: *dl.dropboxusercontent.com/s/rb576a9cbdgcynz/semantic_bounds_violation.mp4*

representations of instances of “every” category of a thing that can be depicted within this medium surrounding the frame.I believe it was the very form of a static painting with embedded digital moving image, that happened to be the origin of the whole work. I am unable to trace this thought to any particular source.
Around a similar point in time as I was seeking content for this form I watched a lecture given by Virgil Abloh[2] for Harvard Graduate School of Design[3], where he mentions post-rationalizing. That, alongside a trend I was seeing in the art academy’s seminars, where many discussed works were presented as completely subjective with no actual delineated value in their content, gave me an idea to make the work about this sort of process, of searching for and assigning of meanings, itself hence the “title”: “about post-rationalizational adventures”.



As it is my personal preference I aimed to convey the contents without relying on any textual description and/or maximizing the possibility of the desired interpretation. My working hypothesis was such that there are certain features that most humans on average notice sooner than others. A feature that makes an object stand out from its surroundings. Eg. moving object on static background, differently colored or shaped object surrounded by many similar objects, sharper looking objects in front of blunt-shaped objects, bigger objects before the smaller ones and depending on the culture of origin of the viewer, objects located on the left before the ones on the right or other way around (direction of reading). All of these and more (size, color, placement, material, interaction in-between other elements) could be empirically tested and ordered into a sort of hierarchy. And this hierarchy could be utilized to construct a “path” guiding the audience closer to the intended reading of the work.
Another effort was to minimize the usage of culture-specific symbols that could be misleading/unclear for some. With this approach and static unadaptive medium, it is unlikely to communicate more complex notions, such as in this case, to a broad worldwide audience. However, it was my goal to make the contents of the work intelligible at least to the largest group.

As I began the process of conceptualization and fleshing out the details it turned out to be a rather nonlinear and perplexing process as each element had to be logically coherent with the rest and changing one part meant verifying whether the rest still holds.
Among other matters, question of validity of the chosen medium came to my mind. I tried to attack the course I have taken and try to think of perhaps an even more fitting form to depict the action of post-rationalization. Large spatial installation or completely different materials such as stone instead of wooden base and paint. Although ultimately I was unable to conceive of at the time a better alter-

2. American designer/entrepreneur
3. *“Core Studio Public Lecture: Virgil Abloh, “Insert Complicated Title Here.””, Harvard GSD, 2017. www.youtube.com/watch?v=lQdkxyXPPMc (14:12).*
4. *“...a universe of what is self-evident or given, a world that subjects may experience together. The concept was popularized by* Edmund Husserl,...*” (“Lifeworld”, Wikimedia Foundation, 8 December 2022, en.wikipedia.org/wiki/Lifeworld)*

native to the combination and contrast between 2.5D impasto painting and digital screen, which to me felt like ideal representations of our physical world/lifeworld[3] and the realm of interpretations (digital with the possibility to be ever-changing).
Prior to questioning the medium, I undertook the same process for contemplating the actual structure of the image itself. The representation of still life painting seemed as the most apt as not only it is what I imagine when I think of Painting, but also the established tradition of still life (passive objects with neutral background with less capacity for implied meaning than other forms) was more suitable for the ideas I was trying to communicate.

The defining feature utilizing the still life theme is the division of the bottle and vase with flowers and other objects surrounding it. Both the silhouette of the one object and the group of objects are cutout into the wooden board with the screen on the back side displaying the distinct objects with different reflections and projections. By this, I tried to convey the possibility to derive emerging meanings/interpretations from a group of objects as a whole just as from their separate parts/single objects.

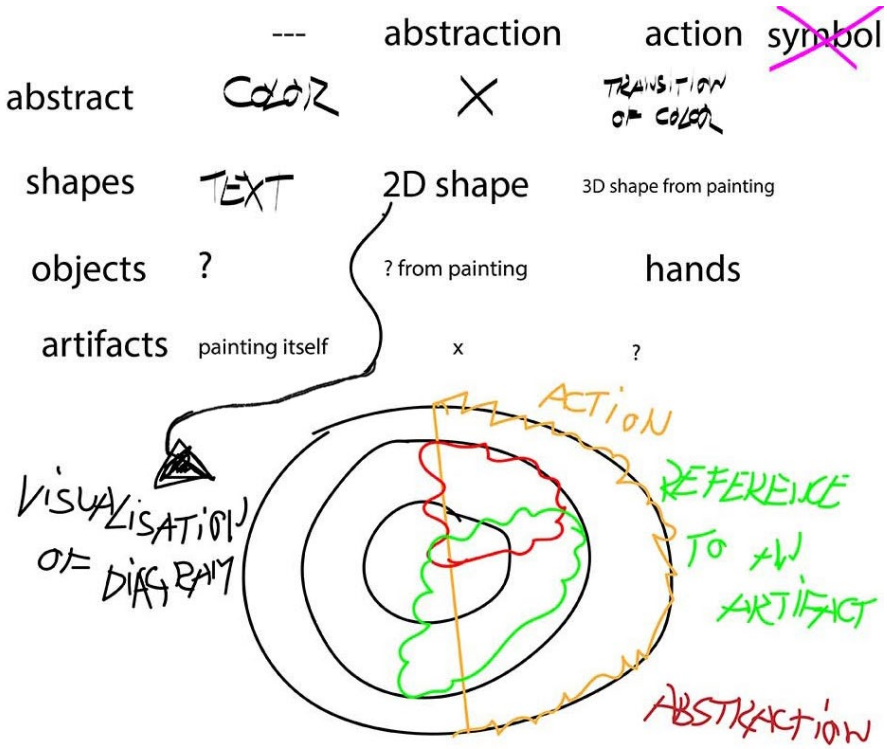
The rest of the still life image part of the work, its background and surrounding objects, were meant to be thematically fitting, yet uninvolved. My aim was to strike a balance between not disturbing away from the key parts, however make it remain looking like other images within this category, and avoid complete minimalism.

This image is enclosed by a plain unpainted frame of the wooden base with cutout text in this instance being: “about post-rationalizational adventures” wrapped around 3 sides in the same manner as in the presented work. The reasons for the inclusion of the text are two. The first one was due to my preference for titleless artworks despite the fact that they provide convenient additional context. The second reason is that alongside the wooden frame, it provides a meta layer (layer of the outside world) that can be disrupted and complement the perhaps most noticeable part of the work, the hands of the spectator.

The arms seemingly of one person and translucent to not restrict the spectatorship to any particular group of people. Are reaching towards the bottle and the vase. For this original version, I intended the arms to shift in perspective as they pass through the frame to put even greater emphasis on the difference between these two areas. The bottle and the vase silhouettes as mentioned are cut out of the board, and their digital forms with altering reflections and projections are displayed by the screen behind the board.
When it comes to the content of the reflections and projections I considered two solutions. The completely randomized one I ended up using and then a bit more intricate one, where subjects from the painting itself, material about the author, the current exhibition space, broader cultural environment, current observers, and other contextual clues would be shown.
The ever-changing reflections seen on the bottle are linked and realized by the magnifying glass held in the left hand. This I see as an action of search for all conceivable relations linked to interpretations from an observer’s current accessible memory. All originating from the object that remains identical.
The right hand holding the scissors is meant to conjure up the action of “range selection” when one is interpreting, which is connected to the meaning invoked from the single object/many objects division described above. Accompanying it is the pointing gesture combined with the wavering projection that illustrates selection. In the extensive first version, I intended to also add subtle cutout slits emanating light to other objects in the still life painting, that could complement the scissors and the sense of that every single element is incorporated into this process of interpretation/selection.
I believe that it is the union of both of these hands/actions that increase the likelihood of the desired understanding, as opposed to them being read on their own.
Now the only remaining element are the instances of representations of all the possible categories of things that can be depicted using this medium as indicated at the very start. They were meant

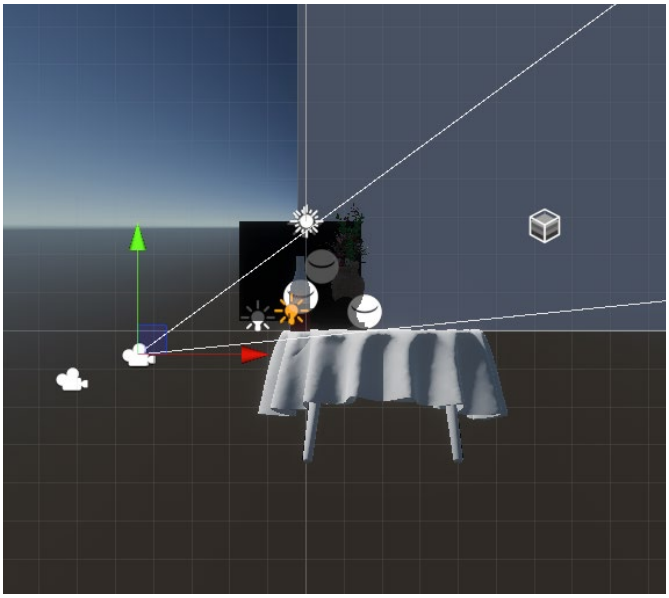
to be surrounding the empty frame and laser cut around their outermost edges to create a feeling of boundlessness. I defined the categories as: (something) abstract, shape, and object. Where the depiction of something abstract would be for example neverending color. Shape would be a two-dimensional restricted space. And an object would be a two-dimensional representation of a three-dimensional structure. Each of these could also potentially possess the quality of being an abstraction, be in action, and refer to an artifact. The quality of abstraction as I thought of it was a simplification of something to its essential features or intensifying them. Being in action would be a depiction of a thing's transformation through time. By being a reference to an artifact I thought of a representation of a thing set in time and space as opposed to merely referencing a category of things existing outside of the medium of painting (eg. painting of a hat with no distinct features is a reference to the hats in the physical world, but a painting of a painting of mona lisa will directly refer to that very object). In the end, I found thinking of a suitable candidate for each possibility quite demanding and decided to pivot for the time being to a simpler version of the work, the one featured in my graduation show.

This version of the work, therefore, lacks the representations of all the categories and smaller see-through cutouts on smaller background objects. My motives were to experience the technical process to get a sense of what are the unknown unknowns in the practical part of the work that without practice I am unable to anticipate. With that, I still wanted to possibly return to this version and furthermore, the text "about post-rationalizational adventures" with the cutback elements would no longer be logically satisfactory. Thus, I changed it to the present "title": "semantic bounds violation". This would refer to times when an aspect of the work is interpreted without taking the rest into consideration and therefore attributing meaning to it that sits outside of the range of meanings logically plausible, which is supported by the contextually random digital visuals.



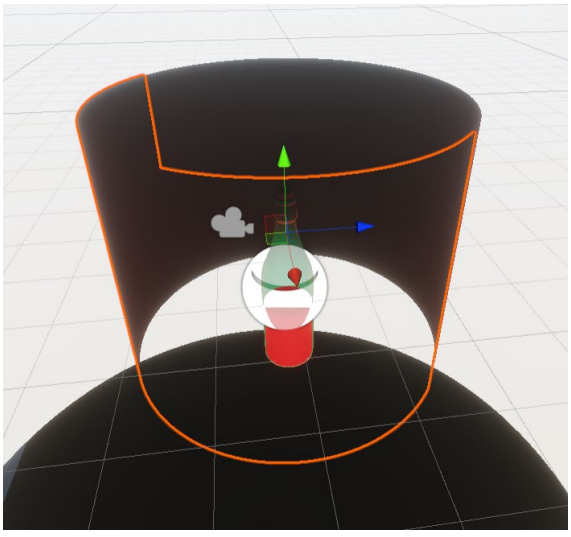
Realization

Once I have settled with most of the conceptual decisions, with some exceptions due to the need of getting a rough idea of the actual composition first. I started with the key part from which the rest would develop, the digital 3D models.
With the bottle, it was fairly straightforward. This object needed to be standing on itself and symmetrical to make it ambiguous whether the object is rotating or the environment is, which was important for the original version of the work. I believe I have considered some alternatives, however, a glass bottle seemed most fitting within the world of still life.
When it came to the "group of objects" the aim was the same, it should not feel out of place from the conventions of still life. But at the same time, the composite needed to be perceived as roughly of the same size as the bottle within the painting, that for example was the reason behind using the vase with flowers. Just for subtle oddness, I picked some elements not commonly used: a mushroom and a pile of dirt in the fruit basket.



Then I positioned both of the components on top of a round table and tried to find the optimal camera angle simultaneously considering the size and ratio of the physical screen I had available for this project. All the 3D models with textures were free for any use and found online.

Once I was happy with the composition, although, through this whole process, I would alter it many times again, I started to work with the lighting and rendering settings. Initially, I worked in Cinema 4D, which provides an extensive number of options. But then I realized the rendering of the reflections/projections ought to be done live to achieve proper randomness instead of a pre-rendered sequence of visuals. One alternative was to pre-render separate bits and then show them in random order, however, I did not find this solution satisfactory. Hence I moved the objects to the Unity game engine environment, which despite lowering the graphical potential, allowed for coding-in the randomness and live rendering.
When it comes to the video and image material used in the reflections/projections. I gathered huge amounts of them from stock image/video banks by making a custom "webscraper" program in Python[5] that automatically downloaded any free-to-use content. Prior to this, I planned to be using the latest uploaded youtube videos in order to perhaps capture current events, etc. But as the website often changes the program would require regular maintenance to keep it functioning, not to mention the circumstances of the change happening right during the exhibition.
The setup for the bottle reflections consists of two arched rectangles around the bottle forming a hollow cylinder.



5. *a high-level, general-purpose programming language ("Python (programming language)," Wikimedia Foundation, 19 July 2023, en.wikipedia.org/wiki/Python_(programming_language))*

The next step was to capture the image of the camera's view of the scene and trace an outline of the objects in Adobe Illustrator[6].
With the outline ready I also measured the display of the physical screen and aligned the shapes. The goal was to make the outlines be as big as possible so that the maximum of the screen area is utilized. Which forced me to reconfigure the original 3D scene a few times. At this point, I was considering whether the "still life" part of the artwork should go beyond the edges of the screen or whether the delineating area would follow right away. The edge of the table model helped me make this decision on where exactly to make the cut as the table would be part of the image.
Finally, I photographed my arms in the desired positions, and using Adobe Photoshop[7] I added the magnifying glass and scissors and traced both of the hands, cartoonifying them slightly.
The remaining component was the text/title. I experimented with many variants of placement and fonts and stylization. But, in the end, I carried on with a simpler solution. One idea that I tried to materialize was to have the stretch out around the edges of the board. Unfortunately, I did not manage to make it meet the desired aesthetic standard.

With this resulting vector file I was able to cut out the shapes into a plywood board and a few into an acrylic plate. I also engraved the boundary of the still-life image for reference and orientation. Consequently, I needed to attach and align the board to the screen. Despite some feedback that I am able to obtain it from somewhere, I found that the best solution would be to 3D print two hooks that would get screwed to the board and sat on top of the screen. This became a tedious process because it has not occurred to me to make the holes for the hook during the laser cutting. And by using a drill instead, the holes were slightly off, therefore the 3D-printed hooks had to account for that.
Later, another issue arose with the warping of the board after sealing it. And even with my efforts of sealing it with weights on top of it, the board ended up slightly bent and had to be taped to the screen. The screws protruding out of the back of the board were sealed with epoxy glue.
And then because the parts of the arms intersecting with the two main objects needed to be transparent the cut-out acrylic plate needed to be also glued to the board with epoxy.
At last taping over the transparent parts, as described, the board was sealed with wood glue and water mixture, where it was necessary to make sure to not leave the glue dry in thinly cut areas, otherwise, the glue would remain there, as I learned the hard way and had to try again on a new board.

At around the time of preparing the file for laser cutting I recognized, that as I haven't painted before, painting from a sketch or sketching directly on the board will give me difficulties. So I decided to work further with the vector file and imported it into Adobe Photoshop, where I constructed the composition via the "matte painting" technique. I intended to segment the painting into smaller areas where painting it from reference would become much easier. Therefore I tried to make the reference image highly realistic to the extent of simulating the tablecloth in Marvelous Designer[8] to get realistic folds on the cloth and tried to find the correct direction of shadows in the scene, at which point I have been suggested to stop since I will not be able to recreate any of this detail in paint. With the reference ready, I engraved the outlines of the objects on top of the plywood board during the laser cutting procedure.

Before finally starting to paint, I needed to test which medium I would end up using for the impasto effect and the transparent hands. As I found out, to make the impasto effect stand out and appear sort of relief-like I had to find a supporting medium as using just paint would be way too wasteful. The main contenders were 3D-printing and acrylic modeling paste. Because of the time pressure, I decided to move forward with the modeling paste, since it seemed that the 3D-printing material available might not be time persistent. And that ostensibly 3D modeling could be more time intensive,

6. a vector graphics editor and design program *("Adobe Illustrator", Wikimedia Foundation, 28 June 2023, en.wikipedia.org/wiki/Adobe_Illustrator)*
7. a raster graphics editor *("Adobe Photoshop", Wikimedia Foundation, 5 July 2023, en.wikipedia.org/w/index.php?title=Adobe_Photoshop)*
8. a 3D fabric simulation software used for realistic digital and real life clothing designs


BOUNDS
SEMANTIC
VIOLATION

which turned out false, due to the paste not being as viscous as it would be practically helpful while being very sticky. Making it require many layers until I managed to get the right shapes.
For the transparent arm effect, I first tested the acrylic glossy gel, which dries into transparency, however, if too much is applied it seemingly does not dry even after weeks. With no other alternative in mind, I reached out online and received feedback stating that transparent quickly drying solid "paint", is tricky to produce and that might be why there is none on the market. Luckily, the same person also noted that we could collaborate. However, after a few weeks, I have not been able to wait any longer and turned to my backup plan of using a transparent silicone sealant, which does have the vital properties with the exception of being solid, a tradeoff I was willing to make.
Because the modeling phase exceeded a safe limit set to adhere to the deadline before the exhibition, I resorted to painting certain parts simultaneously with waiting for the paste to solidify. I started by filling separate areas by using colors that were the most emanating and moved on to filling the smaller areas with colors seemingly appearing a bit less and so on. Working as described took me to a certain distance, but as I got to the parts, that are more of a gradient than one specific color, I had to change the approach to using a "dry brush" technique, which had me almost violently drag the brush around the board[9] to achieve these faint transitions. At the same time I had to make a decision on how detailed I would like it to be/how many shades of color do I need to introduce as the deadline drew closer and my painting abilities plateaued. Before I started, I was fearing this situation and thus I tried to experiment with segmenting the color and cartoonifying the reference image in Photoshop. To make the painting part of the work easier but it was to no avail, the results were meager. In the end, my efforts resulted in a sort of semi-cartoonish look with mono-colored scissors and magnifying glass, and a two-colored table cloth but at the same time quite detailed background despite mixing just about 4 shades of color for the clouds.

The very last step was adding the transparent hands. Only at the very last moment before starting, I decided against using purely just the silicone sealant. Considering the installation deadline, I had a fear of further complications and I picked a safer route of making slices of the hands in Adobe Illustrator and laser cutting them again into acrylic plates. Subsequently, gluing them and stacking them onto each other. Which culminated into the low-resolution hand models that were concerningly heavy for my purposes. I proceeded by "smoothening" the layers by adding the silicone sealant on the top and creating similar texture to the rest of the painting. Finally, I attached both of the arms to the board using double-sided transparent tape with the reasoning that I will unattach them and revise after the exhibition has concluded.

Emerging points

As is often the case and similarly to my previous experiences, the most difficult segments of this project were those unrestricted by a pre-decided conceptual framework or medium, progressing solely by quickly flashing through numerous possibilities and adjusting based on aesthetic judgment. (E.g. decisions on type design, background composition, or arrangement of objects around the vase.)

Overall my evaluation of the finished work is positive despite the rushed finish, yet there are certain parts that do not match my vision.
The more small surface-level changes I would take into account next time would be the method of making the hands. The current state did not end up being transparent and is barely translucent. Which does not negate my conceptualized purpose, however, I think casting the arms out of resin or printing them via a resin-based 3D printer resulting in more transparency would be a finer choice. Secondly, at the very last moment of attaching the hands, I removed the masking tape covering the frame area at the outer edges. And for the first time, I noticed the great contrast between the painting's darker color palette and the light brown board, which I would prefer to be darker brown to achieve a more harmonious result.

9. I have surprisingly used up quite many of my brushes this way.

Now, returning more towards the conceptual phase. Another aspect brought to my attention by the feedback I have gotten is the landscape view as background not being what is commonly seen as a "standard" still life layout. The background generally being flat and of a single color. Therefore it might incite unaccounted associations, although the landscape view allowed for more opportunities of applying the impasto technique in a way I wanted i.e. building up/heightening objects closer to the field of view rather than using it in an arbitrary/abstract way.

Thinking about the chosen medium of painting on the wooden board, now upon completion.
The usage of a stone plate and painting, as brought up in the first section, could actually yield more novel aesthetic results, while keeping up with the idea of material/immaterial digital/physical. Omitting the obvious additional technical challenges that working with heavy material and stone has, although not entirely impossible since the required technology is available.
On a more viable approach, 3D printing all the spatial elements with added "painterly" roughness, laser-printing a chosen texture on top of them, and attaching them to the board is another path I would like to explore, on the occasion of making an additional version. I see it as possibly less time intensive, having experienced the more "hands-on style".

To touch on the first principles, my initial hypothesis, and the deployed method. I developed the work introspectively with additional external feedback, therefore I have hardly reviewed prior any present literature in perception or meaning-making and/or conducted any trials that could help me narrow down the scope of interpretations I was striving for. I am curious how doing so would transform the current artwork with the former aim of targeting the largest group of people.

Furthermore, changing the aim from targeting the largest group of people to custom-fit to the individual by shifting the architecture of the work could make for an interesting project as well. This as of now would realistically mostly work for digitally based artworks. I envision a display with an eye-tracking camera iterating through the least amount of combinations of specific features and based on the data received by the camera generating an image with a predicted sequence of how certain features will be noticed. And not only noticed but which features will be the most dwelled on and scrutinized. I speculate that with this information some narratives can be successfully conveyed without the use of symbolic language.

Finally, after some, but not conclusive research[10] on these matters.
There seem to be distinctive views on interpretation of artworks in the art historical sense. The main dichotomy consists of intentionalist position, where the claim is that the meaning of the work that the artist intended for is paramount to anything else on the opposite end is the anti-intentionalism and its "underlying assumption is that a work of art enjoys autonomy with respect to meaning and other aesthetically relevant properties" and "... whether a statue symbolizes human destiny depends not on what its maker says but on our being able to make out that theme from the statue on the basis of our knowledge of artistic conventions…"[11]. There are also more nuanced versions on a spectrum between these two views. In my opinion, each of these views can be held at different times depending on the context. Someone engaged in the art-making process should strive to satisfy the anti-intentionalist evaluation of the specific group they wish to present their work to (relatives, specific subculture, nation, everyone alive, or someone who will be alive in the future) unless it is meant as a recreational activity. Intentionalist perspective should be adopted if we would like to understand the artwork despite not being included in the group it was made for.
I found an instance of the idea of long-lasting interpretability pursued in the case of indication for danger of radioactive waste that would last for centuries[12]. Another instance of pursuit for inter-species interpretability can be found on the cover of Voyager Golden Record project[13] designed by

10. Quite a bit of the research is behind a paywall.
11. *Szu-Yen, Lin. "Art and Interpretation." Internet encyclopedia of philosophy., Accessed September 11, 2023. iep.utm.edu/art-and-interpretation/.*
12. *99pi. "Ten Thousand Years." 99% Invisible, July 8, 2020. 99percentinvisible.org/episode/ten-thousand-years/.*
13. *"Voyager - the Golden Record." NASA. Accessed September 11, 2023. voyager.jpl.nasa.gov/golden-record/.*

Jon Lomberg. I could not locate other purely "artistic" works, where a push for long-lasting and highermost translation of meaning in non-symbolic language would be its fundamental aim. Perhaps because these goals are usually implicit, and in some cases the information/emotion expressed is feasibly straightforward that it does not require any further deliberation such as in the case of Banksy's Ramallah check-point murals[14]. I think the main features in this example could be maintained throughout the time, although the surrounding contextual information will fade unless additionally provided. Instances of the use of symbolic language in artworks that narrow down the spectrum of interpretations are easier to come by; we can see it take effect in artwork titles, however, another such instance would be the famous René Magritte's The Treachery of Images (also known as This Is Not a Pipe) painting. Yet interestingly, even with the use of titles and symbolic language, adequate translation of meaning can still sometimes be arduous[15].

Concepts of signifier and signified from the field of semiotics[16] can also be useful to keep in mind for the purposes of understanding the building blocks of symbols and meaning. Both terms, coined by Ferdinand de Saussure one of the founders of the field, are parts of a sign/symbol. Signifier being the material something which is pointing us towards the signified. And signified a mental representation of a physical object a "referent"[17].

That wraps up all the helpful theoretical concepts I came across with regard to my purposes. The empirical research seems to focus mainly on aesthetic appreciation rather than interpretation. Techniques using fMRI[18] and EEG[19] scans and or eye movement tracking are deployed to do so.

The eye movement studies develop models[20] of the behavioral patterns of vision by distinguishing eye movements into saccades, bouts of movement with brief pauses, and fixations, periods of relative immobility. It is assumed that gaze is initially led by bottom-up i.e. more abstract properties before being taken over by top-down sense-making mechanisms.[21] Effects of how violations of "scene grammar" are also a topic of study. The scene "grammar" terms of semantics and syntactics are derived from linguistics[22]. Semantic violations in this context are presented as presence of objects outside of their ordinary occurrence (e.g. elephant inside of an office), while syntactic violation is a violation of rules of how objects are ordinarily positioned. (e.g. floating laptop in the office space) Some of the other things I found, that have been studied, are the effects of artwork titles[19], environment[23] or materials[24] on the eye movement of the research participants when viewing a scenes/artworks.

Upon reflecting on what I have found so far I wonder how do these advancements in eye movement prediction relate to the inner "mental" attention as we look at the scene. Relevant project worth of mentioning is the mind-video project, where a combination of machine learning techniques and neuroimaging data of subjects viewing videos was quite impressively able to produce very similar output to what the subjects originally looked at[25].

Are the areas with the most eye fixations also the most memorable/ salient features of the scene/artwork? Understanding of these relations could be helpful in uncovering the mental processes necessary for creating a sufficient model of lossless meaning translation custom to each individual.

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14. "*Ramallah check-point wall graffiti, 2005." Banksyexplained. Accessed September 20, 2023. banksyexplained.com/wp-content/uploads/2021/05/SEGREGATION-WALL-PIC-BB4.png.*

15. *Linsenmayer, Mark. "EP. 325: Paul Grice on Meaning and Conversation (Part One)" The Partially Examined Life, September 18, 2023. https://partiallyexaminedlife.com/2023/09/18/ep325-1-grice/.*

16. Semiotics (also called semiotic studies) is the systematic study of sign processes (semiosis) and meaning-making. *("Semiotics", Wikimedia Foundation, 18 August 2023, https://en.wikipedia.org/wiki/Semiotics)*

17. *"What is Semiotics? Saussure on Langue/Parole and Signifier/Signified",The Living Philosophy, 2021, youtube.com/watch?v=5KfmwgEXohI (06:06).*

18. Functional magnetic resonance imaging or functional MRI (fMRI) measures brain activity by detecting changes associated with blood flow. *("Functional magnetic resonance imaging", Wikimedia Foundation, 5 September 2023, en.wikipedia.org/wiki/Functional_magnetic_resonance_imaging)*

19. Electroencephalography (EEG) is a method to record an electrogram of the spontaneous electrical activity of the brain. *("Electroencephalography", Wikimedia Foundation, 6 September 2023, en.wikipedia.org/wiki/Electroencephalography)*

20. One example of such model is the LATEST model (*Tatler, Benjamin W., James R. Brockmole, and R. H. Carpenter. "Latest: A Model of Saccadic Decisions in Space and Time." Psychological Review 124, no. 3 (2017): 267–300.*)

21. *Ganczarek, Joanna, et al. "Titles and Semantic Violations Affect Eye Movements When Viewing Contemporary Paintings." Frontiers in Human Neuroscience 16 (2022).*

22. *Markey, Patrick S., Martina Jakesch, and Helmut Leder. "Art Looks Different – Semantic and Syntactic Processing of Paintings and Associated Neurophysiological Brain Responses." Brain and Cognition 134 (2019): 58–66*

23. *Võ, Melissa Le-Hoa. "The Meaning and Structure of Scenes." Vision Research 181 (2021): 10–20.*

24. *Lauer, Tim, Filipp Schmidt, and Melissa L.-H. Võ. "The Role of Contextual Materials in Object Recognition." Scientific Reports 11, no. 1 (2021).*

23. *Chen, Zijiao, Jiaxin Qing, and Juan Helen Zhou. "Cinematic Mindscapes: High-Quality Video Reconstruction from Brain Activity." arXiv.org, May 19, 2023. arxiv.org/abs/2305.11675.*

All Shapes[1]

Theoretical processes

Contrary to the first project, this one has much simpler underpinnings and starts with my affinity for capturing and curating the vast and sublime. The idea of having a category of a “thing” encapsulated in one object is aesthetically alluring to me. In my previous work wwwww021 freesounds & all their 5 beat rhythms (1.406704e+12) the starting point was to generate all the possible music yet not to repeat it and in this case, I moved this notion into the visual realm and iterated over all possible shapes.

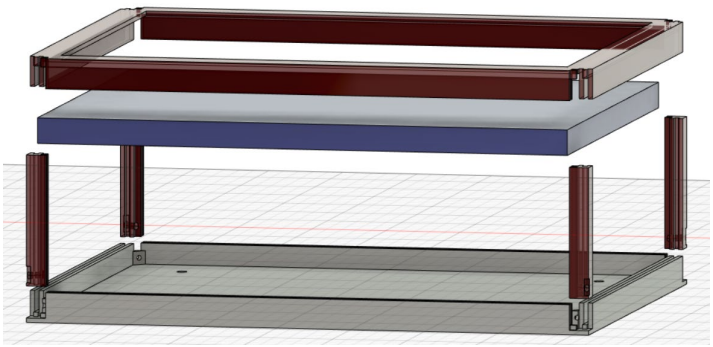
Because the core of the work is digital it can be displayed in multiple types of media. Depending on the properties of the medium it can have an impact on the nature of the digital program as well. Additionally, the work could also be operating on a cloud server, however, the quality of seeing the vessel itself that conducts all the computing is I think a fundamental feature of this work.
The primary factors for the nature of the work are the number of displaying points and their formation. For practical reasons, I proceeded with a rectangular setup of a screen I already owned.

1. video documentation: *dl.dropboxusercontent.com/s/4976asa2nhz1due/allshapes.mp4*

Despite that, I think diverging from the standard e.g. polygonal layouts could give rise to additional interpretations and derail from the original idea. Although on the other hand, circular or elliptical displays could, as I will touch upon, be a good solution in certain cases.
Another consideration would be the size, my preferences moved me to a more compact scale, because of the effect of encapsulation being much stronger and even “magical” and the details of the visualizations of not much importance, and even if increasing the size would result usually in more shapes the quantity is sufficiently vast even in smaller scales.
This all had its influence on how the work would in the end be presented. And as the work needs several other components besides the screen in order to work (Raspberry Pi, power supply, inverter, controller board). It cannot be completely flat, therefore I also thought of the possibility of placing it somewhere in space other than on a wall. It came down to the size again and since the packaging could be compressed to a compact size, the effect of placing it elsewhere but on the wall did not seem interesting. And any “sculptural” reshaping or additions to change it, I thought of as going beyond the original idea.
To incorporate the container with the digital part of the work as well as follow my preference for description independent works. I created a reductive diagram illustrating all the steps the algorithm calculates when displaying a shape, which would be part of the box.

Now onto the program itself, to make the matter less intimidating I settled on showing only singular 2D shapes without any holes.
Another limit I needed to decide on was the scope with which I would be working. The uppermost limit was set by the displaying medium I have chosen, although another engaging idea was restricting the bounds to the limitations of the human eye, which, since working with a smaller screen that already restricts this, I have not developed further, however when it comes to the low limit I considered it. But after some testing, I concluded that the limit needs to be higher, as barely visible changes are not equal to being noticeable (e.g. displaying one pixel on a dark background will be visible only when pointed out).
Because the presentation of the work lies in the iteration over all the possible shapes within these pre-set limits and displaying them. The selection of which shape gets showcased plays an important role. There are many ways to do so. The most conceptually straightforward ones for me are random selection, ordered selection, and contrasting selection. I wanted to use the contrasting iteration because I believe it is the most interesting to engage with, which unfortunately also makes the project difficult. To implement this approach I first needed to find what are the features of a shape of which differences I could try to maximize. I identified them to be: size, ratio, rotation, number of points, placement of points, amount of curvature, connections, and supplementary features might be: location of the shape and color.

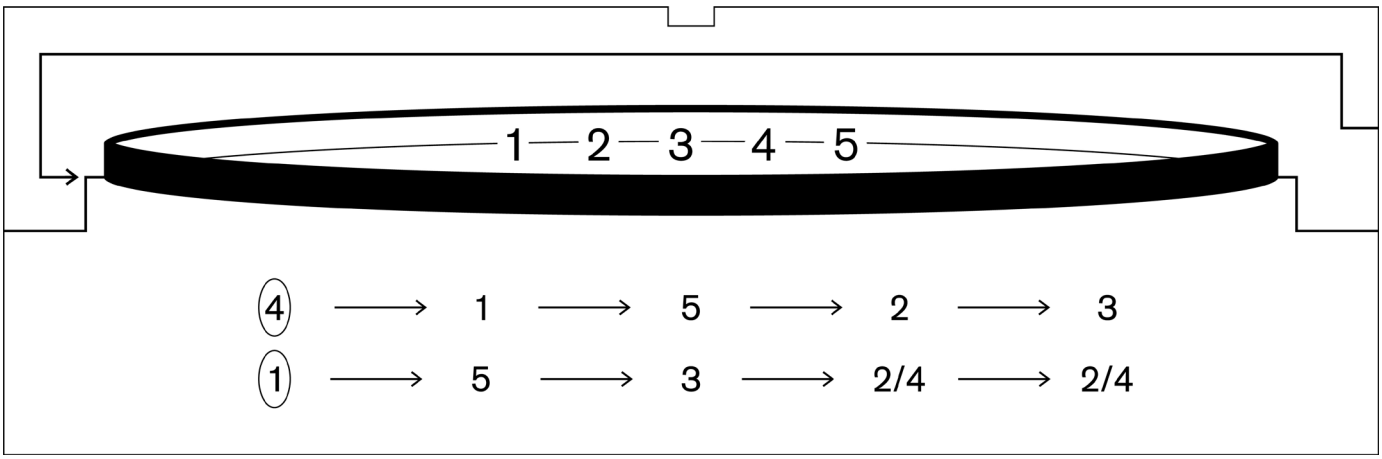
Realization



The physical and digital parts of the work were again built up concurrently.

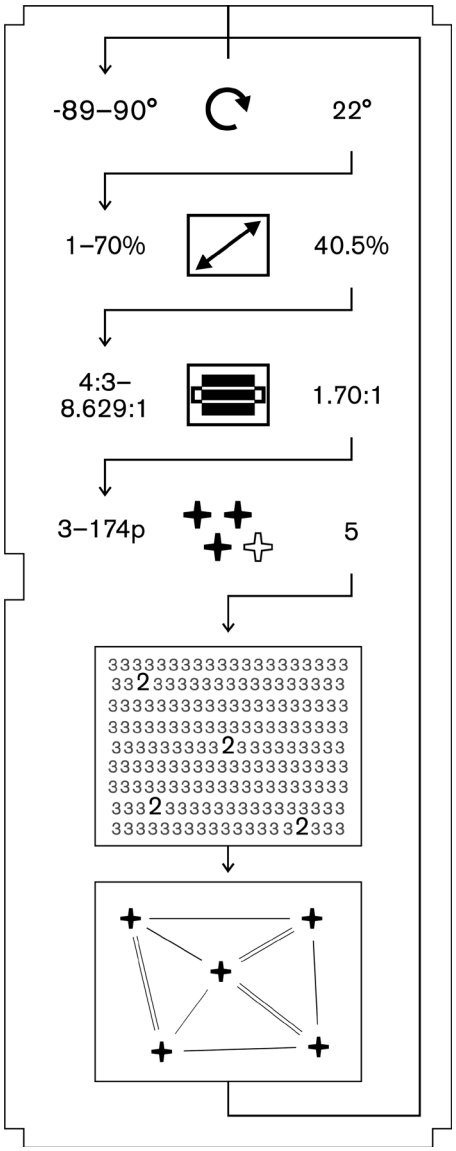
Initially, my plan for the box/container for the screen and electronics was to 3D print a custom model made in Autodesk Fusion 360[2] and use it to make a mold for aluminum casting. Which I thought would yield a unique look that could be shaped further. While, there were issues with printing size limits and connecting the separately printed parts, due to warping of the thin joints.

2. a commercial computer-aided design (CAD), computer-aided manufacturing (CAM), computer-aided engineering (CAE) and printed circuit board (PCB) design software application *(“Fusion 360”, Wikimedia Foundation, 9 August 2023, en.wikipedia.org/wiki/Fusion_360)*

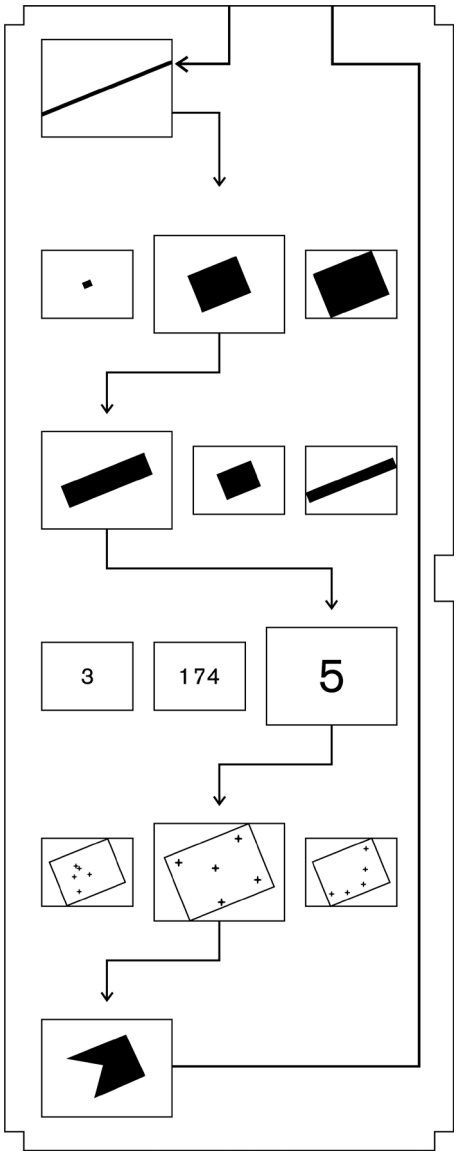


What forced me to shift was finding out that sections of my design were too thin (3 mm) and that would not likely be successfully cast without manufacturing grade equipment.

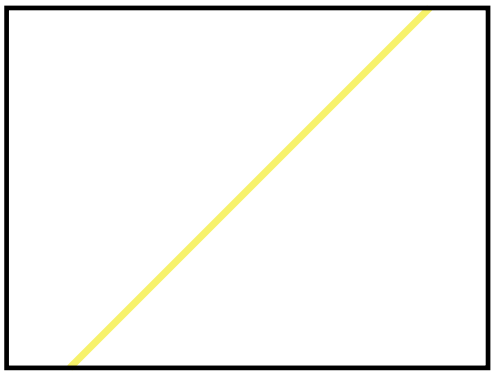
Turning to an easier construction made out of connecting square aluminum profiles and aluminum 3-way corners. Every part had to be meticulously measured and fit with quite high precision, which ended up causing some troubles when cutting the profiles to size. After cutting and smoothening the edges I drilled 4 holes in the middle of the back-facing bars serving as points for wall attachment. Four more holes had to be made from the sides of the front-facing bars to fasten the screen with bolts, which had to be cut down to size. All profiles were connected using the 3-way corner connectors and allen-key bolts.



The whole build was first designed in the Fusion 360 software, where I minimized the size of the container and made sure all the components would fit and be aligned.
When it comes to walls my wishes were to use glass, but I soon discarded it for more easily manageable transparent acrylic plates, which I could laser cut to size, engrave and add holes for bolts for securing the electronics. And by fitting two acrylic plates on top of each other and cutting out a small pocket on top of the hole in the inner plates, I overlayed the bolts with the outer plates successfully hiding them. The corners of the walls had to also be laser cut in a way to adjust them to the corner seams of the aluminum profiles as well as the wall screws. All the walls were then inserted into the aluminum grooves. The engraving of the diagrams on the walls was done simultaneously with laser-cutting and the design was made using Adobe Illustrator. Where I applied my efforts aiming for depicting a clear representation of the essential mechanisms.



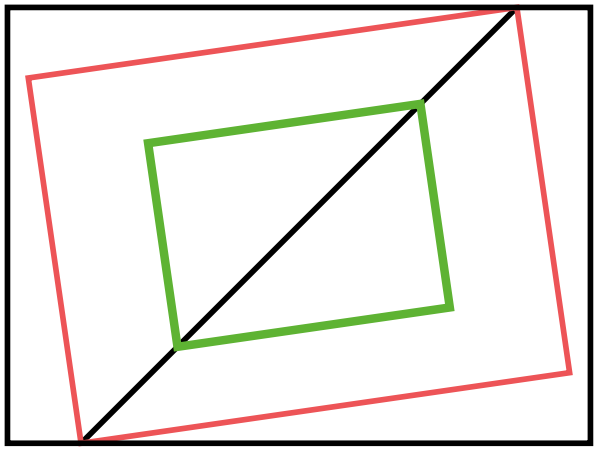
Prior to building the software, I needed to determine what would be the optimal programming language for this project. Since I was concerned about the amount of computation necessary especially in the later stages of the program, when many of the shapes have already been generated, I was looking for a language with a lesser amount of abstraction, that is more performant.
I concluded my search upon finding Nannou, a graphic library for Rust. But, because I anticipated the difficulties of trying to use a new tool with a nearing deadline. I opted for Processing, which is a graphics library for Java, that I had experience using in the past. The downside of this is that as already mentioned it is not as efficient, however, my resolution was that the concepts I am going to develop would be the same, while the size of the project will not be immense. Therefore if the chosen framework is eventually inadequate I can reapply the already developed ideas into the other language.
Now, with the chosen framework I started by defining the steps needed for creating the first shape, while keeping in mind the key features of size, rotation, proportion, etc. mentioned above. Determining the size of the "working area" where the shape will be formed was the first matter on the list, but as I later found out, starting with defining the rotation simplified the process a lot[3].



Thus, the first parameter to be randomly picked is the rotation. The range to be selected from is between -89.5 to 90 with half-degree steps. -90 is omitted, since the workspace to be determined follows the shape of the rectangular shape of the screen and therefore is symmetrical, therefore 90 and -90 degrees give identical results.
The randomly picked value is stored as part of an array. The following value in this array is going to be another parameter stored as part of another array embedded within.

[picked rotation, [second array]]

The range from which we can pick the size value, the second parameter of the workspace rectangle, is already affected by the rotation value. With the rotation of 0, the permissible range is 1 to 100% of the original screen resolution, which is 1024 to 768 pixels. The range starts from 1% to adhere to a limit I set for the smallest possible shape being 5 by 5 pixels, which to me appeared to be also the limit for noticeability. Again, just like with the degrees, the steps between the percentages are incremental by 0.5%.



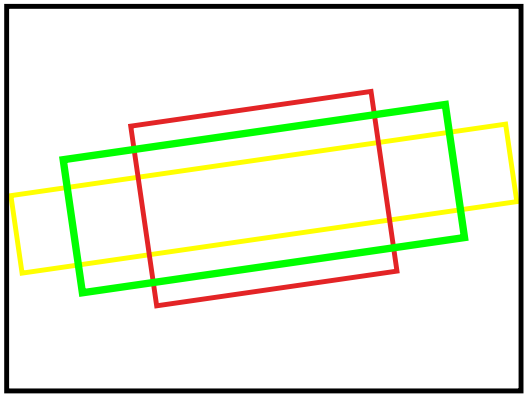
With any other rotation value than 0, the upper limit of the selectable size range decreases[4]. This is calculated by using Pythagorean formulas for the biggest possibly fitting rectangle, calculating the area of the rectangle, and converting the area to a percentage of the area of the original screen size.
The chosen value is again stored as part of an array, which is stored as the second value of the first array. The current array's second value will also be another array embedded within it.

[picked rotation, [picked size, [third array]]]

The third parameter is the width-to-height ratio of the workspace rectangle. In this case, to narrow down the possibilities that might yield similar results, the width of the rectangle could only increase

3. The bigger percentages of the original screen size restrict rotation range and since rotation in both directions is permitted, additional calculations are necessary for determining the confines for both directions. This is not needed if the rotation is selected prior to the size of the rectangle.
4. E.g. for rotation of 90 degrees the range is 1 to 74.7 percent of the original size

at the expense of the height. The range this time being between 4:3 to the widest possible ratio.
The equations necessary for calculating the most permissible “stretching” (increasing of the width and decreasing of the height) of a rotated rectangle before its edges touch the corner of the screen, with the thinnest permissible limit being again the height of 5 pixels minimum, were out of reach for my limited math knowledge. To hasten the process, after a few weeks of my own attempts, I hired a mathematician who after some communication troubles[5] provided me with a working solution!



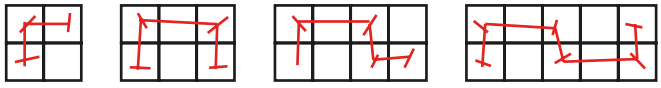
The randomly picked value is again stored in the second array in the same way as previously.

[picked rotation, [picked size, [picked ratio, [fourth array]]]]

The calculation of the upper range for the fourth parameter, the amount of points used for making the shape, grew into a perplexing issue.
While the lower range starts from 3 points to make a shape.
The upper amount is derived from the generated working space rectangle. Limited by a few pre-decided principles one being that three consecutive points/blocks[6] cannot be adjacent to each other on a single axis, as it would make no difference whether there are 4, 3, or just two points forming the line or edge.
The second limitation is that there needs to be a horizontal/vertical/perpendicular space between the emerging edges of the shape in order to avoid “invisible walls”.
Although the number of different rectangle sizes is large, following my intuition I wagered that by finding specific emerging patterns for prime number rectangles, I would be able to extrapolate the formula to the rest. This is true, however, my chosen method of finding these patterns by trial and error ended up time taxing.

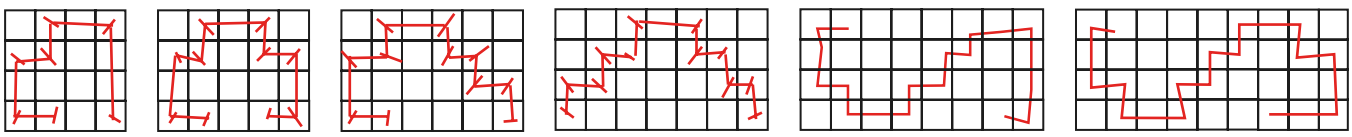
The patterns of point increase by each added column for specific height:

1 row = 4 points



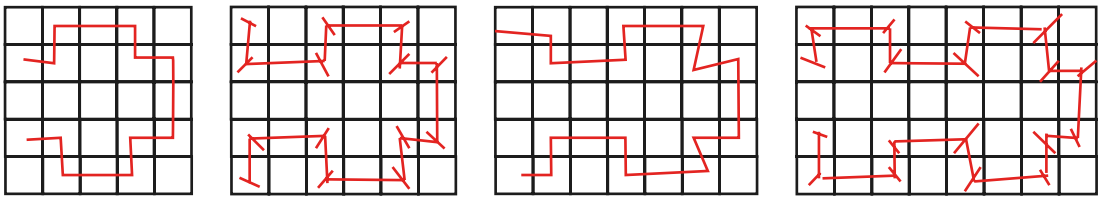
2 rows = increase by 2 points

3 rows = increase by (4),...4,2,2,4,... points

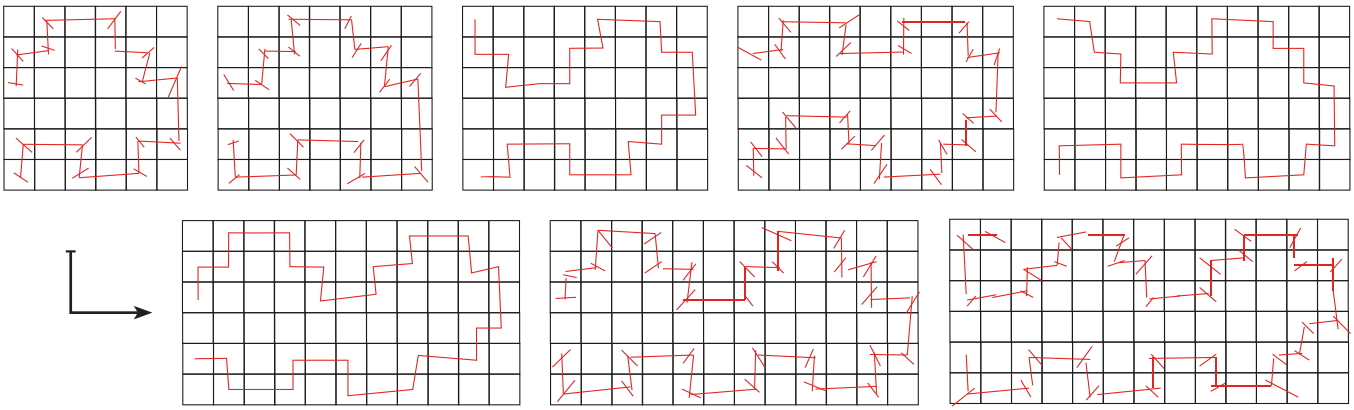


4 rows = (6),...2,2,4,4,... points

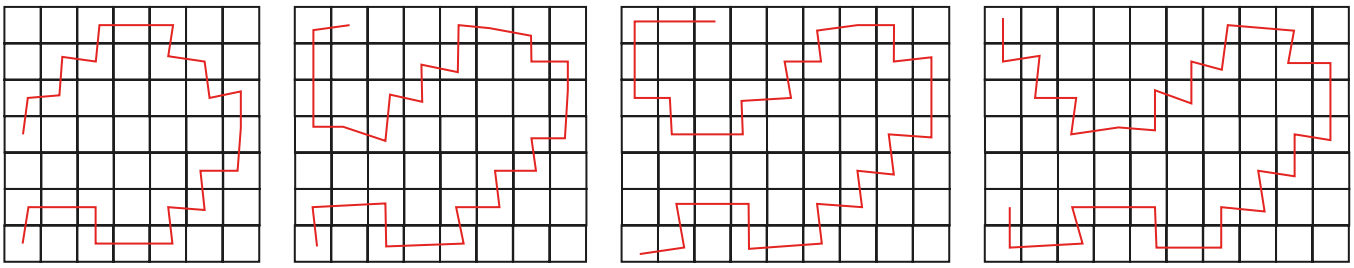
5. I found that even defining a problem using language is prone to misinterpretation.
6. I simplified the point calculation problem into connecting the smallest possible shapes, the 5-pixel blocks, together instead of working with points per se. This decision stemmed from the idea of “noticeability”. Making the shortest possible connection to be the 2 smallest shapes adjacent to each other.



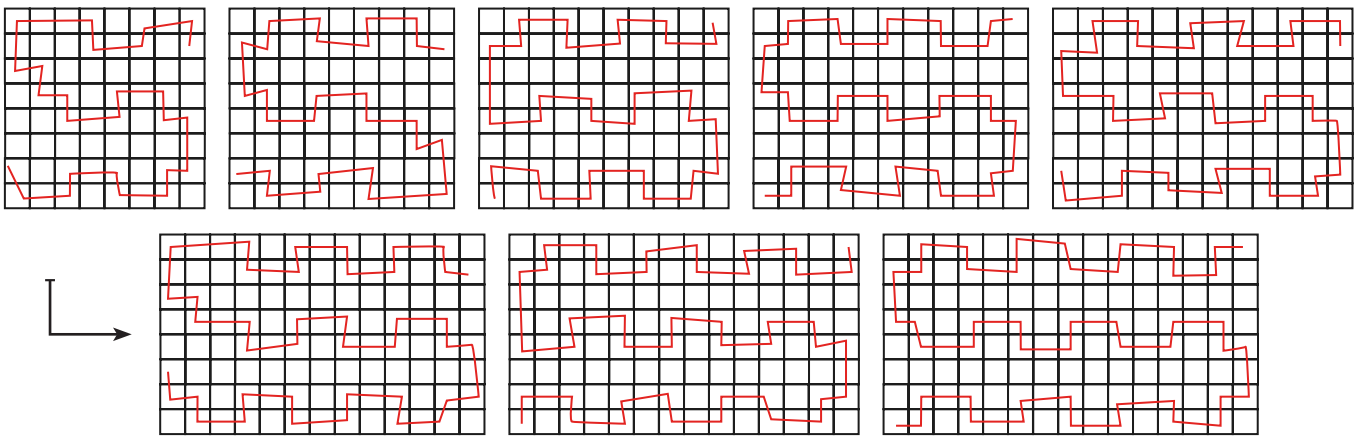
5 rows = increase by 4 points



6 rows = increase by (2,8),...4,4,4,6,4,6... points

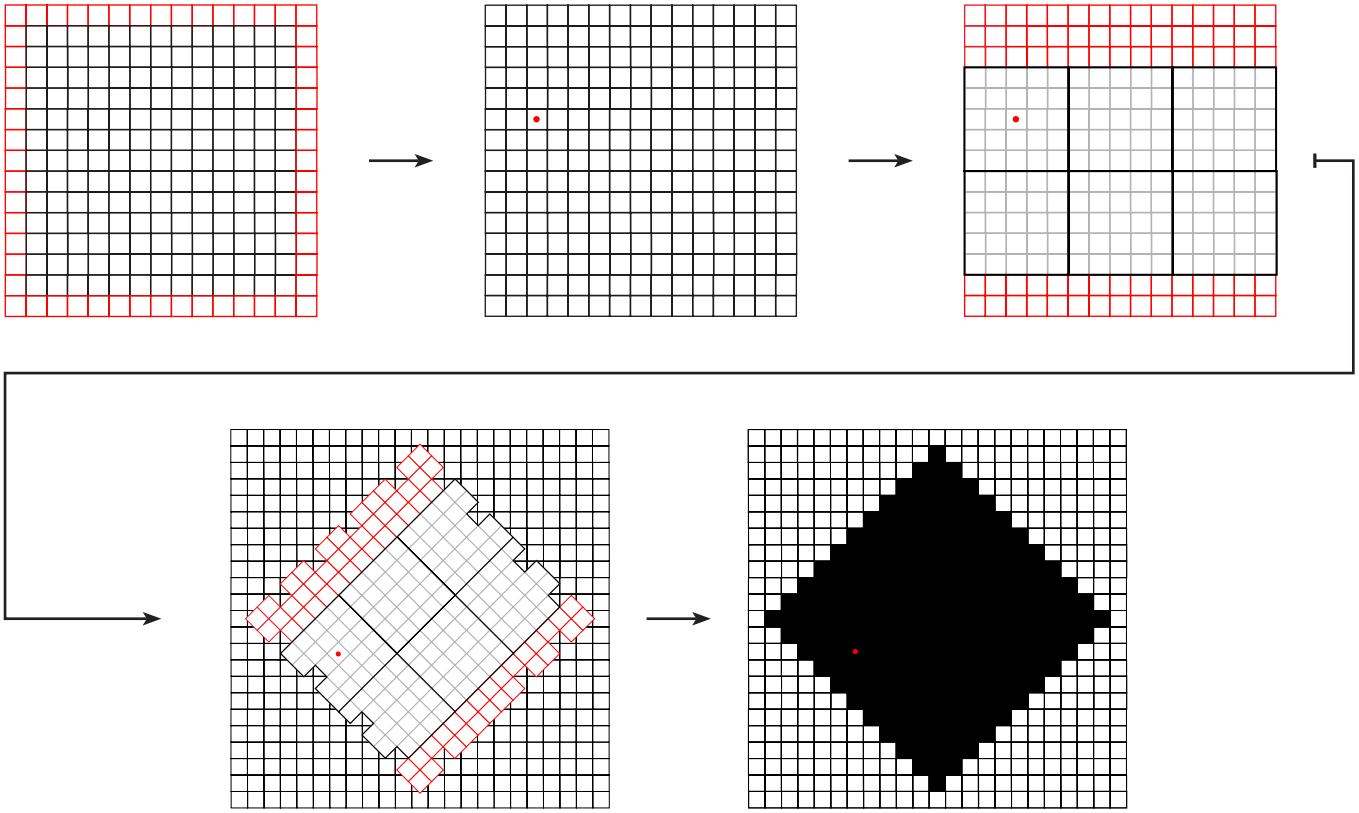


7 rows = increase by 6,6,4,4,... points



8 rows = increase by 4,6,8,4,6,6,8,4,6,... points

Furthermore, by the end of this hardship, an issue with my approach was brought to my attention. Since all my calculations have been made using a non-rotated rectangular grid, yet many of the rectangle workspaces are rotated. And since the pixel grid of the physical display itself cannot be rotated, the edges of the rotated rectangle workspaces will be “jagged” and missing some pixels along its edges, therefore making the formula inaccurate. This was a considerable obstacle, which I have foregone for the time being. Luckily, upon working on the mechanisms discussed next, it has struck me that by following the already set up logic of the smallest shape size (5x5 pixels), it can be completely bypassed. To elaborate, the reasoning behind the smallest possible shape restriction, as mentioned, was to preserve the quality of “noticeability”, thus extending this rule to the way of how the edges of bigger shapes are formed seems legitimate. There seem to be two ways of doing so, although only one of them is compatible with the present setup. One way would be to always create this 5x5 pixel grid from the generated workspace relative to the initially placed point.



While this path provides more variety when it comes to the total number of combinations it does not bypass the “edge problem” (another way of addressing this issue i suspect would be to retain 1 unused pixel margin in the workspace, which would be affected during rotation) and would also require a restructuring of the existing framework e.g. selecting the initializing point from which to create the grid before calculating the maximum amount of points. The second and simpler technique is to completely “pixelisize” and downscale the workspace into 5x5 pixels and calculate the maximum permissible amount of points on this scale. This would necessitate keeping the width and height of the workspace divisible by 5, limiting the amount of variety. However, moving to the actual placement of the points, keeping the points within 2-pixel margins on each side from any other edge would ensure that rotation does not affect the permissible total amount of points calculated in this manner.

Therefore, after finding the uppermost limit of the amount of points for the current workspace the number of randomly picked points is again stored in the third array in the same way as previously.

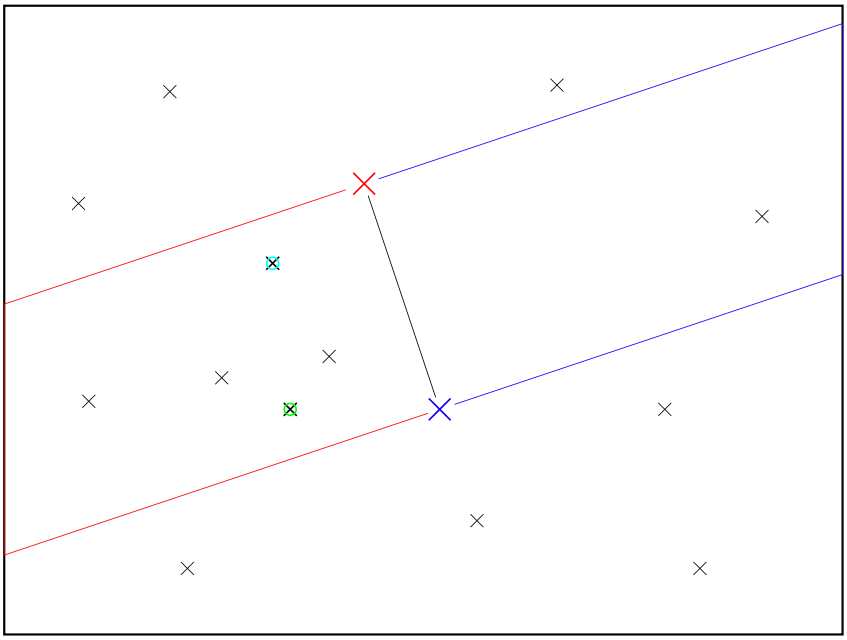
[picked rotation, [picked size, [picked ratio, [picked number of points]]]]

At this point, the “depth” (no more new arrays are being embedded inside of the fourth array) of the created array is final. Its purpose is to store all the already used combinations of feature values. Therefore from this point on newly chosen values will be added by the existing values eg. newly picked size value:

[rotation, [old picked size, [ratio, [number of points, [fifth array]]], newly picked size, []]]

In addition to this array, there are “meta” arrays that get updated alongside the “relation” array. These arrays are tracking feature values no matter the relation to the previous feature. The purpose of these arrays is to maximize the “contrast” and try to prevent the same value repeat before all values have been used for that specific feature. Eg. a rotation of 0 degrees will not be prioritized in use before all other 358 options are used.
The “meta” arrays consist of: rotationArray, sizeArray, proportionArray, pointArray, positionArray, and connnectionArray. The positionArray tracks which pixels in the whole screen have already been used and how many times, and tries to prioritize the least used ones. While the connectionArray similarly tracks all the specific connections between all points on the screen.

The chosen amount of points are randomly scattered around the least used positions determined by the positionArray and the rule of at least one block of space between the edges, which in terms of placing points translates to not having three blocks adjacent to each other in one axis.
What follows is a random connection of the scattered points. While adhering to the rules of only 2 consecutive points on one axis and not crossing already existing connections. The brief non-technical solution to this is to always check whether the two groups of points perpendicular to the newly made connection can still be connected. Sadly, this concise explanation comes with many difficulties when it is being implemented in practice.
I start by randomly choosing an origin from the scattered points. Then I choose a connection point based on values specific to the chosen point in the connectionArray in order to find the least used connection available. Of course, for the first time every connection would have been used 0 amount of times.
In a custom-created graphic of the same size as the screen, I firstly mark all the points and then connect the origin and connecting point by a line. Subsequently, I calculate the angle between the points and draw lines from each point perpendicularly to the edges of the screen/graphic. With the background black, I fill newly created “boxes” on each side with differing colors blue and red (coloring is arbitrary). Which allows me to iterate over every placed point and check whether they have fallen into an area with black, blue, or red. Then I am able to place the points into separate groups groupA (blue box) and groupB (red box). Points outside of the boxes in the black area are ignored[7].
If one of the boxes is empty the connection can be successfully created, if not following procedure takes place:
By iterating again over the points in the groupA[8] and calculating how close they are to both of the perpendicular lines I find two points (or one) that are closest to each of the lines…



7. Utilizing the graphic in order to find the points might not be the most elegant solution, yet I was incapable of finding an alternative.
8. Again, this is an arbitrary decision it could have been groupB.

At this moment in the development, the exhibition installing day was only a few days away and I decided to opt for an improvised simpler version of the work. The continuous description of the rest of the full-scope work starts in the following section.

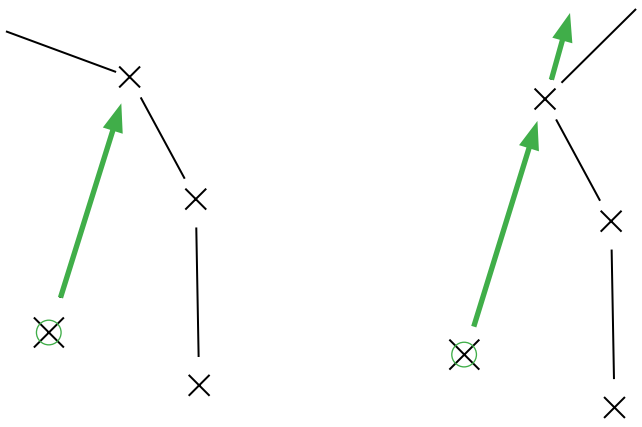
The cutback version functioned by randomly generating a number of points in random positions and saving the configuration into an array. The array was iterated over in order to detect undesired configurations (identical shapes). This impromptu version of course lacked the system of maximizing contrast, that I have been building and without a doubt would be computationally expensive by brute checking all the previous iterations in order to find possible same shape not to mention the situation when perhaps only few last ungenerated shapes are missing, when the likelihood of randomly generating those specific shapes is very low. Nonetheless, because the number of all the possible shapes is very high this version of the work withstood the exhibition time and lived up to its name!

The last facet of the work I needed to resolve was the graphic presentation of the shapes. The effort was to keep it meaning neutral, but even then there were few choices to be made such as presenting the shape with an infill or without and picking the color scheme. A black background with white shapes was the most obvious simple choice that I decided to stick with, yet another option that I find aesthetically pleasing yet neutral is an outline of the shape filled with the whole color spectrum.

Post-exhibition WIP

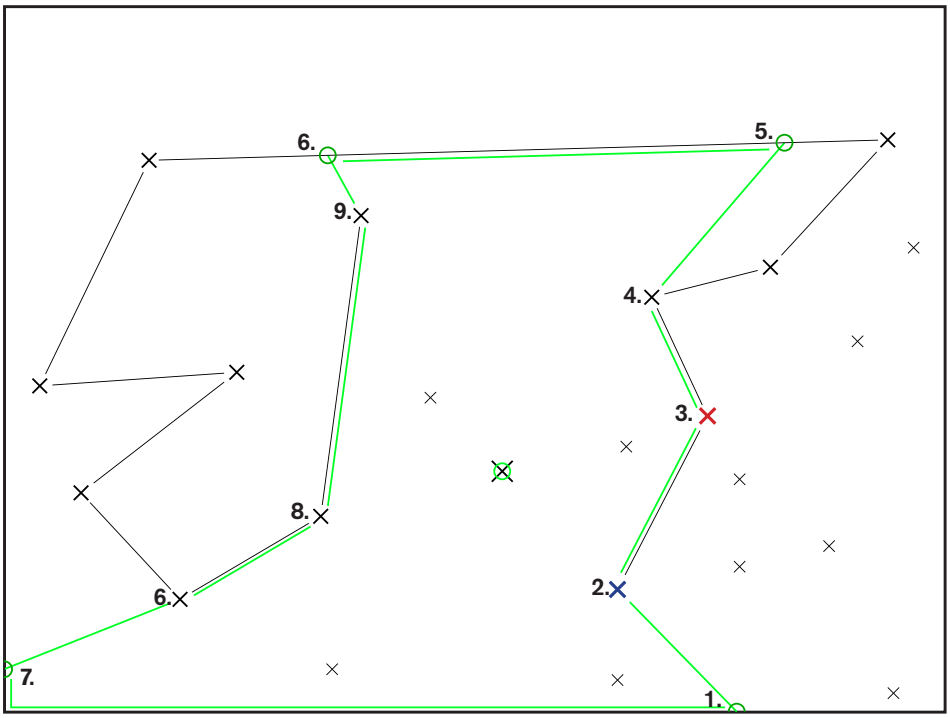
Continuing from where I left off in the description of the point connection method, all from here on, along with the total amount of points calculation highlighted earlier, has not been practically implemented.

With the selected points closest to each edge on both sides of the newly proposed point connection, I choose the point which is closest to the connectingPoint edge[9]. New graphic is created where this point's "field of view" is drawn. Starting from the connecting point all the way to the origin point polygon is created so we would be able to check which points are within. This happened to be difficult as to create it, all points need to be in orderly sequence. But connections that obscure each other and places where the wall is "visible" thwart any hopes for an easy solution. Thus we continue by stretching a line pixel by pixel from the connecting point (under the same angle as our selected point) and checking on each step for collision with a wall or another connection. Once our line collides whether with a wall or a line, we add this point(1) along with the connectingPoint(2) and continue doing so for all the previously connected points, but also checking for their concavity/convexity in order to know if we can continue stretching the line from the point in question as in the case of the connectingPoint.

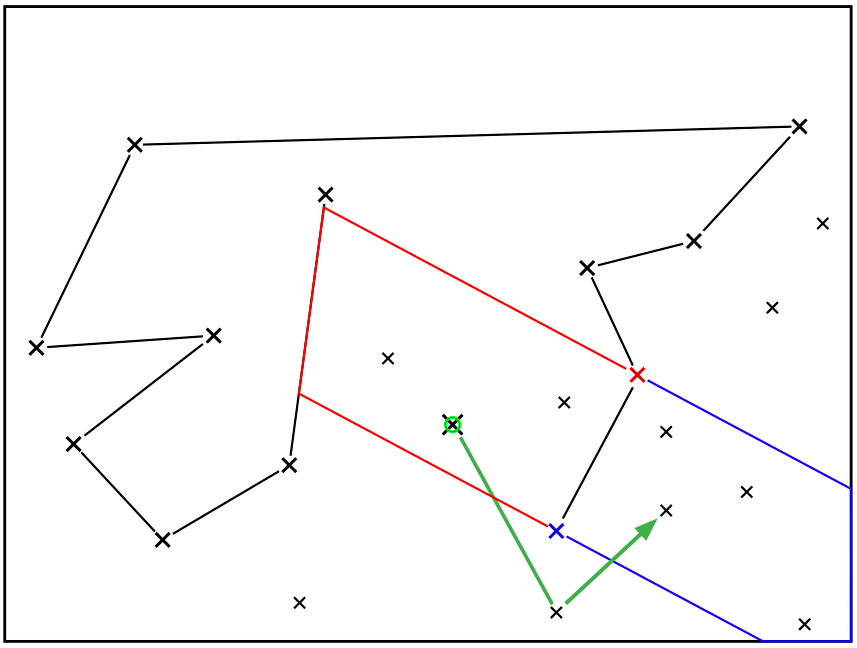


9. This is because it is more likely that the connection to the groupB can be made with this point rather than with the point closer to the origin edge, since the more connections there are more lines need to be avoided

Adding all the points to the ordered list with the difference that, in the instances of collision with another line or wall and creating a new point(2), the newly created point is added after the “real” point(1) and also needs to be marked. This is to be able to successfully order the points into the desired polygon.



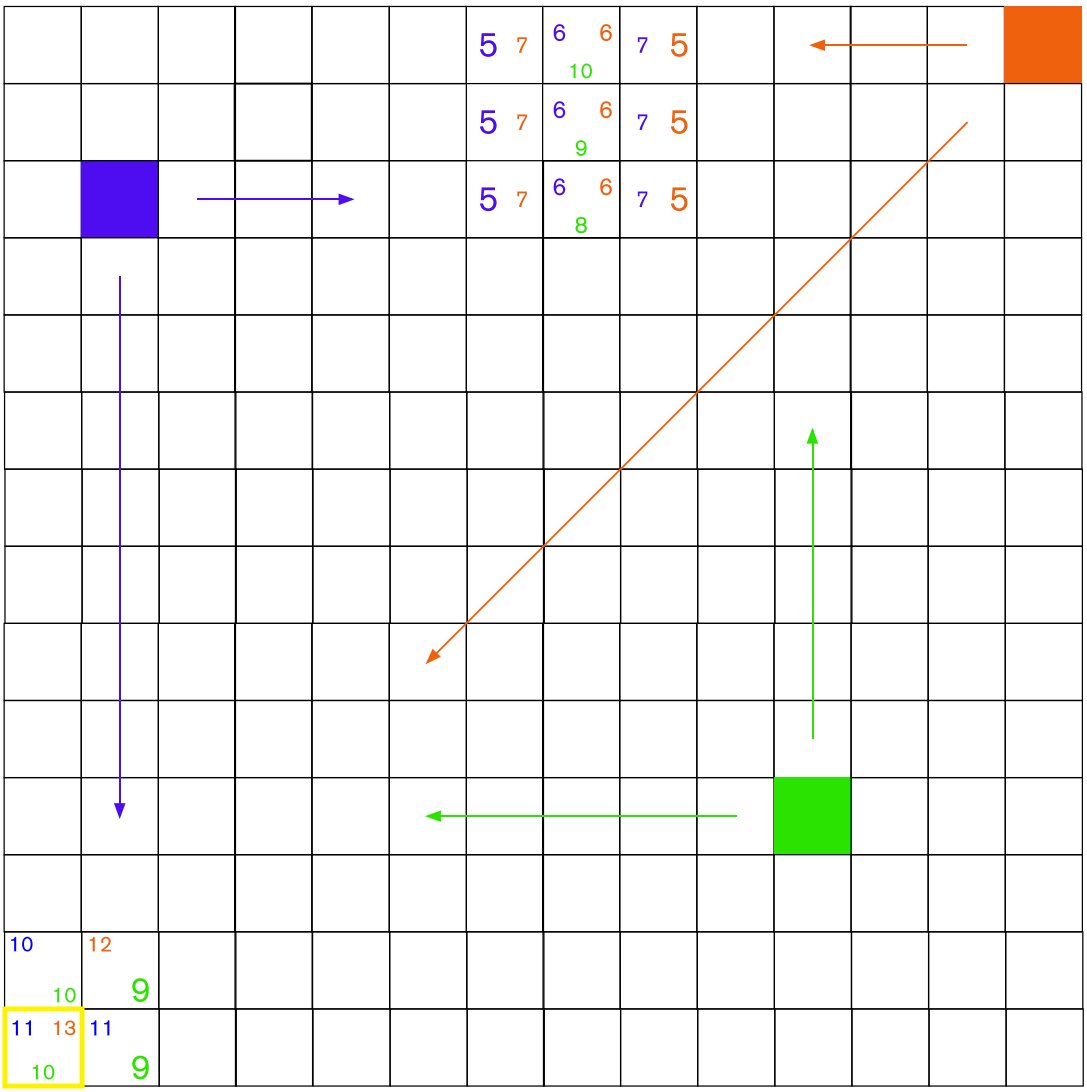
By filling the polygon with color and iterating through all the unused available points that are not in the groupA or groupA we could then see which ones fall into the “field of view” of the selected point.
In case of there not being any, the same procedure would happen for the second selected point closest to the originPoint edge and if that would fail as well this specific connection is not possible and a new one needs to be selected.
If there are available points in the “field of view” we would firstly try to select one of them that is distance-wise closest to the “edge points” of groupB. And create a “field of view” for this point too and check whether the points from groupB might appear inside of it.
In the case that there are not any points from groupB we would exclude all the points located in the “field of view” of the previous point and again find the closest point distance-wise to the groupB and iteratively repeat.
In the case of points from group B appearing in the “field of view”, the connection can be made. And we can move on to selecting a new connection point, repeating until there are no points left.
The origin point needs to remain being considered as a point when checking for the perpendicular points. Since we need to be able to connect to it in the end, to form a shape.



This concludes the first cycle in generating all the possible shapes. What follows is an identical loop of previously expressed steps with the exception of additional calculations

for maximizing the difference in all the tracked attributes and verifying whether the picked configuration has not already been shown.
Thus for the linear spectrum of values of rotation, size, proportion, and amount of points, the added values in their respective meta arrays are used to calculate the next most “contrasting” value by searching for one that has the least proximity to all the existing values. The least proximity overall, not on average:

In case of a tie between the values, the next number is picked randomly.
Once all the values are used, the meta array resets and can be filled again.
The same happens but with added complexity when using the positionArray and calculating the placement of the points:



For the calculation of connections, connectionArray is checked against all the possible connections available, and the least used ones are picked with no further evaluation.
For checking of recurrence of shapes in the later stages there is an extra three-layered array in place. With an identical structure to the “contrast and relational” array it tracks first the amount of points, and within it point coordinates, and finally within that the specific connections. The array works together with the “contrast and relational” array when checking for repeating shapes, yet it is separate to avoid duplicate shapes since workspace size 100% and workspace size 10% can have identical shapes nested within them.

[Amount of points, [Point coordinates, [Connections]]

Additionally, because the nature of the work is also time-based with yet unknown playtime derived from the unidentified amount of total shapes to be shown. “Seed” numbers determining the outcome when choices are left to chance and storing of the array values can enable us to replay certain pathways or start from the last instance before the artwork got turned off by whichever cause.

Lastly, regardless of thorough checks throughout the development, debugging[10] tests need to be designed and executed to catch shortcomings emerging from the whole system.

Emerging points

At this point, it is evident some sections of the project still need some attention. Although the major part, the digital part, of the artwork is in the scope of what I am predominantly focusing on in my practice, the precise mathematical nature of this project proved to be challenging.
And while not keeping track of total time I estimate about 2-3 months of total work-time has already been spent on it.
In the beginning stages, I have been suggested to work on 3D shapes instead, because three-dimensionality seems to be more aesthetically salient and pleasing in this context for some reason. Despite being of the same opinion I leaned towards the less difficult option, for which, looking back, I am now grateful. My line of reasoning has been, that after getting the hang of the arising puzzles, they might transfer to the 3D world and I can build that project too with some insights and practices right from the onset.
I found presenting and discussing my plans and prototypes helpful in weeding out any major future problems that might arise[11]. In the future, when faced with a bit more strenuous task, I would like to consult my plans with a technical expert relevant to the specific project. I think it would make for smoother progression instead of trying to efficiently close a major gap in knowledge for every foreign concept I face. The one occasion acquired support for; finding the formula for calculating the proportion/ratio was very helpful and it made me think of how differently and more efficiently could the project be laid out if I discussed my overall plans with someone who solves these problems on a daily basis.

This artwork could be grouped together with artists and works of the digital generative kind. Some of which I have been familiar with were:
Casey Reas, one of the authors of the Processing library I have been using. Refik Anadol, who seems to be receiving a lot of recognition as of now, at least in my media bubble, for his large AI data visualizations. Jason Ting (JZLabs) working in TouchDesigner[12]. Shohei Fujimoto using open Frameworks[13]

10. In computer programming and software development, debugging is the process of finding and resolving bugs (defects or problems that prevent correct operation) within computer programs, software, or systems. *(“Debugging”, Wikimedia Foundation, 25 August 2023, en.wikipedia.org/wiki/Debugging)*
11. For that I am thankful to the art & technology team: Robert Fusco and Tuomo Rainio.
12. a node based visual programming language for real time interactive multimedia content *(“TouchDesigner”, Wikimedia Foundation, 26 August 2023, en.wikipedia.org/wiki/TouchDesigner)*
13. an open source toolkit designed for creative coding *(“openFrameworks”, Wikimedia Foundation, 10 April 2023, en.wikipedia.org/wiki/OpenFrameworks)*

and translating the results into the analog realm by integrating the program with physical lighting. Albert Omoss creating procedural 3D renders in Houdini[14].
Evidently, there are many slightly different environments or "working paradigms" one can work from and utilize. Yet despite the similar nature of techniques used it seems to me that these artists are more interested in the domain of visual aesthetics, whereas my work sacrifices a bit of value on this front to uphold its conceptual idea.
In my additional research, the closest effort made in relation to this project is that of "SuperShapes" by Andrew Marsh, where one can generate many possible[15] 3D shapes by the use of sliders for specific characteristics.

Overarching efforts

On a broader scope, as hinted at in the catalog text, I view these artworks as intermediate steps towards a future where art-viewing is a bespoke adventure, where prior experiences and current state of mind are optimized for the individual.
They are intermediate steps because the goal is momentarily distant and seemingly unreachable, but by building a knowledge base and skillsets we can slowly reach closer. Yet semi-frequent output is also necessary in our resource-scarce world, thus strategically adopting new knowledge and imbuing it into interesting works is, I believe, the only way onward.

The described objective and or philosophy, I think, stems from my views on art-making. Differentiation can be made between art-making as a form of self-entertainment and art-making that objectively contributes to the whole space of arts.
Another potentially controversial distinction I make is that between artworks and "craftworks". I see art-making as a creation of milestones, where work needs to exceed a certain ambiguous threshold of novelty in order to become art no matter how exceptionally executed. In the past with the lack of a common repository it has been difficult to keep track of these milestones, luckily the internet makes this easier than ever before. There are even leaps forward to annotate and map artworks and their surrounding context in the field of iconology[1] to help us navigate the ever growing art historical body by the means of data and computation[16].
Yet despite this perspective, which lies more on the basis of efficiency, the entertainment/educational value in art-viewing is not dependent on it. The benefit of art-viewing is conditional to the experiential and mind-state priming.
These are the paradigms that influenced me in the production of the two presented works and I am curious how it will withstand the test of time and what the future of art is going to look like!

14. A 3D animation software application. Procedural tools are used to produce different effects such as complex reflections, animations and particles system. *("Houdini (software), Wikimedia Foundation, 13 September 2023, https://en.wikipedia.org/wiki/Houdini_(software))*
15. Although it does not seem it would encompass the whole 3D shape space.

1. A method of interpretation in cultural history and the history of the visual arts, that uncovers the cultural, social, and historical background of themes and subjects in the visual arts. *("Iconology", Wikimedia Foundation, 17 January 2023, en.wikipedia.org/wiki/Iconology)*
2. *Baroncini, S., M. Daquino, and F. Tomasi. "Modelling Art Interpretation and Meaning. A Data Model for Describing Iconology and Iconography." arXiv.org, June 23, 2021. arxiv.org/abs/2106.12967.*

Reference list

Baroncini, S., M. Daquino, and F. Tomasi. “Modelling Art Interpretation and Meaning. A Data Model for Describing Iconology and Iconography.” arXiv.org, June 23, 2021. arxiv.org/abs/2106.12967

Chen, Zijiao, Jiaxin Qing, and Juan Helen Zhou. “Cinematic Mindscapes: High-Quality Video Reconstruction from Brain Activity.” arXiv.org, May 19, 2023. arxiv.org/abs/2305.11675

Ganczarek, Joanna, Karolina Pietras, Anna Stolinska, and Magdalena Szubielska. “Titles and Semantic Violations Affect Eye Movements When Viewing Contemporary Paintings.” Frontiers in Human Neuroscience 16 (2022)

Harvard GSD, Core Studio Public Lecture: Virgil Abloh, “Insert Complicated Title Here.””, 2017, www.youtube.com/watch?v=lQdkxyXPPMc (14:12).

Lauer, Tim, Filipp Schmidt, and Melissa L.-H. Võ. “The Role of Contextual Materials in Object Recognition.” Scientific Reports 11, no. 1 (2021)

Linsenmayer, Mark. “EP. 325: Paul Grice on Meaning and Conversation (Part One)” The Partially Examined Life, September 18, 2023. https://partiallyexaminedlife.com/2023/09/18/ep325-1-grice/.

Markey, Patrick S., Martina Jakesch, and Helmut Leder. “Art Looks Different – Semantic and Syntactic Processing of Paintings and Associated Neurophysiological Brain Responses.” Brain and Cognition 134 (2019): 58–66

NASA, “Voyager - the Golden Record.” Accessed September 11, 2023. voyager.jpl.nasa.gov/golden-record/.

Szu-Yen, Lin. “Art and Interpretation.” Internet encyclopedia of philosophy, Accessed September 11, 2023. iep.utm.edu/art-and-interpretation/

Tatler, Benjamin W., James R. Brockmole, and R. H. Carpenter. “Latest: A Model of Saccadic Decisions in Space and Time.” Psychological Review 124, no. 3 (2017): 267–300

The Living Philosophy, “What is Semiotics? Saussure on Langue/Parole and Signifier/Signified”, 2021, youtube.com/watch?v=5KfmwgEXohI (06:06)

Võ, Melissa Le-Hoa. “The Meaning and Structure of Scenes.” Vision Research 181 (2021): 10–20

Wikimedia Foundation, “Debugging”, 25 August 2023, en.wikipedia.org/wiki/Debugging

Wikimedia Foundation, “Electroencephalography”, 6 September 2023, en.wikipedia.org/wiki/Electroencephalography

Wikimedia Foundation, “Functional magnetic resonance imaging”, 5 September 2023, en.wikipedia.org/wiki/Functional_magnetic_resonance_imaging)

Wikimedia Foundation, “Fusion 360”, 9 August 2023, en.wikipedia.org/wiki/Fusion_360

Wikimedia Foundation, Houdini (software), 13 September 2023, en.wikipedia.org/wiki/Houdini_(software)

Wikimedia Foundation, “Iconology”, 17 January 2023, en.wikipedia.org/wiki/Iconology

Wikimedia Foundation, “Lifeworld”, 8 December 2022, en.wikipedia.org/wiki/Lifeworld

Wikimedia Foundation, “openFrameworks”, 10 April 2023, en.wikipedia.org/wiki/OpenFrameworks

Wikimedia Foundation, “Semiotics”, 18 August 2023, en.wikipedia.org/wiki/Semiotics

Wikimedia Foundation, “TouchDesigner”, 26 August 2023, en.wikipedia.org/wiki/TouchDesigner

99pi. “Ten Thousand Years.” 99% Invisible, July 8, 2020. 99percentinvisible.org/episode/ten-thousand-years/.

Appendix

All Shapes source code repository: gitfront.io/r/alex-schellong/M7z5VLuoBrXM/All-shapes

Website: lifeworld.solutions