

Report on *Data Patterns*:
A study of collaborative garment creation between human and machine

Work submitted to Marc-André Cossette
As part of CART 410 (Research Creation in Computation Arts)

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December 7th, 2022

Process and Methods

As mentioned in the proposal, commercial Generative Adversarial Networks (GANs) were the main method chosen to generate patterns meant to be worked into somewhat working clothes, albeit a few design eccentricities created by the unaware AI. Midjourney was preferred over other commercial GANs solutions such as Dall-e or Craiyon. From its very large crowdsourcing foundations, Midjourney is rapidly evolving into the most prominent commercial GAN solution prompted from Natural Language Processing (NLP). With written prompts, the discord-based algorithms create faithful and hyper realistic representations of almost anything a client could want to visualize. In this context, many iterations of prompts were fed to Midjourney which built a foundational ground to clarifying the communication patterns of the GAN (see Figure 1, Figure 2, Figure 3). Indeed, the goal of the project was not only to create AI generated patterns but also develop a comprehensive understanding of patterns AI, especially NLP GANs, learn through to be able to understand human linguistics and discriminate them from pixels and generate visual information through them. Finally, Midjourney was able to generate 3 satisfactory design iterations that would serve as the inspirations for the garment I was to create (see Figure 4, Figure 5, Figure 6)

Because Midjourney's GAN only outputted dressed figures, a few more steps were added to the originally anticipated methods of the project. A method called ‘concassage’ (*crushing, dividing*) in French was first used to extract the most inspiring details from Midjourney’s generated clothes using a projector and manual drawing techniques (see Figure 7, Figure 8). Those drawings were inherently taking the physicality of Midjourney’s imagined garments; being discriminated and artificially generated pixels, the AI imagined clothes do not abide by the real world’s physics. Because of the *unrealness* of the clothes, further technical drawings were

necessary to develop in order to understand how Midjourney's generated ideas would translate to *real* clothes (see Figure 9). Although technical drawings did elucidate the pattern development and making of both the shirt and pants, many questions remained as to the specificities of the skirt/dress portion of the garment. Patterns were developed through digital software, mainly Adobe Illustrator, and projected unto a cutting table. The pants and shirt were completed in a straightforward way. As for the dress, its upper pattern was extracted from an already existing tank top (see Figure 10). The flowing organza skirt was however draped without pattern unto the mannequin (see Figure 11). The organic nature of draping, that is placing uncut fabric unto a mannequin and giving it shape directly unto the body, facilitated the parallel between Midjourney's imagined design and the real-life garment. Translating between 2D and 3D, which was the preferred pattern development method for the shirt and pants proved to be more challenging for more complex imagined physics and volumes like that of the skirt.

Observation and Limitations

The first challenges of the project occurred at its very beginning, as the prompts were stubbornly misunderstood by the algorithms generating visual information based on them. Having been trained in French throughout Fashion school, it was an oversight to expect the prompted creation of "patterns" to return technical drawings and not textile prints, which are both called 'patterns' in English. As specific as the prompts were to ask for technical patterns, Midjourney kept returning figures and models wearing clothes; not the envisioned 2D shapes technical patterns consist of. Because the datasets Midjourney use are unknown, it is difficult to know beyond doubt the reasons for the discrepancy between what was prompted and what was received. However, a hypothesis could be that the internet – or whichever dataset Midjourney

pulls from, can be understood to store more figure-shaped clothes than 2D patterns of them, creating a powerful data ‘noise’, effectively blurring the generation of technical patterns. The fact that Midjourney’s dataset has potentially more worn clothes than flat clothes is a realistic reasoning as to why the output kept revealing silhouette figures. For these reasons, more interpreting methods were added to the project’s methodology to gap between the AI generated designs and its resulting patterns that could be used to create the *real* versions of imagined garments.

As stated previously, GANs are *unreal* discriminated pixels and do not abide by real life physics. It was therefore challenging to introduce AI generated design choices within the constraints of real-life physics and pattern techniques. For the quirkiest details, such as the dress portion of the garment, draping techniques were preferred as opposed to more procedural digital pattern making methods. This allowed for more organic volumes to be created outside of the more restrictive bounds of 2D pattern making. The way the images were generated left a lot of unanswered questions about the way the skirt was to be constructed, especially its length which varied drastically from front to back, added to its logically impossible superimposed design principle (see Figure 6). By avoiding procedural methodologies, the skirt was able to take its shape as the garment was built. To leave the sides unsewn was a stylization choice that would not have been anticipated had it been thought through 2D pattern techniques, though came to be a great solution to allow for the generated design details to take shape in real life.

Cutting through the fabric would not have been a design choice I would have taken had it not been prescribed by the AI generated image. Because the skirt was first sewn in its entire length, the final garment came really close to being completed without a cut front skirt. In the entire project, this is where I truly realized I had given design agency to artificially generated

pixels and that there was no way of avoiding it. I reluctantly cut through the fabric, and, helped with all the resources I had inspired myself from and had created throughout the process, made the garments come together at once and elevate its style to where it was supposed to be (see Figure 12). The final garments were finally completed, thanks to a collaborative approach of creation between human and machine (see Figure 13).

Conclusion and Possible Futures

The original intent of the project was to create technical 2D patterns through NLP based GAN systems and translate them in fully formed garments through interpretive methods of pattern making. Given the limitations of the solutions used, only figure-like shapes were able to be generated, which needed more of my personal interpretation to be turned into garments, which was not originally planned. In future iterations of the project, I would like to build my own dataset of patterns so a customized GAN could generate specific images, having been trained only on the datasets I produced. Another approach, this one needing more research and development before being implemented, would be to build a CAD based generative network. Instead of creating arbitrary discriminated and generated pixel data, a CAD system would allow the production of AI generated points and lines, which would in turn infer on shapes that could be used as 2D patterns. This current iteration of Data Patterns however proves that collaboration between human and machine is possible, though the technologies and methods used to recreate *real things* from *non-things* need to be subverted and reworked in order to allow the power dynamics between human and non-human to be reshaped.



Figure 1 Generated with Midjourney with the prompt "/Imagine technical sewing pattern with measurements "



Figure 2 Generated with Midjourney with the prompt “/imagine technical sewing pattern, measurements, a line dress, on paper”



Figure 3 Generated from Midjourney with the prompt "/imagine a technical pattern drawing, measurements, on paper, hyper realistic, dress with a draped design, avant-garde Japanese fashion"

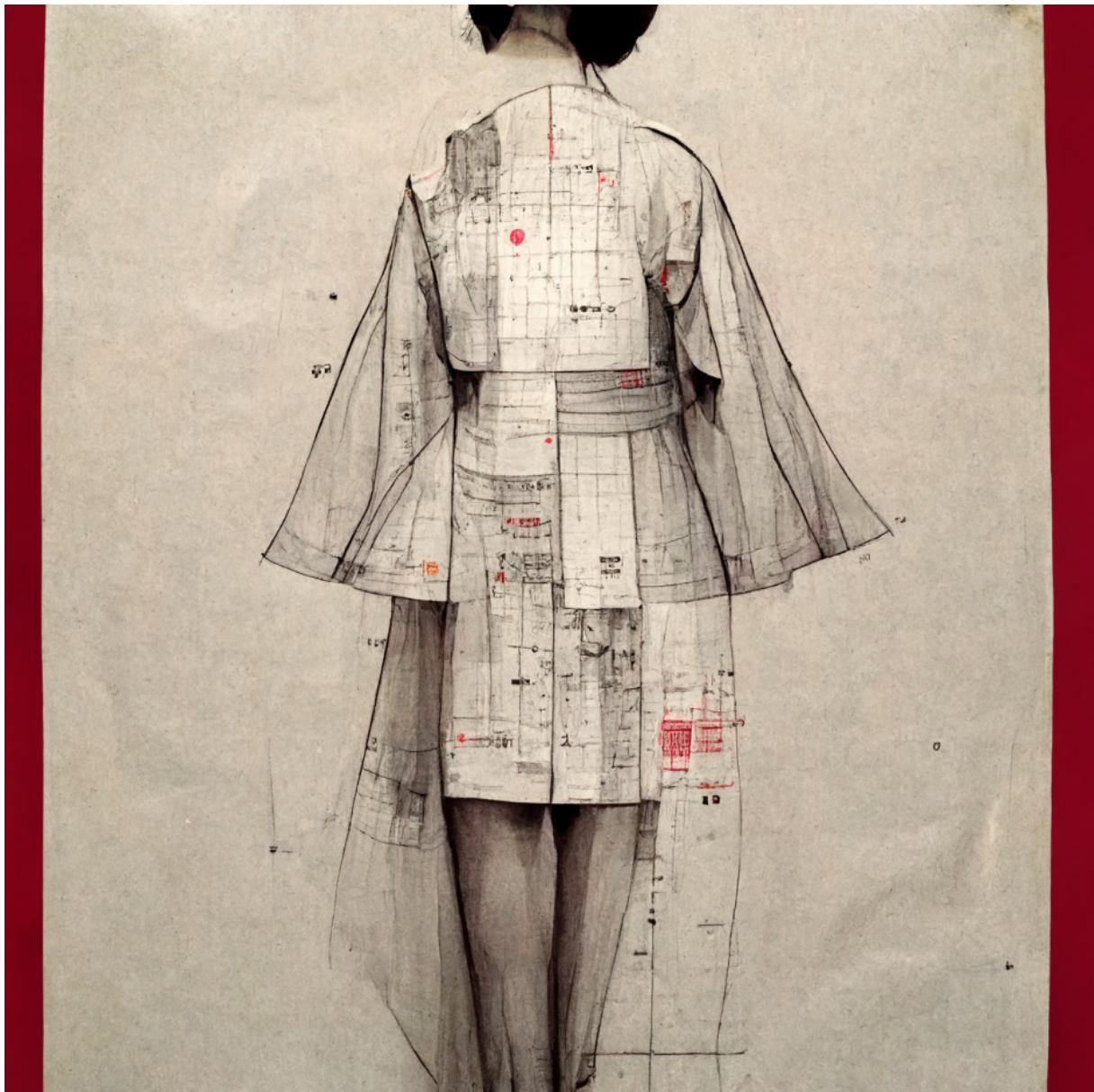


Figure 4 Final Ultras generated from Midjourney with the prompt "/imagine technical sewing pattern, on paper, measurements, hyper realistic, Japanese avant-garde fashion "



Figure 5 Final Ultras generated from Midjourney with the prompt "/imagine technical sewing pattern, on paper, measurements, hyper realistic, Japanese avant-garde fashion "



Figure 6 Final Ultras generated from Midjourney with the prompt "/imagine technical sewing pattern, on paper, measurements, hyper realistic, Japanese avant-garde fashion "

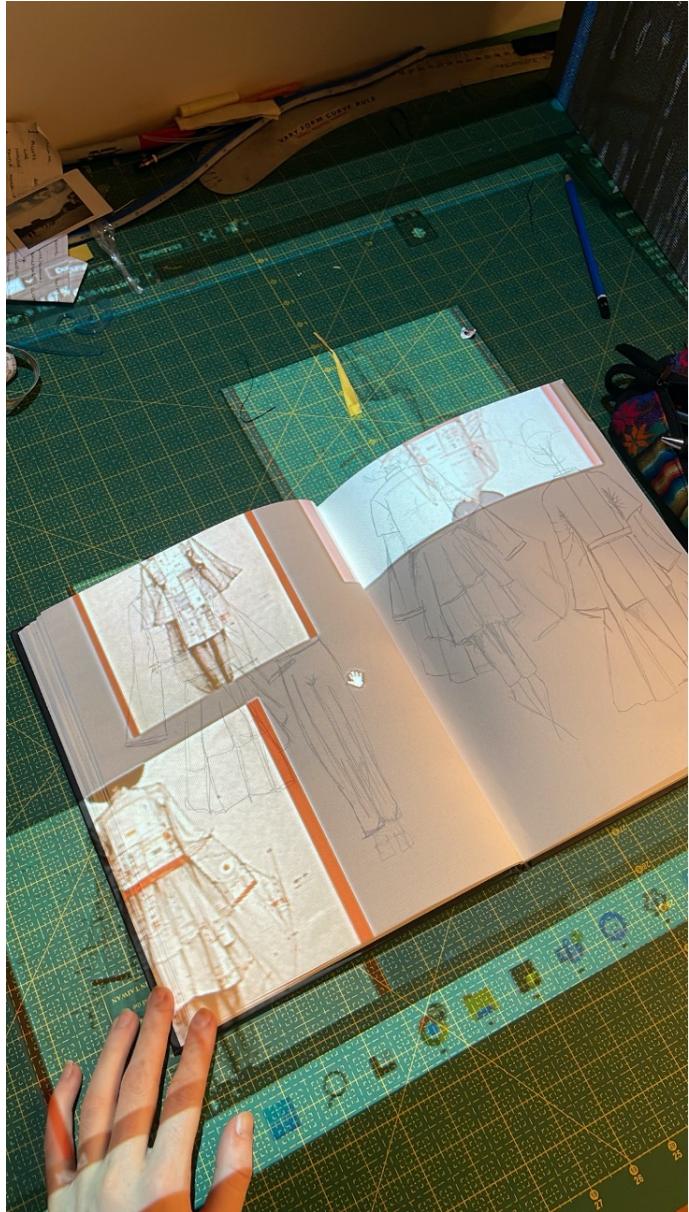


Figure 7 The 'concassage' technique allows for the extraction of specific details with the superimposition of inspiration unto drawing material

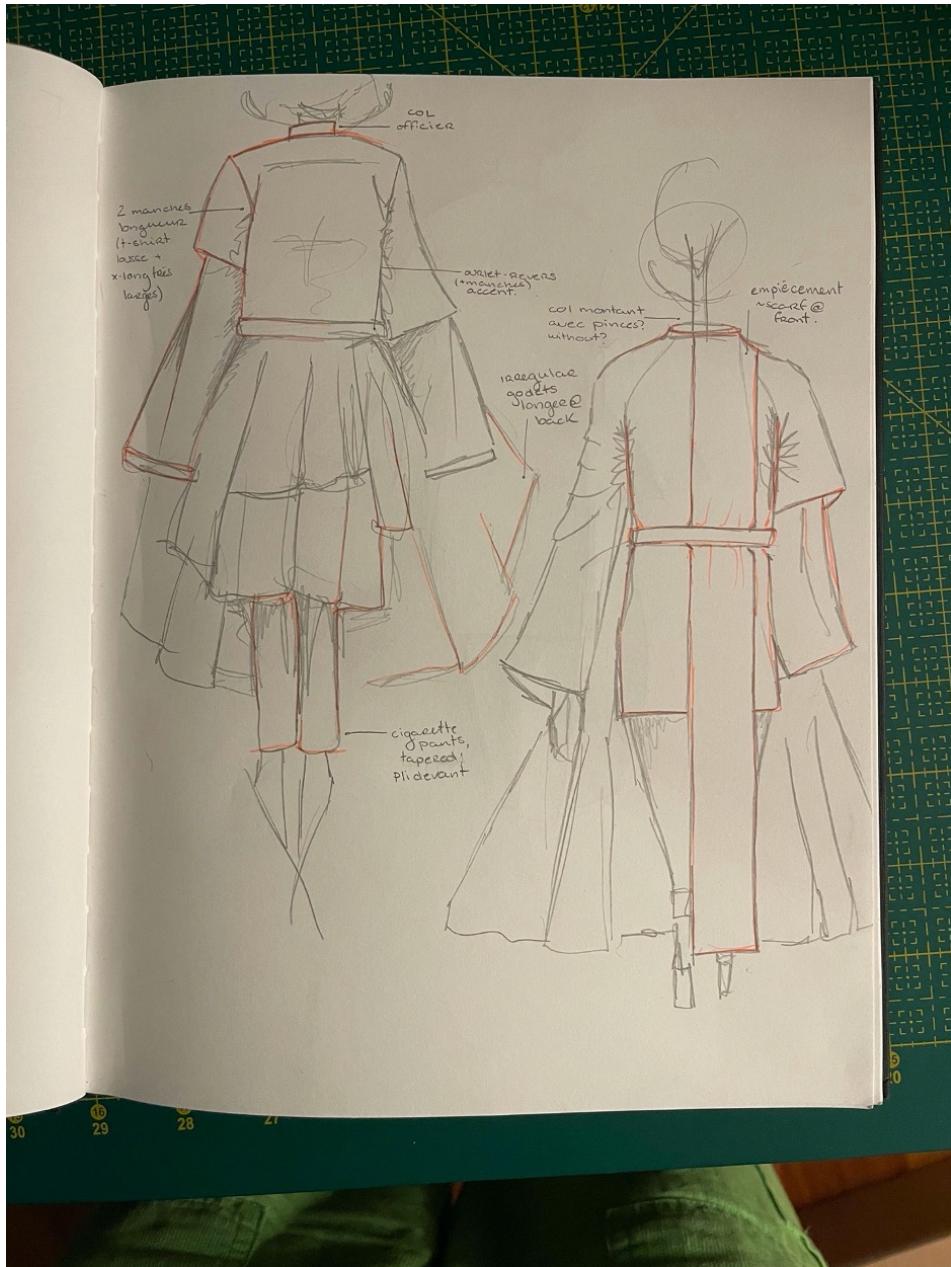


Figure 8 The 'concassage' technique's results are still not 'physically' accurate to real-life pattern techniques and physics

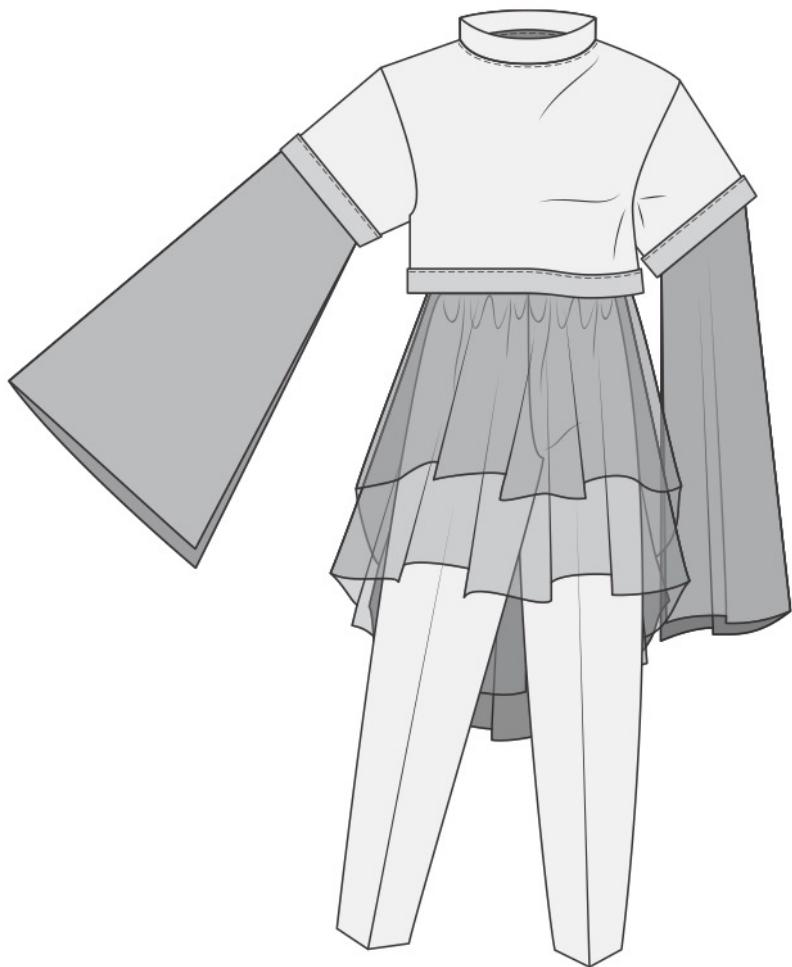


Figure 9 Technical drawings helped clarify how the garments would be built



Figure 10 The upper portion of the dress pattern was made through extracting the pattern of an already existing tank top



Figure 11 The skirt portion of the dress was made using draping techniques, which allow to create the volumes of the garment before cutting the fabric

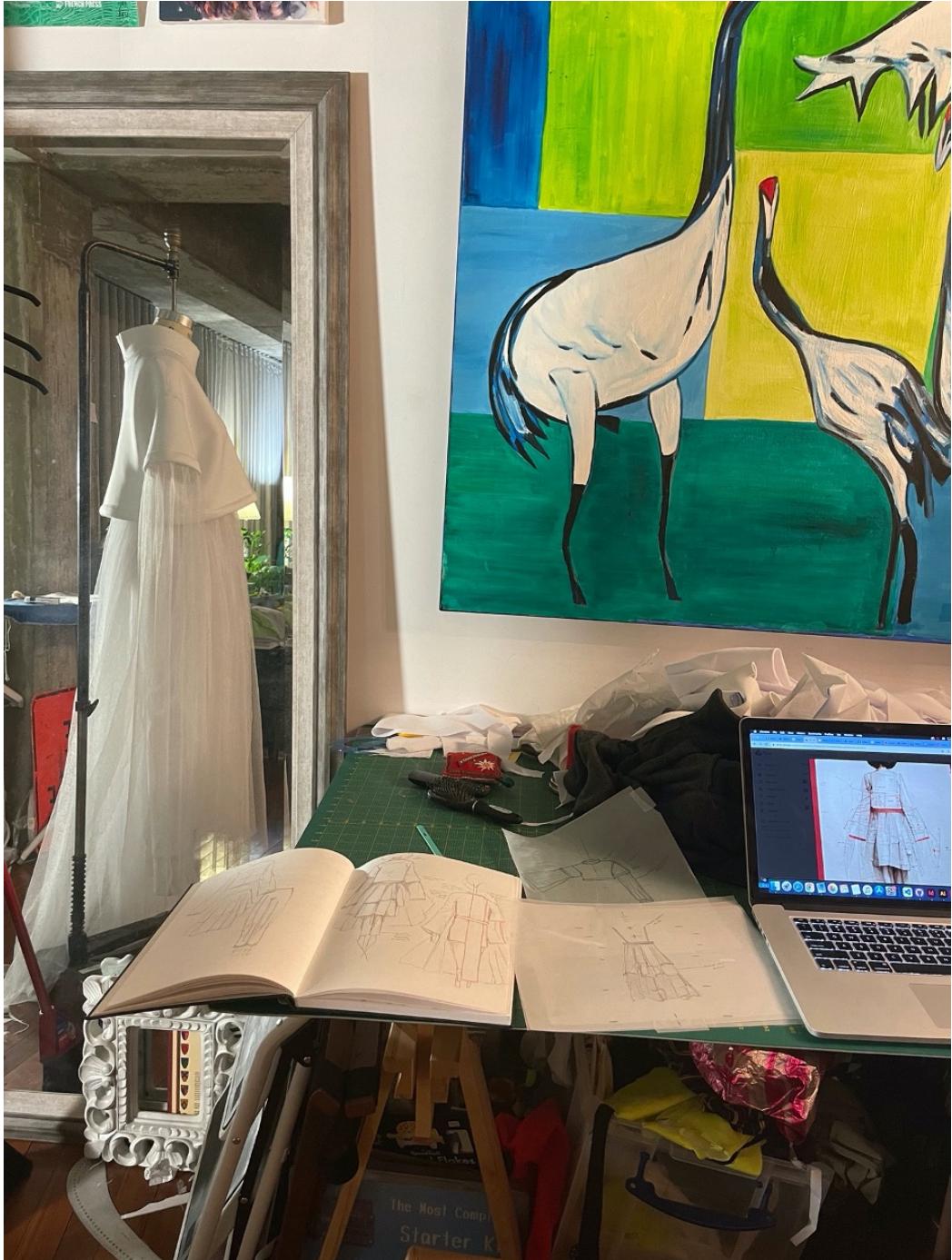


Figure 12 When it came to cutting through the front portion of the skirt, I reached out for all the generated images, drawings and other inspirations I had built throughout the process to make sure the envisioned design was created



Figure 13 Final garments (three pieces: shirt, pants, dress)