A taxonomy of concerns concerning neural art

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Abstract

AI generated art or neural art is on the cusp of having a profound, and perhaps an indelible impact on the very intuition of art. Whether this current phase we are in, be judged as a watershed moment for creativity or the exact moment we carelessly opened the Pandora's box will be decided on how we carefully navigate certain concerns in the coming months. In this paper, we present a taxonomy of such concerns spanning the blood-diamond effect emerging from unethically sourced datasets, the emergence of Non-Fungible Tokens, downstream effects of gender and racial biases, gate-keeping antics in the AI-neural art community and the computational conquest of gender.

1. Introduction

One could argue that the field of generative art has always evoked mixed emotions amongst the puritans and critics alike. Works such as [7] have challenged this *"Is-this-**really**-art?"* toned diatribes by dismantling the usual misconceptions. Misconceptions such as the lack of romantic indulgence in the enterprise of chance, the misgivings on the jot of accidental discovery, the imperceptible facet of spontaneity and the classical humbug that the generative *"artist has zero control and the autonomous machine is randomly generating these designs*. Further in [20], the authors draw out examples from from paleolithic ornamental art, hydraulically-activated automata of ancient Rome, Islamic art of the 9th century and Renaissance clockwork figures as examples of works with generative processes as their basis, that challenge preconceived notions that all generative art is computer generated. With regards to computer generative art, [7] also highlights the pioneering efforts of women artists in 1960s led by the likes of Vera Molnar, Lillian Schwartz, Grace Hertlein and Muriel Cooper, whose contributions are often under-emphasized, which when combined with the current sordid gender ratios in computer tech industry, does veritably render a *tech-bro tint* to the field as a whole.

The latest avatar of generative art, that is AI-generated neural art is a different beast altogether. Specifically, the kind that is *trained* on large scale theft of human-generated art and biased large-scaled computer vision datasets on large scale hardware inaccessible to researchers outside of a few industry labs whilst burning consuming vast amounts of energy.

In this paper, we present our nascent attempts towards constructing a taxonomy of some of these concerns. We hope that this will serve as a basis for further critique, examination and betterment in the neural art community.

2. The continued Blood-diamond effect in art: Inheriting biases

As covered in [11], neural-art produced with unethically sourced (and/or biased) large scale datasets inherit a *blood diamond effect* in them. This critique, we argue resonates far beyond the specific polemics of any specific large scale vision dataset and refers to the wanton culture that permeates the general computer vision domain as we know it today. Hence, it comes as no surprise that recent models trained on far larger and more opaque datasets (See [35, 36]) have not just inherited these ills but also amplified them. Adding to the woes emanating from biases in images, is the latest trend of inculcation of textual information gleaned from the internet, that brings in a new vector of textual biases in to the mix. In Figure 1, we see the images that were produced in response to the textual prompts (found in the title of these images) using the `Aleph-Image: CLIPxDAll-E` project[1]. This profession-to-gender associative anchoring we observed in these images is yet another instance of the downstream effects of training on large dumps of data gleaned from the internet and ignoring all of the critical literature such as [28, 10] that has disentangled the cause and the effects of these androcentric biases.

What is intriguing is that this blood diamond effect or the baked-in biases do not seem to be a deterrent or a deal-breaker for the practitioners. For example, from Section 7.1 of the *CLIP* paper [35], we learn about the racial bias

[1]Built using [35, 36]. Code: https://colab.research.google.com/drive/1Q-TbYvASMPRMXCOQjkxxf72CXYjR_8Vp?usp=sharing#scrollTo=BFsCy7jOn5cH

Figure 1. Downstream effects: Gender bias

aspect of the model and gather that the 'Black' categorized images from the FairFace dataset [41] had the highest chance ($\sim$ 14%) of being classified into the following offensively labeled classes: 'animal', 'gorilla', 'chimpanzee', 'orangutan', 'thief', 'criminal' and 'suspicious person'. In spite of this revelation, the CLIP model has seen widespread embrace amongst the creative art community[2]. One of the plausible reasons to this, we speculate, is the lure of being able to monetize the generated art via Non-Fungible Tokens (NFTs), an issue that we now address in the next section.

3. The rise and rise of NFTs

The selling of the NFT of the work titled `EVERYDAYS: THE FIRST 5000 DAYS` by Mike Winkelmann, better known by his digital artist name *Beeple*, for USD 69,346,250[3] is widely considered to be the watershed moment for this fledgling development in the art world. Even academic institutions have jumped onto the NFT bandwagon with UC Berkeley recently announcing that it will auction NFTs of Nobel Prize-winning inventions to fund university research [37]. Hence, as we author this, we sense that the NFT *revolution* looms large over the horizon of AI art. As AI-artists navigate the difficult bylanes of extractive capitalism they have to grapple with cost of environmental impact vis-a-vis their innate aspirations towards financial viability and ability to actually eke out a decent living. Works such as [16, 13, 22] have amply explored the specifics of the environmental cost measured in terms of CO_2 and metrics such as *Ethereum Energy Consumption Index*. In Table 1, we present the latest estimates of Cryptoart-footprint as of March 22, 2021 sourced from https://github.com/kylemcdonald/cryptoart-footprint. Similarly, initiatives such as https://carbon.fyi/ (To estimate the footprint for a specific Ethereum wallet or contract) and http://cryptoart.wtf/ (To estimate the footprint of a specific artwork) have emerged that educate the artists about the downstream contributions towards climate change, that has been demonstrated to disproportionately impact minorities and indigenous peoples [8]. On the other hand, AI-artists and Afrofuturists such as Nettrice Gaskins[4] have explored the possibility of NFT-platforms such as *hic et nunc*[5] that operates on the more *"eco-friendly"* Tezos blockchain (See [23, 6]). These initiatives are to be considered in juxtaposition of the historical injustices being meted out to BIPOC artists. As stated in [25], *"For BIPOC/LGBTQ/Womxn/Disabled artists who have been intersectionally shut out of the Official Art Market, NFTs have the potential to help them/us make a living or supplement our incomes. The blockchain market removes the middle person or gatekeeper and empowers artists to use emerging technologies and networks in new or culturally relevant ways."*

This thought paves the way for our next section that deals with stealth of human-generated-art that is then siphoned off as web-crawled datasets to train AI generative models.

Name	Gas	Transactions	kgCO2
OpenSea	173,618,258,189	804,476	60,962,694
Nifty Gateway	31,925,160,353	116,531	13,381,972
Rarible	27,700,791,937	216,407	10,302,402
Makersplace	21,679,291,384	69,165	6,222,148
SuperRare	15,950,212,376	171,967	5,031,957
Foundation	8,169,344,070	51,375	4,103,883
Known Origin	4,677,980,129	19,181	1,468,752
Zora	1,871,937,838	7,137	868,972
Async	1,502,889,319	15,081	396,560

Table 1. Estimates of Cryptoart-footprint as of March 22, 2021 (Source:https://github.com/kylemcdonald/cryptoart-footprint)

4. Theft, Crawling and ghostwork

The question of theft emerges in two contexts: the atomic and the en-masse.

The atomic context pertains to scenarios where a specific digital or physical asset is subjected to an artistic manipulation process, thus birthing a secondary work that might not be *transformative* enough [14] to be merit assignment of the intellectual property (IP) rights associated with *original* piece. Recently, it was revealed in [39] that *Arrival*

[2]See https://www.reddit.com/r/MachineLearning/comments/ldc6oc/p_list_of_sitesprogramsprojects_that_use_openais/

[3]https://onlineonly.christies.com/s/beeple-first-5000-days/beeple-b-1981-1/112924

[4]https://www.nettricegaskins.com/about

[5]Hic et Nunc (Latin for "here and now") is being billed as the 'open-source','DIY' and 'community developed' counter-cultural NFT art marketplace [23] that is touted to offer a more ethical energy-efficient option compared to the venture capital-backed NFT platforms like SuperRare, OpenSea, and Nifty Gateway (https://www.hicetnunc.xyz/about).

of a Train at La Ciotat, a popular neurally enhanced and *de-oldified* video of a train arrival [31] originally shot by Louis Lumière received a Digital Millennium Copyright Act (DMCA) claim from Youtube via Institut Lumière and hence had to be deleted from the platform by its uploader, a neural restoration artist named Denis Shiryaev [3]. This follows three other high-profile recent cases where the artist who created the original artwork has seemingly come up trumps. Firstly, we have *The Andy Warhol Foundation for The Visual Arts, Inc. v. Lynn Goldsmith, et al*[6] case where the United States Court of Appeals for the Second Circuit[7] ruled that the iconic *Prince Series*, that contained *a series of silkscreen prints and pencil illustrations created by the visual artist Andy Warhol based on a 1981 photograph of the musical artist Prince that was taken by Defendant-Appellant Lynn Goldsmith in her studio* fell outside of the ambit of the four fair-use factors (A. The Purpose and Character of The Use, B. The Nature of the Copyrighted Work, C. The Amount and Substantiality of the Use, D. The Effect of the Use on the Market for the Original) and ruled in favor of the original photographer [14]. Secondly, the *Lil Nas X v/s Nike* case [21] entailed questions of originality, IP rights and artistic license surrounding the customized *Satan Shoes* created from 666 pairs of Nike Air Max 97 (supposedly created without Nike's approval or authorisation) by the American art collective MSCHF[8]. Thirdly, in the *SpaceX collection issue on OpenSea* [33] issue, the platform objected to some digital artists using artifacts such as an "official-looking SpaceX banner" to surreptitious modify art-work to look like an official SpaceX collection and took these down.

The en-masse context emerges where an artist or an institution scrapes vast volumes of human-generated art from the internet with an intent for it to be ingested into some model training pipeline with no specific credit assigned to the human artists that generated the content and not providing any avenues of revenue sharing. Referring to the dataset curation process that produced the Jukebox generative model for music [19] (1.2 million songs obtained by crawling the web), a Google magenta team researcher[9] recently opined that *"Music datasets (with rights) are *tiny* compared to image and language datasets. I'm pro free use of music, but it feels disingenuous to use an artist's data, not include them in the process, and then train your model to specifically generate "in the style" of that same artist. OpenAI had a much more thoughtful take on the ethical implications of GPT2 and I think it's a shame they didn't take the same level of consideration here. Especially with their ability to create precedent."*

Associated with this is also the problem of ghost-work[27] extracted from platforms such as Amazon Mechanical Turk. A recent article [34] sheds some light into the curation process behind the *ArtEmis* dataset [2] that includes the emotional impact of more than 50,000 artworks from the 15th century to the present and one that entailed the use of more than 6000 so-termed *microworkers*[10].The work covered two important facets that are important to unpack in the context of this critique. Firstly, there is the issue of sanctity of the labeling themselves. One of the *microworkers* verbatim stated that *"To be honest, a lot of it felt very forced. There were many images that were just formless blobs or of basic objects. It was quite a stretch to come up with emotions and explanations at times."* Secondly, it emerged that there was the geographical constraint that the *microworker* had to be "located in Australia, USA, Great Britain, or Canada" that obviously brings in geographical bias. This pro-global-north bias, we argue is symptomatic of a deeper ill that manifests itself both at a macro-level as well as at a more fine-grained level that in turn impacts the academic AI-art community directly. This leads us to the issue of cliquishness that we address in the following section.

5. What's with the cliquishness?

Homophily is a deeply human construct and the associated enterprise of *community building*, when done well, can be wonderfully delightful in creating a safe and nourishing space for exchange of ideas. But human history has taught us time and again that fetishizing over snobbery and hierarchy can quickly precipitate into cliquish echo-chambers replete with gate-keeping histrionics that eventually poisons the community.

The mythology of the 'creative genius': There exists a mountain of evidence that the bigger source of the perceived *worthiness* of art in the marketplace is the network effect and not the make-believe *innate chutzpah* or the creative wizardry. Beginning with the *artsy* monologue literally titled *Artists Become Famous through Their Friends, Not the Originality of Their Work* [30] to the work on *Fame as an illusion of creativity: Evidence from the pioneers of abstract art* [32], we have seen strong academically stress-tested evidence of how shrewd social-networking either at high-society events or the *factories*[11] have been the key to an artists' emergence on the scene, all under the facade of creative spirit (Also see [24, 17, 18, 43] for related iconoclastic rendering of the myth of the *artistic genius*).

[6]The Andy Warhol Foundation for the Visual Arts, Inc. v. Goldsmith, No. 19-2420 (2d Cir. 2021)

[7]https://law.justia.com/cases/federal/appellate-courts/ca2/19-2420/19-2420-2021-03-26.html

[8]https://mschf.xyz/statement.pdf

[9]https://twitter.com/jesseengel/status/1256314515114745857?s=20

[10]The italics in this context are used to both preserve the terminology used in the reference [34] and to also highlight the troublesome jargon that is prevalent in the domain

[11]https://en.wikipedia.org/wiki/The_Factory

"Peer reviewed" workshops: Maintenance of the cliques of the 'gifted' and the 'Godfathers'[12] whilst maintaining the mirage of meritocracy, requires creating *highly selective* exhibits and gatherings where the submissions are reviewed with two instruments of deceit: A single-blind review process coupled with an opaque no-reviews-provided mechanism. While the first part allows for direct gate-keeping, the second ensures the secrecy of where the *goodness* of the so-deemed *good*-art emanates from. We now expand upon these two processes in further detail:

Single-blind review process: This helps create an information-asymmetric marketplace of ideas where the reviewers have the privilege of knowing precisely who the author(s) are but not vice-versa. This makes it easier to enact targeted exclusion by drumming up reasonable sounding pseudo-intellectual reasons as to why the work submitted was not *up to mark* while maintaining the shroud of secrecy on who took the decision to decide so. Other art-forms poisoned by this form of gate-keeping are slowly unshackling themselves. In [26], the authors demonstrated how introducing blind auditions in orchestras where the performer performs behind a screen did markedly increase the probability that a woman would be advanced and hired. Further, in the context of academic peer reviewed articles, works such as [12] have demonstrated how instituting double-blind review was a watershed moment towards increased representation of female authors. Yet, even in the presence of double-blind reviewed workshops at ICML, NEURIPS, ICLR etc, AI-creativity workshops continue to be adamant on this facet which, we argue, does not bode well for the community.

Black-box review process: Irrespective of whether their work gets accepted or not, a lot of the practitioners in the community are interested in learning more about the flavor and nature of critiques that their submission attracted. This feedback, is evidently invaluable to not just improve one's own artistic techniques in the next iteration but also learn from the critique that other submissions elicited. In this regard, we'd like to implore the organizers to give Schmidt et al's *Ten considerations for open peer review* [38] a thorough read and consider embracing utilizing platforms such as `openreview` for the future editions.

To conclude this section, we state that if democratization is indeed the goal, then it pays to learn from the gate-keeping antics that have stymied *other* art-forms covered in the work cited above or risk begetting a *market for lemons* [4] in ours.

6. Computational conquest of gender

It would be an understatement to say that the proverbial *artistic license* is a double-edged sword that comes with a tremendous set of responsibilities. In order to create the necessary tools to cater to the flights of imaginations of artists, the tool-makers are forced to navigate a difficult terrain laced with ethical landmines as the very degrees of freedom they want to incorporate can also be used (and worse) in an automated way to generate bigotry, hatred and challenge the very institution of truth. If we thought photoshop fueled fake-imagery was bad, these creative tools hopped up on AI-steroids can generate harm at a scale hitherto impossible. In appendix-A, we explore specific issues pertaining to the tools that empower a neural-artist to experiment with race/ethnicity, emotion and gender. We have distilled our specific fear surrounding the emergence of gender as a vector of exploration in the latent spaces of the generative art models in the form of a premonitory *AGESaaS: Any-gender-expression-stockphoto-as-a-service* conjecture that reads:

Conjecture: *By 2023, under the guise of performative activism, there will be at least one VC funded startup that will offer photo-realistic 'fully customizable' stock-photos claiming to cover the entire spectrum of gender expressions for less than* $0.99 *to satiate the Diversity, Equity, and Inclusion (DEI) advertisement needs of corporations.* We call upon the community to reflect how the tools that are being developed to fuel the flights of fantasy of artists can and will be used to co-opt and game the DEI movement.

7. Concluding thoughts

As with any art-form, we argue that the political projections of its very existence is but inevitable[13] [29].

Given that the birth of this form of AI/Neural art is being championed from the underbelly of Big-AI that seems to eerily exude the all-too-familiar Big-Tobacco, Big-Pharma and Big-Oil vibes [1], we in the community have to reflect on how this moment will be judged by the generations to come. On one hand, there's all the excitement and energy that comes with the emergence of an increasingly democratized powerful new framework that promises to power the flight-of-fancy of artists and open new avenue of creative expression. On the other hand, we grapple with the computational agenda to conquer and annex the last few remaining pristine bastions of glorious and creative human fuzziness that thrives inside the sacrosanct temples of gender and aestheticism. As struggling and perhaps hypocritical indulgers of the institution of the neural art-form, we find ourselves constantly energized yet frustrated by both the incredible advances but also the glaring shortcomings of the field, some of which we have captured in this short paper. We have authored this in the hope of seeding important conversations to be had in the community, and to be had now.

[12] https://twitter.com/techreview/status/1323580930552958978?s=20

[13] To this end, we invite the reader to consider bodies of scholarship such as *A Context for Complexism: Between Neoliberal Social Thought and Algorithmic Art* [15] and *Introduction: cultural studies, Marxism and the exile of aesthetics*

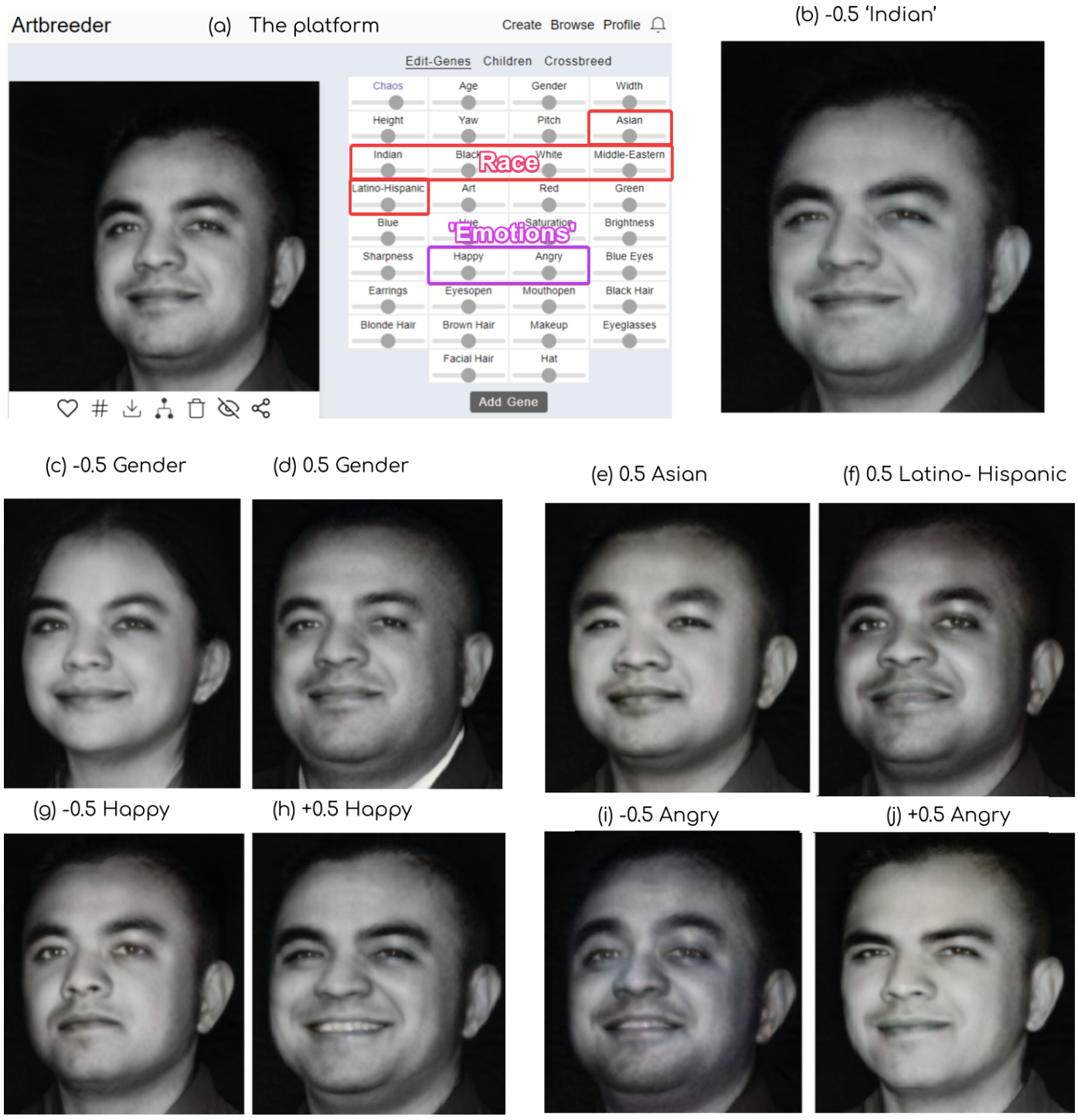

Figure 2. Artistic license: The questions of gender, ethnicity and race

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Appendix A. Gender, emotion and race

Phrenology, physiognomy and computational eugenics are undergoing a silent rebirth emboldened by the rise of Computer Vision aided face psychonomics. Deep learning aided models that claim to perform *High accuracy* Gender classification (binarized), emotion classification and ethnicity classification trained on carelessly curated datasets that promulgate prototyping and reductionist caricatures are all unanimously frowned upon in the AI-ethics community. But these very datasets and models get a second lease of life under the banner of generative models and latent space exploration adventures of these generative models in the context of creativity and entertainment. While we acknowledge the viewpoint of empowering the flights of fantasy of digital artists, we'd like to point out the obvious threats that emanate from appropriation of these very tools. Besides the obvious dangers of gender-swapping

In Figure 2, we see a gallery of the resultant faces of an author of this paper when subjected to artistic face manipulations by re-weighting the *genes* (or latent manipulation vectors) on the popular art-platform artbreeder [40] (formerly GANbreeder). The pixel space face embedding of the uploaded image is shown in sub-figure 2(a). Upon introducing a weight of -0.5 with regards to the `Indian` gene, we obtained sub-figure 2(b) that had a palpable skin-lightening effect, that has particularly stark ramifications given the skin-tone bias and colorism that the society is grappling with [9]! Similarly, the platform affords a gender control gene (more positive implying more *masculine*). Upon introducing a weight of -0.5 and $+0.5$ with regards to the `Gender` gene, we obtain 2(c) and 2(d) respectively. Recent work on *Biases in Generative Art— A Causal Look from the Lens of Art History* [42] has highlighted how current generative art methods fell short in terms of framing effect bias, dataset bias, selection bias, confounding bias, and transportability (gender) bias using structural causal models. Sub-figures 2(e) and (f) represent images 0.5 `Asian` and $+0.5$ `Latino-Hispanic` genes, both of which in our opinion do map to stereotypical anchor-imagery promulgated against these communities. We refer the reader to the thesis titled "Big eye surgery: Understanding the ethical implications of medicalising Asian features in cosmetic surgery" [5] that explores the problematic issues surrounding this parochial caricaturization and the growing demand for Epicanthoplasty.