

I am a programmer and systems developer by trade, with a background in Art and design. I have a vocational degree in modern art and a bachelor degree in Game Design and Graphics. I've been AI developments for decades, and was originally excited about the potential for AI, but have since become disillusioned by the socioeconomic factors around the development of the tech. I have used [re]generative image models for about one hundred hours, and have been reading about and discussing the topic extensively for over a year and a half. My primary knowledge about the tech is regarding visual media, but I also care about audio (music or voice) and text, though they have different risks, benefits and problems.

1. I consistently see small creators and small or medium sized businesses using AI [re]generated imagery for social media posts and advertisements. Crypto, fitness, food, pillows, clothes, games, it does not matter. I have seen multiple AI [re]generated propaganda images about the Palestine Israel conflict. I have also seen an example of giant companies like Marvel commissioning a studio that hired noticeably less artists for creating an intro sequence for Secret Invasion (2023) than other comparable series. Loki Season 2 had a poster where the background was AI [re]generated, likely because the asset was sourced from Shutterstock but not labeled as AI.

Most videos on youtube that are multi-hour music playlists now use AI [re]generated cover art.

Friends have begun using AI [re]generated characters when playing Dungeons and Dragons. People are [re]generating imagery that looks like stock-artwork for businesses.

The result? All visual imagery markets are being saturated by cheap images of decent quality that mimic the style and expression of images that already exist, though altered.

Commercial art (production art for games and entertainment, advertisement, illustration, photography) will be most impacted, as they focus on throughput and iteration speed. Fineart and modern art won't be affected negatively, but they are significantly smaller markets.

The risks and negative outcomes is that:

The perceived value of commercial art will crash completely, making it harder for artists to fight for fair wages.

Most new artists will be COMPLETELY outcompeted by low-paid labour in sweatshops: anyone can prompt "x in the style of y".

Entry-level positions for artists will completely disappear: why pay for training young labour when you can get it for close-to-free? Why pay for a photographer to fly accross the world to capture a rare image of an iguana when you can just generate it? Why pay for the creation of new media, when you can get equivalent or worse imagery for significantly cheaper. An AI generator can generate potentially thousands of images per hour, requiring only curation for higher quality images. This reduces the artistic merit and creativity involved in creative work.

Since entry-level doesn't exist, you have to be personally wealthy or come from a rich family in order to do art commercially.

Over the course of 10 years, the potential for brain drain and loss of original

cultural output is significant. As companies are no longer needing to train the next generation of creatives and don't want to incur the cost of having 10 fulltime artists when 1 who acts as an art director will suffice. The quality will be reduced, but the cost will also be drastically less.

Many artists will stop posting work online, leading to a worse social media experience. Artists currently post their work online under the belief that have Copyright protections and can legally protect their work, and can commercialize it.

These compounding effects might lead to model degradation, since models trained on AI outputs perform worse than models trained on Human output.

Stock websites will degrade into containing only generated images, or be hosting image generators. Directly competing with stock image contributors without compensating them fairly.

If artists stop posting, and the web is overtaken by AI images, then the AI can only train on AI generated images, causing a negative feedback loop.

Silicon Valley tech companies will be the main people profiting from the insights and knowledge artists have gathered over the years, while those insights are not transferred to the next generation of visual creatives. AI does not help in the quest of knowledge building, it automates thought and creativity. [Re]generative AI is more effective the less creative vision the user has, because the user is less likely to object to the automated decisionmaking the AI produces.

The floodgates are open: any data harvesting (video, audio, text, images) can be done on anyone by anyone: your facebook pictures are no longer safe.

[Re]generative AI that directly competes with the creation of the data which produced the original model is inherently an ouruborus: a snake eating it's own tail.

The "problem" that [re]generative image AI "solves" is nonexistent. There is no shortage of images being produced or media being made by passionate individuals. The main barrier for creatives is the attention economy (getting eyeballs on their work) and fair compensation, not production speed. AI will only saturate the market while making it harder for passionate individuals pursuing art as a career to make a living.

2. The inability for general audiences to distinguish between AI [re]generated imagery and traditionally created media is a significant issue.

It is very easy to take a base model like Stable Diffusion 1.5 and training a finetuned model on 300-1000 images of a spesific artist or subject matter, that can then churn out incredible numbers of images. This can be done on consumer-grade hardware. This makes it very easy for individuals and companies to sidestep the need to hire an artist for work, by instead training a model on their work.

Copyright is functionally a tool that was designed to enable artists and creatives to share and publish their work while retaining protections. Ideally, Copyright prevents artists and creatives from having to compete with themselves on the market. [Re]generative AI undoes this, and is a drastically different

shift in the risk involved in posting images online.

This can have profound economic harm to an artists ability to make a living, and it is very difficult to legally prove that this type of infringement has occurred since the output images can be visually different from the output of an individual artist. Unless there is a requirement to disclose whether an image has been AI [re]generated, and a mandate to disclose datasets, it could be literally impossible for artists to enforce their copyrights.

3.

<https://dl.acm.org/doi/abs/10.1145/3600211.3604681>

4. International consistency is very important. The intentionality of The European DSM Article 4 must not be understood as a blanket allowance for training [re]generative AI, as it still requires an adherence to the Berne Convention. You can see this in Article 7 "Common Provisions" of the EU DSM, which essentially says the Berne Convention still applies. With the wider context that the EU Digital Single Market Directive was created with the intention of enabling easier licensing of copyrighted work for commercial use in Europe, it does not make sense to read Article 4 as sidestepping all the opportunities for licensing.

The UK was looking into opening up laws that allowed the commercial use of copyrighted material for AI, until creative industries essentially said that this would ruin their potential markets for Copyrighted material in the UK and undo protections for creatives, creating a downward spiral.

<https://twitter.com/sarahjolney1/status/1620855093515157505>

5. Clarity of legislation and making sure that Fair Use does not become a "free pass" to train [re]generative AI models. A requirement for [re]generative AI to license the copyrighted material used to train their models. Prevent companies from sidestepping legislation by classifying their models as something other than "generative" (CLIP is not a generative AI, yet is essential in training Stable Diffusion, DALL-E and Midjourney). A requirement for companies to transparently disclose their datasets in a way that allows people to verify their copyrighted material is not used to train the models. As these generative models have a disproportionate potential to exist forever, apply strong punishments for infringement and disregard for copyrights, and make it easy for creators to pursue damages.

6. The most popular dataset used to train regenerative Image AI is the LAION family of datasets. LAION was curated by scraping the entirety of Common Crawl (a webscrape of the internet) and extracting all HTML IMG tags from those websites where "ALT Text" was also included. The vast majority of images have been scraped from Shopify (small business owners), Pinterest, Ebay, Amazon, dreamstime, specserver, Fineart America, and similar.

Pinterest being at the top of the list is significant, because Pinterest is notorious for having content uploaded by random users that do not own the

copyright to the images they upload. Pinterest on this list exemplifies the futility of an "opt-out" system, since creators on the web cannot possibly prevent their images from being used to train AI when others upload them across the web on these popular websites. "Opt-out" data does not travel with the images.

LAION 400m was used to train the original Midjourney, while LAION 5b was used to train Stable Diffusion 1.5. LAION 5b was then later filtered down based on an Aesthetic classifier (where "pretty" images were scored higher), which prioritized painterly images, watercolor images and high quality photography. These images were used to train Stable Diffusion 2.x, where higher Aesthetic score images were used to reinforce the learning through subsequent rounds of training. Stable Diffusion was trained on around 2.3 billion images, while Stable Diffusion 2.x was trained on around 1.3 billion images, but in multiple rounds.

By looking at the actual data of LAION Aesthetics (which were used to train SD 2.x) it's obvious that the dataset prioritizes expression rather than objective facts. There's a disproportionate amount of paintings and creative photography in the dataset. And based on the prompting that people use in Midjourney, they often use words like "Artstation" or "awardwinning photography" or "in the style of x".

6.1. The current advances of AI deep learning is based on massive web-scale datasets.

Stability AI funded the compute required to assemble LAION 5b. Stability AI also funded LAION in the creation of OpenCLIP, trained on LAION, a core component of the eventual Stable Diffusion 2.x model. Meta used 196000~ pirated books to train their Llama model. OpenAI has used similar datasets to train ChatGPT. Eleuther AI is assembling and making available hundreds of thousands of copyrighted books for training AI to mimic the Books2 and Books3 datasets that are mentioned in the ChatGPT-3 paper.

6.2. Currently most big companies (OpenAI, Google, Microsoft, NVidia, Stability AI, Midjourney, RunwayML) just do a webscrape without licensing. If they are threatened legally, they might make a deal with a large contributor to license their material after-the-fact. This happened with OpenAI and Shutterstock, where shutterstock now serves a version of Dall-E on their website. Stability AI has claimed in interviews that they are licensing data from Bollywood for proprietary models, but have not disclosed more than that. OpenAI has also been in dialogue with the Authors Guild after having used hundreds of thousands of books to train their models.

6.3. Public domain works are sometimes used as sources like Project Gutenberg and Wikipedia. There's also examples of some datasets containing CC0 materials. But there are important stipulations: There has been no enforced consequence prohibiting people from uploading material with a Creative Commons license like

CC-BY or CC0 without actually owning the property.

Training data is rarely created directly by the developers of AI models: usually they scrape material from the web, hire mechanical turk workers to label images or texts. The data itself is very rarely created directly or commissioned by the developers. There is rarely any effort to check or verify the copyright status of the material.

6.4. LAION secretly keeps a copy of their training datasets for reproducibility purposes and for sharing with other researchers, in a method that is in violation of German Law.

<https://discord.com/channels/823813159592001537/823854149640781824/830732190798184458>

7.1. This differs based on the model, but in general, training can be understood as a reconstruction task of the training data, where success is measured based on how well the model is able to reconstruct the data in the training dataset. Datasets (copyrighted material) are downloaded and used (often multiple times) to train a model. After running through a batch, backpropagation is used to adjust weights in the model based on the results of the loss function: IE, how well the model was able to reconstruct the training data. Based on the results of the loss function, the weights that had the most influence are adjusted.

7.2. A latent diffusion model can be understood as a lossy compressed encrypted database that takes a key and produces a value. The value it produces is the interpolated result between datapoints. This means that models can only produce remixed versions of data that exists in the dataset.

7.3. To my current knowledge, no. It is not feasible to pragmatically have a model "unlearn" things, which

7.4. Through considerable probing and effort, it is in theory possible, but practically it is prohibitively difficult without a deeper understanding of the underlying system. If this system is deployed as a subscription model, this probing could also include a cost, or could be prevented with prompt filters.

8. The only potential circumstance I can imagine fair use being transformative enough to apply is if the resulting model has a completely different result and format than the original data. Motion capture AI models are trained by labeling bones and joints of people in videos and images. Those images are then used to train a model to identify skeletons. The resulting model can then take a video input and produce an output of the skeleton of a person in the video. The AI model is learning "facts" about the image: the physical position of humans in space in an image. And the application of those facts are used to detect new novel humans in situations.

If the AI was trained to mimic the dance moves of people in the training dataset, and perform "new" dances based prompts or instructions, then it would no longer qualify as fair use, since the model is not learning facts but rather expressions, and the model can repeat those expressions.

8.1. Fair use is not a viable defense in either case, since all images exist in the market of dataset for AI training.

Shutterstock licenses their material to OpenAI now. Creative occupations are notoriously undervalued and underpaid. Looking for more opportunities to exploit and avoid paying creatives disincentivizes novel creative and cultural outputs. Paying for datasets could provide increased quality in dataset creation and curation.

Training does not fall under fair use, but finetuning fails even moreso, since it explicitly biases the model towards the finetuned dataset with significant strength.

8.3. Yes, it makes a difference. Non-commercial models should not be able to later be repurposed for commercial use, and commercial entities should not be able to fund non-commercial AI creators to later use the resulting model for commercial purposes.

8.4. The quantity of material used does not affect the fair use analysis. The quality of material used does matter, and one could argue for fair use if only facts were included. But the qualities of images and text that the resulting model stores is "expression" rather than fact.

8.5. All of the above, but Fair use should also consider the potential market of the copyrighted material as training data: the refusal to license images to AI is also a choice that affects the market value of the original as well as other images on the market. If an image could be used to train AI, it is de-facto in the market for AI training, and using an image without licensing it is essentially robbing the creator the opportunity to license the image.

9. They should have to affirmatively consent (opt-in), and the opt-in mechanism cannot be a precondition to using a social media website. In other words: The opt-in cannot be part of the normal "terms and conditions" requirements of using a website.

9.1. Consent from the copyright owner should be required for all uses.

9.2. Opt out cannot work. The internet is full of images and audio that were uploaded by other people than the copyright holders. It is an undue burden to force copyright holders to police the internet to such a degree. Stability AI has been advertising since December 2022 that "the next version of Stable Diffusion will support opt-out". They have since released at least 3 models that have not respected Opt-out at all.

9.3. Consent is feasible. But consent needs an incentive structure: compensation.

9.4. There should be an easy course of action for compensation, punishment should be harsh to prevent wanton infringement. The consequences of infringement by AI companies is orders of magnitude more significant than ordinary infringement.

9.5. Yes. Creators should have a moral right to reject their work be used in AI training. AI training should require explicit and informed consent, and the creator needs to be informed at training time that their work is being used (after they have consented).

10. Yes. Through dedicated websites where users opt-in their material with license information and stipulations (like: this artwork can only be used in generative AI for 5 years, after which the model must be destroyed). These websites offer remuneration to uploaders. The website must be policed strictly, as all websites that allow uploaders to earn money are rife with scammers across all industries (Adobe Stock, Unity Asset Store, ArtStation store, Blender store).

10.1. In visual Art, photography and Voice acting: yes.

10.3. Such a system would be destructive to creative industries, as compulsory licenses could decimate creative industries by legalizing the current practice while destroying any ability of price negotiation.

10.4. No, a collective license approach is destructive and would essentially legalize and normalise web scraping, making the internet a free-for-all of scraping, and preventing anyone from protecting their work from being used to train AI.

12. No: this is a difficult problem that even Adobe has issues solving. It is likely impossible unless two models are trained simultaneously, where one is exclusively designed to gather attribution data. Focusing on outputs of AI systems for attribution is an almost impossible task. A better strategy is to use proper licensing on the input data.

13. It would increase the costs of [re]generative systems, but it would also make them relatively priced compared to the cost of visual art in other contexts. [Re]generative AI should not be considerably cheaper than human

artwork unless the quality is significantly lower.

15. Yes and Yes.

15.1. Item level specificity.

15.2. Copyright holder and creator (if the two are different)

15.3. What obligations, if any, should be placed on developers of AI systems that incorporate models from third parties?

15.4. What would be the cost or other impact of such a recordkeeping system for developers of AI models or systems, creators, consumers, or other relevant parties?

16. Model creators should be obligated to know the authors or licensee of each piece of work they license. If said material is used, model creators should be obligated to notify when the material is used for training.

18. Depending on the [re]generative AI system and what qualifies as [re]generative AI.

For example: A person doing physical motion using a motion capture AI to animate a 3d model should be able to copyright their performance and the animation/motion of the 3d model. The AI was used only to capture the expression of the performance and translate it to digital form. Paul McCartney recently finished a song where they reconstructed John Lennon's voice from a recording. His voice is the original performance, and AI was only used to extract or enhance the performance. John Lennon and Paul McCartney are still the authors. Using AI to upscale a photograph or painting should still credit the original author as the copyright holder of the image, even though 50% or 75% of the pixels suddenly qualify as "generated".

Conversely, someone using drawing a gesture line and allowing a [re]generative AI to generate a human figure based on that line should not qualify as an author of the work. Most of the heavy lifting and "soul" has been done by the AI, not the person.

This is a hard line to draw, and the definition cannot be too technically strict. An image that goes from PNG compression to JPG compression can be reduced in size by 90%, and the bytes can be 100% different. But the image is still the "same" to typical viewer. We put emphasis in the "essence" of images when making determinations about art and Copyright, similarity and effort, not

the bytecode.

19. It could be useful.

20. There are no incentives needed to promote or further the development of AI [re]generative models. Even with this legal uncertainty, billions of dollars are thrown into this industry. By tightening the market for copyrighted material licensing, the development of AI will become less random and more targeted and scientific, promoting knowledge.

20.1. The introduction of Moral Rights in the US copyright system, that are inalienable and cannot be dismissed with contract. They could prevent companies like Disney from unilaterally training AI on their entire database of material without consent from the artists who created work for the movies.

21. No.

[re]generative AI in the creative arts is likely to reduce entry-level positions, reduce the economic value of original creation, reduce expertise in the field by destroying the viability, and flood the market with derivative material. Despite there being more derivative material, original ideas will not be able to compete either because the moment something new is created it will instantly spawn derivatives.

22. Through similar reproduction. The highest quality [re]generative outputs often mimic the style, composition or structure of images in the source dataset. It is very easy to use an Img2Img model to take an existing image and modifying it slightly to attempt to dodge copyright while getting all the value of the resulting image.

24. No: civil discovery rules that exist currently only allow significantly wealthy or resourceful individuals to pursue legal actions against companies that have trained on Copyrighted material.

25. Licensing should be required for datasets. Dataset licensing violations should fall on the developer, but vicarious infringement should follow use of the dataset by downstream users. This prevents the scenario where an anonymous user develops a finetuned model, and downstream users claim innocence for not knowing/caring about the dataset. If downstream users are liable for infringement, this also forces the market to adopt a rigorous respect for copyright.

25.1. Open Source models are often treated as "public domain", and nobody claims

responsibility for potential infringements.
Forcing models to respect licenses will

26. 17 U.S.C. 1202(b) should apply, and training an [re]generative model on material with copyright management information (CMI) should count as a violation. Training an AI model can be loosely understood as a lossy compressed encrypted database that accepts keys and returns a value.
Artists are actively applying copyright management information (CMI) to their works, including Watermarks, Glaze, Nightshade and other remedies to be able to keep posting online while retaining their rights.
17 U.S.C. 1202(b) can be an effective remedy for individuals to go after infringement.

28. Yes. If more than 25 percent of the pixels in the image are generated with AI.
This allows models like hand-trackers and body trackers that drive animations to avoid the label requirement as they are functionally different than many types of generative AI.
In static media (image/posters) it should be labeled on the image visually with large text.
On video media there should be a floating watermark.
The label should also include what model was used (or models, if multiple).
The prompts, model used to generate an image and seed should travel in metadata with the image. This can assist in claims of copyright infringement.
No LLM should be allowed to pretend to be human when confronted or asked.
Infringement should lead to severe punishment.

28.1. The publisher of said work. If social media, the poster of said work.
Infringing behaviour (not identifying material as AI) should be treated as a DMCA violation, and lead to potential bans.

28.2. AI software should have built-in labeling.
Social media websites currently automatically remove metadata from images and media uploaded.
This means copyright data and other important metadata is frequently removed automatically.
Implementing legislation requiring social media sites to not strip copyright metadata from images could be useful.

28.3. A flat fine per infringement, based on an index that scales with inflation and number of infringements.

29. AI detection tools are notoriously finnick, and are not consistent in their detection. Minor adjustments of the images or texts can completely destroy a verdict. Currently the best AI detection system is still human scrutiny of the source data (with as much of the raw material as possible), as well as a meta

analysis of the other habits of the target (do they share AI generated material).

31. Normal people should be protected from having their likenesses being reconstructed with AI without their consent. People should not have to fear being "faked", both in deepfake pornography or in embarrassing or incriminating situations. These protections and rights should not be easy to revoke (through a terms of service agreement, for example).

32. If we develop a system of "opt-in", we can avoid having this discussion. Adding extra stipulations of copyright protections based on "style" is not legislatively practical, and could cause a lot of Copyright trolling. Even if such artists or words were filtered out of prompts, there are easy ways to sidestep those filters by using prompts that are in the same area of latent space.

34. Consider whether or not [re]generative AI like Text, Image and Sound generators are a valuable pursuit for society. Really think about what the ramifications are. Most of these models try to mimic human outputs by ingesting human data in order to replace the process that produced the original data in the first place. AI Image generators are ridiculously useful for producing false profile images, unconsensual pornography, child sexually exploitive images, violent imagery, deepfakes and propaganda. Text generators/LLMs are very good at convincing readers, but they have no relation to facts or truth. Scammers can use LLMs to drive entire email scam conversations with no human input until the target mark is ready to be relieved of their money. Sound generators can mimic many voices with only 3 seconds of audio. The biggest utility these models have is their ability to replace human labour and pretend to be human. A more sensible approach to AI would be human amplification: image upscaling, motion capture, pen tablet smoothness, autocompleting, denoising images, denoising sound, contextual fill, contextual blur. These types of AI remove the tedium in many processes without replacing the type of creative labour that humans generally enjoy doing. It's not hard to imagine a future where the typical extent of creative labour is generating hundreds of iterations of a concept, and curating a handful of them.