

Copyright Infringement in Generative AI

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The Problem:

Generative AI art “creations” often undermine the rights of artists and creators, causing harm to the intellectual property market and marginalising traditional artists. According to a study, the global market value of copyright-intensive industries, including the art sector, was estimated at \$1.8 trillion in 2021, highlighting the significant economic impact of copyright protection [1]. A series of stakeholders involved in making generative AI models are often left unaccountable for all the work of real human artists that they use to run their businesses, and as a result, the end-users are penalised. We think that that is unfair.

Case Study: Artist Kelly McKernan discovered that their works are being used in AI-generated image creation without their consent or any compensation. McKernan joined a class-action lawsuit against AI imagery generators (Stable Diffusion and DreamUp), alleging copyright infringement and lack of credit. The case highlights the ethical and legal implications of using AI to generate derivative works without proper authorization, compensation, or recognition for the original artists. [2]

^bStakeholders Involved:

1. **Artists and Creators:** They are the primary stakeholders facing the challenge of copyright infringement in generative AI art. They invest time, effort, and creativity in producing original works and rely on copyright protection to retain control over 3

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Existing solutions:

Existing Policy Proposals	Stakeholders Involved	Benefits	Shortcomings
<ul style="list-style-type: none"> Licensing and Permissions 	<ul style="list-style-type: none"> Artists, creators, and AI model developers. 	<ul style="list-style-type: none"> Empowers artists to control and authorize the use of their artwork in AI-generated creations, ensuring fair compensation for copyrighted works. 	<ul style="list-style-type: none"> Depends on individual negotiations, which can be time-consuming and impractical for all AI-generated artwork.
<ul style="list-style-type: none"> Watermarking and Attribution 	<ul style="list-style-type: none"> Artists, creators, AI model developers, and end-users. 	<ul style="list-style-type: none"> Ensures clear ownership and attribution in AI-generated creations, deterring unauthorized use with identifiable marks from the original creator. 	<ul style="list-style-type: none"> Watermark removal or alteration techniques undermine this solution's effectiveness, and attribution alone may not address unauthorized copying and distribution.
<ul style="list-style-type: none"> Compulsory Licensing Scheme 	<ul style="list-style-type: none"> Artists, creators, policymakers, copyright holders. 	<ul style="list-style-type: none"> Addresses unauthorized use of copyrighted content in training AI models and facilitates compensation for copyright holders in AI-generated creations. 	<ul style="list-style-type: none"> Limited applicability to derivative works and insufficient for complex AI-generated art. Needs clearer legal frameworks and further exploration.

[3] [4]

Better solutions should involve:

- Accountability being held with fewer parties.
- The policies also need to be backed up by strong engineering of technical solutions that should not be too difficult to regulate- they should be computationally secure to avoid loopholes.
- Scalability and standardisation should be uncomplicated. This is because AI is a very fast-growing industry and we need standardisation to allow for international collaboration.
- Ideally, authors and end-users must not be at a legal disadvantage. They are the end points of AI influencing the entire world, they cannot be the only ones being held accountable for everything. That would mean sloppy tech policies.

Our Solution:

We propose a solution that carefully integrates both technical and regulatory means to achieve a more fair-use of copyrighted human art for Generative AI. It has the following features and comprises of the below steps:

- Stakeholders involved:
 1. Regulatory bodies making laws
 2. A publishing software in-charge of ensuring the authors can correctly digitally sign their work
 3. The author, who is the human creator of copyrighted and published artwork (**Party A**)
 4. The companies making the training data sets for generative AI models (**Party B**)
 5. The companies providing AI as a Service (AIaaS) making generative AI models using those data sets (**Party C**)
- Companies making training data sets are accountable to recognise the artists that they are using the data for curation.
 1. Regulatory authorities should develop explicit guidelines for Party A to determine the circumstances under which they can utilize copyrighted content to train and educate AI, clarifying the exceptions they may rely on. Furthermore, they can set forth criteria for Party B, the companies generating training datasets, to ensure their data collection practices are responsible. These criteria should encompass obtaining explicit consent or licensing agreements from artists before incorporating their copyrighted artwork into the datasets.
 2. Use of Digital Signatures to establish ownership [5]: A digital signature is a cryptographic algorithm to establish integrity and authenticity of a party that signs their transaction, or in this case, their artwork. The digital signature, along with the associated public key, serves as proof of authorship in this scenario. Verifying the signature helps establish that the artist or content creator is the rightful owner of the copyrighted work. When an author publishes their work, they can digitally “sign” their art piece in such a way that every time the art piece is used in an AI model even, the metadata of the piece traces back to the original author.
 3. Party B must publish a record of copyrighted, original artwork pieces that it uses to build its training model. It could do that again with the help of verifying the authenticity of every art picture that it picks up on the internet during the collection phase. The above algorithm only helps establish ownership of the author up until Party B, which is the party that creates the training data set for generative AI models. In order to further ensure ownership is preserved, Party C can obtain the metadata of the digital signatures of the involved artworks in its model.
 4. Further, Party C should publish the authors of every generated AI artwork using their digital signature information if it is over 50% of derivation from a particular piece of art. This can be done by using AI interpretation technology. For the others, it cites the company that it bought the training dataset from (Party B). An example is further

described later in this section.

5. Global Standardisation and Royalty Schemes: regulatory bodies can also promote international collaboration and standardisation of policies. They could also standardise royalty schemes that would encourage more artists to be open to consent to AI models using their art to train and generate art.
6. Building of ownership: Artists (Party A) can collaborate with AI developers (Party C), platforms, and companies to establish clear guidelines and ethical standards for the use of their work. This can include creating licensing agreements, ensuring proper attribution, and establishing revenue-sharing models to provide fair compensation to artists when their work is utilised in AI-generated content. Additionally, artists can negotiate agreements that allow them to generate revenue based on residuals, which can provide ongoing compensation to artists based on the usage or commercial success of the AI-generated artworks.

For the future: For future advancements in AI, artists can collaboratively sign their works to a trusted third party or decentralised network, which the training model can pick as a whole and this third party could build a revenue model, compensating the human artists for trusting their work with them. This network then becomes Party A in the above steps, allowing for easier implementations of ethical AI.

An example:

1. I am Alice. I make art. I am willing to publish an art piece of mine for free use, which has a bunch of cats in it. I digitally sign it and put it on the internet with the help of a publishing software. *I exeunt.*
2. I am OpenedAI. I want to make a training model so I make my code crawl over the webspace for published artworks on the internet. I find a whopping 3 TB of data, among which Alice's art piece is 3 MB. I know that because I was able to verify her digital signature with her public key. I respect her right to ownership of her IP. I also publish this information publicly.
3. I am WatGPT, a generative AI company that outputs pictures based on en-user prompts. One user happens to type "Cats", and I happen to use more than 50% of Alice's painting of "Cats". I use the digital signature obtained via the training model to verify her ownership and cite the same in the output I give.
4. Everyone is happy.

This policy removes the liability on a non-technical end-user to responsibly use AI models for their tasks. It puts the responsibility on the governing bodies and technical engineers, as all socially-benefiting technology should be.

Limitations and Assumptions:

1. It is assumed that digital publishing companies make all copyrighted artists digitally sign their work mandatorily.

2. A strong technical assumption is that the AI model-designing companies are able to link the art in the training model data to their digital signatures.
3. Party C usually cannot quickly run an interpretability model to judge the percentage of exact replication that it makes of an existing artwork. This might take some time to actually materialise.
4. This policy still does not protect artists who DON'T want to have their art be used in training models.
5. A further limitation is that it is the obvious responsibility of the end-user to acknowledge the author from which the generative art is made from. It is displayed to them, but it is still their responsibility to use that information to cite when publishing the generated artwork somewhere.
6. It is also a shortcoming that for an art piece that is not originally digital, establishing proof of ownership is difficult, even through digital signatures.

The lack of accountability and fair compensation in the use of generative AI models to replicate artwork undermines the rights of artists like Kelly McKernan, emphasising the need for stronger copyright protection and ethical considerations in AI-generated art.

References:

- [1] https://www.wipo.int/export/sites/www/copyright/en/performance/pdf/report_2022_us.pdf
- [2] <https://www.newyorker.com/culture/infinite-scroll/is-ai-art-stealing-from-artists>
- [3] <https://doi.org/10.1007/s40319-021-01119-w>
- [4] <https://shorturl.at/qtyX0> "copyright infringement art generative AI"
- [5] <https://dl.acm.org/doi/pdf/10.1145/278476.278488>