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# Machine Learning Has A Fixation Problem

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## Abstract

Legal scholars tend to assume, firstly, that *fixation* is a narrow copyright concept, and secondly, that fixation has obvious utility in terms of public perception of the copyrighted work, author identification, and evidence of infringement. However, machine learning models challenge both of these assumptions: they demonstrate that almost any intangible subject matter can be “fixed” in material form, and become the object of exclusive economic rights, far beyond the realm of copyrightable expression. Secondly, machine learning models reveal the *disutility* of fixation with respect to its automatic generation of authorship claims, and the resulting liability exposure of generative models.

## 1. Fixation

In copyright law, *fixation* is often synonymous with *authorship*. This means that whoever fixes a work in material form is generally considered to be the author of that work, and thus entitled to exclusive economic rights. There are exceptions, of course, where the *actual* author of a work is not its *legal* author; the work made for hire doctrine vests legal authorship of an employee-created work in the employer. Aside from these exceptions, however, fixation often produces a valid claim to authorship.

There are both *descriptive* and *normative* consequences that flow from this relationship between fixation and authorship. Descriptively, the ease of fixation of digital works produces an overwhelming supply of potentially copyrighted materials. Given the absence of copyright formalities, and the low legal threshold for originality, almost every photo taken on a smartphone automatically receives copyright protection upon creation (Sobel, 2021). This means that a generative model trained on millions of text-image pairs found online has significant exposure to copyright infringement liability.

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To the extent that a model generates output that is substantially similar to copyrighted works on which it was trained, the fair use defense may not be available, especially if the model’s output threatens the market for the original work (Henderson, 2023; Ginsburg and Budiardjo, 2019; Sobel, 2017; Carlini, 2023; Somepalli, 2022). Additionally, this infringing output is ineligible to receive copyright protection as an unauthorized derivative work. This outcome may be normatively desirable where it preserves the market for human-authored art (Craig and Kerr, 2019), but it also undermines the ability of users to experiment with a new form of creative expression.

Normatively, the relationship between fixation and authorship can produce counter-intuitive chains of ownership and control. For example, someone who records improvised jazz at a bar on their smartphone owns the copyright in that sound recording, not the jazz musician. Similarly, Indigenous communities struggle to retain ownership over unfixed creative works (such as songs, stories, and dances) when they are recorded by non-Indigenous parties (Okediji, 2021). Creators of transitory contemporary artworks (such as sculptures made from living materials) fail to receive domestic protection for their works, despite being eligible for protection in many civil law jurisdictions (Carpenter and Hetcher, 2014). Contemporary artists may therefore be disadvantaged by the fixation requirement, in violation of the *Bleistein* nondiscrimination principle.

### 1.1. Fixation as Authorship

As emerging technologies expand the range of subject matter that can be “fixed” in material form, this connection between fixation and authorship may continue to produce counter-intuitive chains of ownership and control. For example, users of generative art models (such as Stable Diffusion and Midjourney) may be regarded as the authors of model output because their text prompts *cause* the images to be generated and thus *fixed* in material form (Samuelson, 1986). Text prompts arguably meet the low standard for creativity required by *Feist* (Bridy, 2012; Denicola, 2016). However, the inability of users to *control* the machine learning process, or to predict the output generated by their prompts, has so far failed to convince the Copyright Office to reward them with legal authorship (Ginsburg and Budiardjo, 2019).

## 1.2. Datafication as Fixation

Beyond generative art, machine learning models are expanding the range of intangible subject matter that can be “fixed” in material form. For example, automated gender recognition involves the “detection” of an individual’s gender from their facial landmarks and other physical features analyzed through computer vision. This allows technology firms to “fix” an individual’s gender as machine-readable data. Once an individual’s data proxy is gendered, and that proxy is churned through multiple decision-making apparatuses, its attributed gender becomes more “real” or consequential than the individual’s true gender identity (Keyes, 2018). Mis-gendering can be particularly harmful for transgender and non-binary individuals.

By externalizing interiorities of the self as computational data, machine learning models transform fixation from a narrow copyright concept into a key marker of digital commodification, with consequences not only for creative authorship, but for personal identity formation (Smith, 2016). The uncopyrightability of gender under the idea-expression dichotomy does not prevent technology firms from propertizing this information. The enclosure and monetization of personal data (as “facts” about individuals) has always drawn outside the lines of traditional intellectual property doctrine (Cohen, 2019).

## 1.3. Fixation As Ownership

Automated gender recognition reinforces the problematic relationship between fixation and ownership that is exposed by Indigenous cultural appropriation. The unauthorized fixation of traditional cultural expressions by non-Indigenous parties bears a striking resemblance to the unwanted fixation of gender as computational data.

The process of datafication changes the nature of embodied knowledge, in the same way that fixation changes the nature of traditional cultural expressions (Hayles, 2008). Technology firms can only *fix* gender in computational datasets by encoding it as binary, physiological, and immutable (Keyes, 2018). By encoding gender using inaccurate and incontestable criteria, technology firms violate the phenomenological borders of embodiment (Smith, 2016). The reification of computational data as an “objective” and “neutral” source of knowledge about gender identity also recalls the historical marginalization of Indigenous ontologies and epistemologies, including the concept of the body as a living repository or embodied library that contributes to the survival, resilience, and sustainability of traditional knowledge (Peters, 2016).

## 1.4. Exposure to Copyright Infringement Liability

In response to the possibility of copyright infringement liability, machine learning researchers have developed a variety of technical mitigation strategies to reduce their exposure, including input and output filtering, instance attribution, differentially private training, and feedback-based learning (Henderson, 2023). The use of these strategies could protect model deployments under DMCA-style safe harbors, just as YouTube is protected by its use of ContentID (Henderson, 2023).

However, technical mitigation does not address the root cause of machine learning’s legal exposure, which is the ease of digital fixation and its automatic generation of authorship claims. This relationship between fixation and authorship will prove increasingly problematic for new forms of digital fixation, including AI image generation, and automated gender recognition.

## 1.5. Delinking Ownership from Fixation

While the judicial response to machine learning output remains uncertain, copyright scholars should take this opportunity to reexamine the legal consequences that flow from fixation. Just as the work made for hire doctrine *de-links* ownership from fixation in the context of employee-created works, utilitarian copyright jurists could create similar legal fictions for specific machine learning applications (Bridy, 2012).

Delinking ownership from fixation where fixation was not intended to generate authorship claims (for example, fixation was incidental to a non-creative purpose) would achieve two normatively desirable outcomes: first, it would allow machine learning innovation to flourish (and users to experiment with a new form of creative expression) without the need to license millions of digital works, and without compromising the market for human-authored art.

Secondly, it would preclude technology firms from propertizing gender expression, and other forms of deeply embodied knowledge. Ensuring that fixation does not automatically give rise to ownership and, conversely, that ownership does not always depend on fixation, may achieve a better balance of competing interests moving forward.

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