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## The Need to Revise Copyright Law to Reflect the Changing Costs and Benefits of Modern Digital Reuse of Artistic Creations

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### Abstract

*Copyright law has always sought to maximize the quantity of valuable creative works available to society. While protecting the creative artists is essential, it is in some sense incidental; the reason to protect the artist is that without them, there would be nothing to copy. As new digital technologies for transforming artistic works gain in capability, the ease of producing innovative and valuable works based on the reuse of prior work increases, meaning that society can now benefit from an increased supply of works based on the reuse of others. This suggests that restrictions on reuse that were considered optimal in the past should now be relaxed. We suggest changes to copyright law to achieve this new optimum. We suggest that artistic merit should once again be considered relevant to copyright law, in this case to determine when artistic works should be permitted to reuse works still subject to copyright protection. We retain the concept of originality in deciding when works based on reuse should themselves be granted copyright.*

### 1. Introduction

#### 1.1. The Complex Aims of Copyright Law

From its inception, copyright law has always had complex aims because it has always sought to find an optimal balance between two conflicting objectives. Copyright law, like patent law and all other forms of intellectual property rights regulations, seeks to benefit society by simultaneously maximizing society's supply of innovation by protecting creators and to maximize society's access to innovation by limiting the protection afforded to creators [1]. Copyright law seeks to protect the innovators who create new works of art and new practical inventions, because without innovative originals there would be nothing to copy. Protecting the creative innovator is usually done by providing incentives for creativity, and this usually involves awarding the creator with a limited period in which the creator has sole control over how the innovation is to be used. This balance between protecting creation and protecting access has been debated everywhere that intellectual property rights are protected, and its importance was so clear that patent law is actually included in the U.S. constitution [2]. During this period of monopoly rights to the work, the innovators can make as many copies as they wish, URL: <https://hdl.handle.net/10125/80195>  
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or can license the innovation to one or more other parties, and can grant them well-defined and well-delimited rights to reproduce the innovation as well. Providing access to society usually involves placing clear limits on the duration of the innovator's monopoly rights, and when this limited period of monopoly rights ends others can begin to produce more copies, perhaps with enhancements, and this results in increased competition, which in turn results in lower prices and more choice for consumers.

It should be self-evident that as it becomes easier to copy, transform, and extend an original, society will gain more by relaxing the restrictions on copying. While this does not tell us how much to relax copyright protection, it makes it clear that the new balance between protecting the original creator's rights and protecting society's access will certainly shift in the direction of encouraging more access. Prior work by Jerald Hughes et al. makes this same point in the context of the open-source culture that has emerged where artists base their work in large part on existing work, and expect their own work likewise to be used and reused by others [1].

In a very real sense, the definitive art form of the 21st century may be the mashup or collage [3], because of advances in digital technologies that enable reuse, transformation, and redistribution [4]. This is based in part on the fluidity and mutability of digital representations and on the power and ease of use of digital technologies; for example, in music the elaborate multi-track recording and mixing studios that provided the unique power of commercial record labels can now be replicated in the garage of any home enthusiast [3] diminishing the power of these labels [5]. This democratization of creativity requires rethinking of copyright law; if anyone can create value by reusing existing artistic works, then restricting this reuse of prior works should be easier than it is today. If reuse of existing art now leads to the increased creation of valuable new art, then restrictions on reuse are demonstrably more costly to society than they were in the past.

Art has always drawn on the works of prior artists including the motifs, arrangements, characters, themes, techniques, storylines, perspectives, and more [6, 7]. The spectacular Roman statue The Boxer is believed to be a copy by a talented Roman sculptor of a brilliant work by a Greek sculptor before him. Bach and Vivaldi borrowed themes freely from their earlier compositions

and almost as freely from each other. The musicals *Kiss Me Kate*, *Two Gentlemen of Verona*, and *The Boys from Syracuse* [8] are all based on works of Shakespeare. Similarly, Shakespeare's *Romeo and Juliet* provided the inspiration for Bernstein's *West Side Story*. In all these cases, the copies were produced by enormously talented sculptors, composers, and playwrights. Modern forms of copying and reuse are far easier, which complicates regulatory regimes. Value-adding copying is more prevalent, which allows it to add more value for society; however, because it is more prevalent, the potential loss to the creators of prior art is also greater.

More specifically, we will address the range of activities that are now possible and indeed can now be exploited by a second artist to add value to the works of the first. We will explore the value that these activities can create for viewers, readers, and audiences broadly construed. And we will explore changes to copyright law and licensing agreements to develop novel, fair, and equitable ways of combining the value thus created by these activities.

By the turn of the twentieth century, a principle of aesthetic neutrality in the evaluation of copyrightability developed across different copyright jurisdictions. In France *La loi du 11 mars 1902* defined the principle that protection of work should depend neither on the merit nor the purpose of it ('*la protection d'une œuvre ne dépend ni de son mérite ni de sa destination*'). In the UK, the skill and labor doctrine came to prescribe that works protectable under copyright law irrespective of their artistic merits; skill, labor, and judgment are enough to make a work original [cf. 9]. The US Supreme Court's decision in 1903 [10] defined a similar principle that copyright protection of a work does not depend on artistic merits, as famously declared by Justice Holmes 'It would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges of the worth of pictorial illustrations, outside of the narrowest and most obvious limits.'

The general principle of aesthetic neutrality in copyright law has gradually taken hold as a defining world view for assessing whether or not a work deserves to be protected; the originality – in the sense of originating from a creator – of its contribution remains central, while the intrinsic value of its contribution remains in principle undiscussable. Yet, commentators have pointed out that aesthetic neutrality in courts is hard to sustain [11-14].

In our recommendations for policy, we would like to challenge the principle of aesthetic neutrality in assessments of copyrightability making the case that the principle is not only unfeasible but also undesirable given developments in digital technology. Digital technologies facilitate the democratization of art by enabling almost anyone with just a tad of artistic vision they wish to create or with an artistic statement they wish to

make to complete their creation [3, 4]. Technologies for combining, altering, or extending digital works are easy to master (Ibid.). Since this democratization is inevitable and socially beneficial, we believe that it should be permitted when it adds value, which means merit must be considered. Moreover, we believe that when works involving the reuse of protected materials both add value and themselves pass a threshold for artistic contribution, they too should be granted copyright protection in their own right. We explore these two concepts in more detail in section 5, which addresses our recommendations for policy on the regulation of works involving the reuse of material protected by copyright. However, when these works involving reuse are used commercially and produce revenue themselves, the question of revenue division between the original artist and the reusing artist is too complex for us to resolve at this time.

We briefly recapitulate our research agenda here:

- We will classify the forms of transformations and of artistic reuse enabled by new technologies. This will establish why we believe technology-enabled transformational forms of reuse are sufficient to require reexamination of copyright law and reconsideration of the role of artistic merit as a factor in decisions regarding reuse of materials protected by copyright.
- We will also classify these transformations based on their economic value to society and based on their economic impact on the original creator of the work being reused.
- Finally, we will provide recommendations on when reuse should be permitted and how it should be regulated.

## 2. Background on Copyright Law

### 2.1. The Origins of Copyright Law

Early copyright law — the 1710 Statute of Anne in the United Kingdom and the French Act of 19-24 July 1793 — broke the dominance of book guilds [15] and established a free market for ideas [16]. Roughly speaking, in the early days, literary copyright provided a simple protection against 1:1 substitutions of printed volumes [17] while artistic copyright outlawed unauthorized engravings and casts [18]. As such copyright law protected authors' and publishers' investments in literary and artistic works. Furthermore, a rationale for copyright put forward at the time of the early debates on copyright, most notably by Daniel Defoe, was that it offered a protection against copying that would destroy the value of originals. Defoe made the case that press piracy amounted to either the unauthorized printing of abridgments of published books or the re-printing of books in poor quality, including on cheap paper and in small print. This, Defoe, pointed out, was socially harmful

since the public would be deceived into thinking that the abridgments and the low-quality reprints contained the substance of the original book [19]. Besides, it was harmful to the author who as an effect of piracy would not be valued on the basis of what he had said in the original book [20].

## **2.2. Debates over the Proper Balance in Copyright Law**

Since the beginning of copyright, a Lockean labor theory of intangible property has often been applied to justify the exclusive right to copying [21]. This ownership of literary and artistic works can be claimed by reference to the labor put into creating the work. Balancing any interest in individual ownership with the general interest of preserving a commons is secured by ensuring that the commons is not significantly devalued by the appropriation of ideas and turning them into copyrighted material and by observing the Lockean non-waste condition [22]. In a similar vein the cultural argument for copyright point to three groups of stakeholders including authors whose interest it is to maintain an income from their works and getting acknowledgment for it while also securing the work's integrity Publishers aim to profit from publishing editions. The public's interest is two-fold and consists of individual interests in making use of copyrighted works on reasonable terms. The collective interest is in all persons having a reasonable right of use for the sake of the general development and dissemination of knowledge [23]. Importantly the limited term of copyright along with a number of exceptions to the exclusive right has been considered the means to ensure balance between stakeholders and that the non-waste criterion is upheld [24].

## **3. Literature Review 2 — The Early Role of Technology in the Performing Arts**

New art forms, and new ways of reproducing and transmitting art forms dramatically transformed the performing arts in the 20th and 21st centuries. Sound recordings, even in a pre-digital era, introduced new considerations [25]. These issues became even more significant with the advent of radio and royalties for playing a recording. The recording artist paid the author, and that was pretty straightforward. But each recording became a unique instantiation, and each play on air became a unique payment opportunity. ASCAP (American Society of Composers, Authors and Publishers) and RIAA (Recording Industry Association of America) emerged to track on-air usage and to ensure that artists were compensated appropriately.

VCRs introduced the ability to record at home, including the ability to record from broadcast sources, creating new opportunities for producing unauthorized copies of protected performances. There was much

debate about how this should be handled, and in 1992 the Audio Home Recording Act was introduced. Royalties for blank digital media and recording devices were introduced, and safeguards to prevent second-generation or serial copies were implemented (SCMS, Serial Copy Management System) [26].

With the widespread adoption of home DVD players, the production side of the movie industry became concerned that movie attendance would suffer. Video rentals, both VCR cassettes and DVDs and video sales created the concern that the sale of videos for home use would also suffer, since a single copy owned commercially could be shared with a large number of users, reducing their need both to view in theater and to purchase for home viewing. Online streaming made these concerns even more acute. Rental stores paid a higher price for movies and Blockbuster pioneered a revenue-sharing system with Studios) to incorporate royalties for renting [27].

The continuous improvement of digital editing tools for sound recordings made mashups increasingly popular [28]. What had been a laborious artform in the age of analog music became feasible for anyone with access to a computer and a digital editing tool. Mashup artist often distributed their work “underground”, leaving no fair revenue for sampled artists [28]. Similarly, digital photo and video editing tools made collages a more widespread phenomenon. It became easy to access digital photos on videos on the Internet and to recombine them with popular, relatively easy-to-use software such as Adobe Photoshop or Adobe Premiere [29, 30].

Further artforms that emerged due to the advancements of digital technology include user-generated work such as playlists and game mods. The playlist—a set of songs in a fixed order—is known from radio programs and mixtapes. But with digital music streaming, playlists have become a product that users create not only for themselves but to share with any other user [31]. This has sparked a discussion of whether playlists are themselves works that warrant copyright. Game mods are user-generated enhancements and extensions to video games. Some forms of enhancements are barely tolerated by serious gamers, like the various practices related to Goldfarming, which involve earning in-game assets or developing advanced gaming characters, and selling them to novices [32]. Others are seen to create value for games and gamers and are thus more generally accepted, and now even embraced and facilitated by game developers. Game developers now provide modding tools to facilitate creating game extensions

## **4. Reuse — Transmission, Enhancements, Recombination, and Transformation, And the Role of Modern Technology**

We are certainly not the first authors to attempt to

develop a classification of forms of digital transformation; see, for example, Table on page 12 in Hughes, Lang [1]. Our classification differs in two significant ways. First, and most importantly, we no longer make the distinction between reuse implemented by the original creator and reuse implemented by others. Technologies for reuse, modification, enhancement, and transmission have become so powerful and so easy in the decades since Hughes, Lang [1] was written that we assume that ultimately most changes will be feasible for almost anyone to implement. For that reason, we focus our analysis solely on the copyright implications of reuse by parties other than the original creator. Additionally, and less significantly, our classification of forms of reuse, modification, and enhancement is informed by additional decades of technological development for digital reuse, and is therefore more complete. Notably, we distinguish (1) simple reproduction or retransmission, without quality changes, (2) reproduction with higher quality, (3) reproduction with enhancements, including extensions and multi-user versions of existing games (4) recombination and repurposing, (5) digital transformation, including reperformance. See Table 1, below, for a summary of transformations of artistic and other creative works, where the original underlying works are protected by existing intellectual property rights regimes.

We provide this classification for two reasons. First, it helps demonstrate how profoundly technology has enhanced the scope for reuse of protected works, which in turn helps motivate our argument that copyright law should be reexamined. Additionally, it helps guide analysis of which forms of reuse are artistically and transformationally trivial and which may have sufficient merit to justify protection.

#### 4.1. Reuse without Quality Changes

*Simple reproduction or retransmission, without quality changes* has become a widespread phenomenon for various types of media because digital technologies have made it so easy. Digital photographs can be easily copied and shared via the Internet and analog photographs can easily be digitalized via scanning. In particular, on social media platforms such as Pinterest, Instagram, and Facebook, digital copies of photographs are shared *en masse*, frequently without permission from the photographer or copyright holder [33]. In the US, the safe harbor regulation from the Digital Millennium Copyright Act [34] protects the platform operator from being prosecuted for copyright infringement on their platforms. Thus, copyright holders have been unsuccessful in suing platform operators when their material has been shared on their platforms; instead they have been forced to litigate individually against every user who shared protected photographs or other protected materials [33]. Similar to photographs, digital reproduction of artwork

such as paintings, lithographs or even sculptures can be digitalized via photographing, 2D-, and 3D-scanning [35]. If the original artwork is public domain, such reproductions are possible. Cultural institutions such as museums have tried to establish copyright for their digital reproductions but have failed to do so; for example in the cases National Portrait Gallery (UK) v. Wikimedia Commons and *Bridgeman v. Corel* [36].

Digital technologies have further simplified the copying of music and video material. As digital formats for music (e.g., MP3) and videos (e.g., MPEG) became available, it was easy for users to make digital copies of analog material and share this material. This led to a wave of peer-to-peer file sharing in the late 1990s and early 2000s [37] with Napster being the most prominent example. On the Napster platform, music and other protected material were shared *en masse*, which had a negative impact on revenue for artists [38]. However, RIAA and A&M Records sued for copyright infringement and won, leading to settlement payments and a shutdown of the Napster file-sharing network [39]. The phenomenon of file sharing persisted with new platforms emerging as quickly as existing platforms got shut down. With increasing internet speed on-demand streaming of music and videos became more and more popular, raising new copyright issues. Besides legitimate services such as Spotify for music or Netflix for videos, a plethora of illegal websites emerged to offer streaming of material they offered without the authorization of the copyright owners. In the US, the practice was particularly widespread with *Game of Thrones* becoming the most illegally streamed material ever, due to the so-called “streaming loophole”: Streaming was not seen as copying [40], thus watching a stream was not illegal. Hosting a stream was, but was only prosecuted as a misdemeanor. As a result of recent regulatory changes, operating a public for-profit streaming service without permission to use materials under copyright is now a felony [41]. Video platforms such as YouTube, where users can upload and share any video material, further highlight copyright issues. In its early days, YouTube users could upload video material without YouTube controlling for any copyright violations. This changed due to lawsuits such as *Viacom v. YouTube* in 2013. Viacom sued because YouTube users uploaded copyrighted content. However, the lawsuit and appeal were decided in favor of YouTube because of the safe harbor regulation in the Digital Millennium Copyright Act. In the end, the parties settled: Viacom did not seek damages and YouTube developed the “Content ID” to identify copyright infringement. With the Content ID, copyrighted material is detected and users can decide whether to delete the content or to accept ads that would be added to the material and that would generate revenue for the copyright owner [42]. A further copyright issue emerged as players of video games began

uploading recordings of their gameplay and, with increasing Internet speed, began live-streaming their gameplay on platforms such as YouTube and Twitch [43]. Balancing the interests of game developers as copyright holders, gamers as users, and Internet platforms remains an open issue.

With regard to software, simple reproduction refers to copying a software product. If the product is copyright protected, this is typically referred to as piracy [44]. Copyright owners try to protect their products through safeguards such as registration codes, which in turn, criminals try to circumvent by “cracking” or even stealing registration codes [45].

## 4.2. Reuse with Higher Quality

Digital technologies have enabled the *reproduction with higher quality* of artwork. First, musical recordings can be remastered, not only transforming analog formats into digital formats but increasing the sound quality [46]. If the original material is copyright protected, remastering typically can only be done with the authorization of the copyright holder. However, until 2018, material from before 1972 was not protected, raising the question of whether remastered material would be granted new copyright. In an ongoing case [47], a recent opinion states that “a derivative sound recording distinctly identifiable solely by the changes in a medium generally does not exhibit the minimum level of originality to be copyrightable.” While material from after 1972 has always been protected from derivative work without authorization, this protection has been extended to pre-1972 work with a blanket copyright as part of the Music Modernization Act from 2018 [48].

Reproduction enabled by digital technologies can not only increase quality but also enhance the original artwork. Such *reproduction with enhancements* covers improving the functionality of software under copyright, *modding* an existing game to improve image quality, adapting a play to a new version or to a musical, adapting a play or a musical to a movie, taking single-user versions of software for word processing and spreadsheets and adapting for multi-user updates. Reproduction with enhancements raises complex copyright issues that are related to questions such as whether the copyright of the original work is infringed and whether the enhanced work warrants copyright on its own. In the software industry, the software has often been copied and enhanced, sometimes by imitating user interfaces, sometimes by using code from the original software. For example, the cases of *VisiCalc v. Lotus* [49, 50] and *Lotus v. Microsoft Excel* [51] raised the question of when copying a user interface becomes copyright infringement, even if the functionality of the software has been enhanced. In these complex lawsuits, decisions depended on how much of the look-and-feel was actually copied because a command structure itself was not

copyrightable. Similar cases have been ongoing until today, for example, a recent Supreme Court decision found that Google did not violate copyright by using code from Java APIs in Android which was seen as fair use [52].

## 4.3. Reuse with Extensions and Enhancements

*Extensions* represent another form of reuse. Extensions go beyond enhancements because they are distinct additions to underlying work and not just an enhanced form of the work. Extensions include modding an existing game by adding characters, weapons, or new scenarios and creating a function library for software. Creating extensions such as mods may violate copyright if they are shared. However, not all game owners seek to limit modding, because it creates value for gamers and can potentially contribute to the popularity of the original game [32]. A further example of extensions is gold farming in the video gaming industry, a phenomenon that describes when companies use cheap labor force to unlock characters, weapons, or other content in online games to resell them to players in an unofficial marketplace. Gold farming was particularly prevalent in Blizzard’s massive multiplayer online games *World of Warcraft*. Blizzard fought gold farming and was successful in lawsuits because users in online games were seen as licensees of the game rather than owners. Blizzard was thus entitled to prohibit gold farming through its terms of use [53]. However, it is difficult for game developers to quell gold farming completely as users find ways to avoid detection, for example by trading characters via the dark web [54].

## 4.4. Recombination and Repurposing

*Recombination and repurposing* refer to form of reuse such as collages, playlists, and other forms of combination that create a new work of art. Such artwork can be created without digital technologies, such as collages created from magazines. For example, Salvador Dalí used illustrations of a lion from, most likely, a children’s book for his work *The Accommodations of Desire*. Such recombination and repurposing lead to copyright issues as illustrated by the 2019 movie *Yesterday* that uses numerous songs by the Beatles. The release of the movie had to be moved up before the copyright of some songs would revert from Sony Music to Paul McCartney as a result of a settlement of an earlier lawsuit [55]. Similarly, the successful musical *Crazy for You*, a Broadway production from 1992 largely built on songs and lyrics from the Gershwin 1930 musical *Girl Crazy*. Digital technologies have made recombination and repurposing significantly easier and have also created new art forms. Collages, mashups, and sampling has become more widespread as the required material is available in abundance online [30]. New formats include playlists that are a combination of songs in a

certain order and can be seen as new work in itself [31].

#### 4.5. Digital Transformation Including Reperformance

Lastly, *digital transformation* refers to a form of reuse that is both more automated and more transformative than simple enhancements. For example, the reperformance of old music performances by robots and AI are considered a digital transformation type of reuse [56]. Yamaha created a “Dear Glenn AI” that would reperform the famous Bach and Mozart performances of Canadian Pianist Glenn Gould, imitating his stylistic nuances [57]. Google Tone Transfer uses machine learning to transform any audio into one of four instruments [58]. This is also possible for voice, as a recent project by the company Supertone showed: their voice AI system created a new song performed with the artificially created voice of folk-rock singer Kim Kwang-Seok, who has died almost 25 years ago [59]. Applying these technologies to speech allows to create deep fakes, that is, artificially created speech that sounds exactly like a specific person [60]. Combining all of the above leads to a plethora of possibilities to create new material that is based on older performances, and imitates nuances of instrument performances and even voice both in signing and speech. This creates new copyright issues, given that material is not directly copied but rather transformed.

In movies, colorizing was the first step towards transformation. While initially, colorizing was largely done manually, the increasing capabilities of video editing technologies enabled automated colorizing and even animation. For example, when filming the movie *Avatar*, motion-capture was used to transform actor’s physical performances into their digital counterparts. Small, body-mounted cameras even capture the facial expression and eye movements of actors [61]. Building on these technologies, reperformances of existing work can be fully automated in the future. Instead of reperforming a play with new actors—such as Shaw’s *Pygmalion* that was adapted as the Broadway Musical and then the Hollywood movie *My Fair Lady*—computer animation could be applied to create digital reperformances of movies or recorded plays. Many studios already preserve 3D digital counterparts of actors which can be potentially reused in later movies when the actor needs to appear younger or has died [62]. See figure 1 with an example of the “before image” (on the right) and the “transformed image” (on the left), which illustrates the capability of digital transformation[63]. This new form of transformation goes well beyond the “colorizing” of old black-and-white movies, and creates new artistic possibilities.

#### 4.6. Summary of Guiding Principles

The following principles guide our policy on reuse of

materials that are themselves based upon reuse of existing materials:

- If the work being reused is an authorized reuse of protected material and if the original reuse is itself protected by its own copyright, then the secondary reuse is treated as any other reuse of protected material.
- If the work being reused is of protected material and the original reuse has not been authorized, then the secondary reuse is likewise unauthorized.
- If the work being reused is an authorized reuse of protected material and if the original reuse is not protected by its own copyright, then the secondary reuse is of the original protected material is governed by the protection of the original work.
- Finally, if the reuse involves unmodified reposting of unprotected material, as would be the case if it involves images from the digital commons, then the reuse cannot be protected by copyright. This would appear self-evident but it is in fact controversial. The business model of Getty Images and Alamy do involve taking unprotected materials, providing indexing, copyrighting their purloined images, and charging for the use of images in the public domain. In a case that went to trial they actually attempted to charge a photographer for use of her own works, which she had donated to the library of congress and they which Getty and Alamy had then copyrighted [64].

### 5. Examination of Relationship between Change in Transformation Capability and the Design of Applicable Copyright Regulation

Because of space limitations, we address only one of the six rows in table 1. We address changes in copyright law to address the new capabilities of digital transformation because this is the newest capability, the most technically advanced, and the one with the potential of adding the most value. For these reasons, it is also the capability that requires the most comprehensive reexamination of copyright regulation.

In our analysis of digital transformation, we examine a spectrum of cases, within the single category of reperformance. Once again, our basic argument has been that if modern technology makes any form of reuse both less expensive and more valuable, then regulations affecting and restricting it of necessity need to be relaxed and made more flexible and less restrictive. And once again, if society had developed a set of regulations of any activity, and if those regulations were once optimal, then when the activity has become easier and more valuable it is clear that the prior set of regulations restricting that activity can no longer be optimal.

Consider first the example of *robotic*

*reperformance*, where technology reverse engineers the precise sequence of finger movements, timing, intensity, and duration, of every note played in an old Edison-era recording of piano music. To be specific, imagine we have a very old wax-based recording of Scott Joplin performing his own music. The recording will be monophonic and not stereophonic, of course. It will have captured a very limited range of frequencies, with none of the high-frequency transients that make percussion instruments “pop” and sound alive. Remastering would remove surface noise, but would do nothing to restore the actual sound of the piano. Having someone else record the piece is a real possibility, and indeed Joshua Rivkin’s recordings of Scott Joplin were considered the standard for some time. But having software analyze the recording to reconstruct Joplin’s original finger movements, and then having a robot implement them, striking the keys of a modern piano in a modern recording studio, is fundamentally different from remastering. In a very real sense, the reperformance brings Joplin’s recordings of his own music back to life.

Since robotic performance was never possible before, there are no provisions in current copyright law that would cover the example of robotically reperforming Joplin. And, as we know, individual recordings of performances are protected by copyright, just as the underlying composition is protected. We would argue that this form of reperformance creates significant value, and should be not only permitted but encouraged. Clearly society, in its role as an audience, would benefit. The owners of the actual copyright in the original performance would suffer only minimal harm, since those recordings are of low quality and may have only historical value; it is unlikely that these new recordings would reduce their sales in any way, as their sales are likely to be minimal already. Therefore, even modest compensation to the original copyright owners would be appropriate.

Implicit in our belief that this should be *permitted* is our belief that this reperformance has *artistic merit*. The question of whether the reperformance should be granted copyright protection requires assessing its originality. Once software and hardware necessary to accomplish this form of reperformance are generally available and inexpensive this form of reperformance may appear routine and not worthy of copyright. However, without a doubt the technology needed to create the reperformance is original and should be protected.

We may want to provide limited copyright protection to an individual reperformance, much as we would provide copyright protection to a recording produced by a pianist, a cellist, or an orchestra. But just as any artist can record a work, any reperformance artist with access to technology can produce a reperformance for commercial use, even if others have already done so.

Now consider robotic reperformance where the

analysis may be more complex. Glenn Gould was an idiosyncratic pianist with a distinctive sound. He did not live long enough to record the entire repertoire for solo piano. Suppose someone wanted to robotically reperform a recording so that it sounded as if it had been played by Gould. This is more complex; assume that the reusing artist has had little training as a pianist, and thus his unmodified performance would initially be without merit, but if he could robotically reperform it to sound as if Gould had performed it, the work would now have significant merit. Gould is deceased, and no longer recording, so the reuse does not deprive him of future opportunities to record the work.

If Gould’s estate, or the owners of his body of works, believes that the reused performance does not harm Gould’s reputation, there should be no obstacle to negotiating a licensing agreement that allows this form of reperformance to be recorded and used commercially. Regulations should be drafted to enable this reperformance to go forward, and to provide guidance to our licensing negotiations. Our discussions about artistic merit, originality, and copyright are much as they were in the previous example.

Now consider yet another example, technologically simpler but perhaps legally even more complex. Technology already exists to take one recording of a brass instrument and transform it to sound like another. Any competent trumpet player who is also a competent audio engineer can record “Flight of the Bumblebee” on a trumpet and then reperform it on a tuba. Actually playing Flight of the Bumblebee on a tuba is a physical impossibility, since no brass player could manage the triple-tonguing and the super-fast sequence of notes and no human tuba player would have enough breath to do so. Tuba players might feel threatened by the ease with which a trumpet player could create recordings, but would have no reason to object other than that.

However, a competent trumpet player might make a recording of a recently released piece of jazz music and then copy the embouchure, or “mouth” of an existing artist like John Faddis. If done poorly, this recording would capture the sound of Faddis but not his technique, and could potentially damage his reputation; it would sound like Faddis, but it would also sound as if Faddis had become sloppy or lazy in pursuit of additional record sales. If done superbly, by an artist who could match Faddis’s fingering and interpretation, this recording would actually sound as if Faddis had done it. Let us assume that this was done well enough that fans might want to acquire this new ersatz-Faddis recording, potentially precluding Faddis from recording the work himself.

There is clearly value to society in its role of the audience, since the total collection of works recorded by Faddis and his Doppelgänger is larger than Faddis’s body of works alone. And yet, there is the potential of



some harm to Faddis as a result of reduced recording opportunities. We believe that this form of reperformance should clearly be encouraged, since it adds value to society. We also believe that revenue sharing among the two artists — the actual horn player, for his performance, and Faddis for providing his embouchure and his waveform — is a complex problem and we have not yet fully resolved how it is to be accomplished. And again, our discussions about artistic merit, originality, and copyright are much as they were in the previous example.

Analogous issues are raised by the ability to transform an image, as was done in the recording of the movie *Avatar*. For example, it is now possible to transform a movie, altering the appearance, race, even species of characters and the appearance of their location. This allows the creation of entirely new works from existing videos. Again, issues of artistic merit and originality are central, and again issues of harm to the owners of the original work and the formulas for revenue sharing are complex and unresolved.

This list of forms of reuse is meant to highlight the diversity of forms of transformation. It is not intended to be exhaustive either of all forms of transformation or all instances of reperformance of existing works.

## 6. Conclusions

### 6.1. Contributions

First and foremost, we seek to reintroduce the centrality of artistic merit into copyright law. From the mid-19th Century, legal doctrine regarding copyright law began to focus increasingly on the originality of the work, rather than on the more subjective question of its artistic merit. If work was seen as original, its creator deserved the protection offered by copyright, and if this work was seen as without merit by the general public the creator would gain little or nothing from the granting of copyright.

With the advent of numerous forms of digital transformation, and with the advent of technology that makes this capability available to anyone who can master a simple user interface, the role of artistic merit has become more critical. An individual should always be permitted the right to create an original work, and its merit will determine the value of its copyright. It is a step too far to say an individual should always be allowed to reuse someone else's original work as the basis of his own, especially if the other party's work is protected by copyright. We therefore propose that artistic merit is now central to the decision of whether or not to permit the reuse of protected works of art in the creation of works that rely on the reuse of those works.

Reuse of existing works that are already protected by copyright should be permitted under the following conditions: The reuse clearly adds value; that is, it has merit as a work of art. The reuse thus creates a new work

of art. Reuse should be protected by granting it its own copyright only if it demonstrates originality. The decision to protect a work that is based upon the reuse of other works is separate from the decision of whether or not to permit that reuse. And works that entail reuse of protected works should be required to provide compensation to the owners of copyright that exists in the works upon which it is based.

### 6.2. Limitations of the Work and Directions for Future Research

The greatest single limitation of this work is our failure to resolve questions about how revenue should be divided between the creator of the technology-enabled work based upon reuse and the owners of copyright that exists in the protected prior works on which it is based. We understand that in many cases the owners of copyright in the prior works will suffer some damage. When the damage to prior copyright holders exceeds the value created by the work that reuses it clearly the reuse should not be permitted. This would be the case when the reuse in some sense significantly damages the value of prior copyright holders, decreasing the value of much of their existing body of work. When the damage to prior copyright holders is small some form of equitable division of revenue between the creator of the new work that reuses it and the creators of the original works upon which the new is based.

Additional work, too lengthy to present here, describes how revenues should be shared between the original creator and the re-user in order to achieve societal objectives governing the division of economic surplus between the original creator and the reusing party.

## 7. Acknowledgements

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## 8. References:

- [1] Hughes, J., et al., *A Unified Interdisciplinary Theory of Open Source Culture and Entertainment*. Research Collection School Of Information Systems, 2007.
- [2] *U.S. Const. Art. I, Sec. 8, Cl. 8*.
- [3] Navas, E. and O. Gallagher, *The Routledge companion to remix studies*. 2014: Routledge.
- [4] Gunkel, D.J., *Of remixology: Ethics and aesthetics after remix*. 2016: MIT Press.
- [5] Lessig, L., *Remix: Making art and commerce thrive in the hybrid economy*. 2008: Penguin.
- [6] Panofsky, E., *Renaissance and renaissances*. *The Kenyon Review*, 1944. 6(2): p. 201-236.
- [7] Davis, W., *A general theory of visual culture*. 2017: Princeton University Press.
- [8] Dash, I.G., *Shakespeare and the American musical*. 2010: Indiana University Press.

- [9] *University of London Press Ltd v University Tutorial Press Ltd*. 1916.
- [10] *Bleistein v. Donaldson Lithographing Co.* . 1903, U.S. Supreme Court.
- [11] Rahmatian, A., *Originality in UK copyright law: The old "skill and labour" doctrine under pressure*. IIC-International Review of Intellectual Property and Competition Law, 2013. **44**(1): p. 4-34.
- [12] Gompel, S.v. and E. Lavik, *Quality, merit, aesthetics and purpose: An inquiry into EU copyright law's eschewal of other criteria than originality*. Revue Internationale du Droit d'Auteur (RIDA), 2013(236): p. 100-295.
- [13] Tehranian, J., *Dangerous Undertakings: Sacred Texts and Copyright's Myth of Aesthetic Neutrality*. The Sage Handbook of Intellectual Property. London, UK and Los Angeles, CA: Sage, 2014: p. 418-429.
- [14] Walker, R.K. and B. Depoorter, *Unavoidable Aesthetic Judgments in Copyright Law: A Community of Practice Standard*. Nw. UL Rev., 2014. **109**: p. 343.
- [15] Armstrong, E., *Before copyright: the French book-privilege system 1498-1526*. 2002: Cambridge University Press.
- [16] Deazley, R., *On the origin of the right to copy: Charting the movement of copyright law in eighteenth century Britain (1695-1775)*. 2004: Bloomsbury Publishing.
- [17] Kaplan, B., *An Unhurried View of Copyright: Proposals and Prospects*. Columbia Law Review, 1966. **66**(5): p. 831-854.
- [18] Teilmann-Lock, S., *The object of copyright: a conceptual history of originals and copies in literature, art and design*. 2015: Routledge.
- [19] Defoe, D. and J. Thompson, *A review of the affairs of France: and of all Europe, as influence'd by that nation*. 1705.
- [20] Defoe, D., *An Essay on the Regulation of the Press*. Primary Sources on Copyright (1450–1900). www.copyrighthistory.org. 1704.
- [21] Locke, J. and J.W. Gough, *The Second Treatise on Civil Government and a Letter Concerning Toleration*. 1948.
- [22] Hughes, J., *The philosophy of intellectual property*. Geo. LJ, 1988. **77**: p. 287.
- [23] Patterson, L.R., *Copyright and the Public Interest, in Copyright. Current Viewpoints on History, Laws, Legislation*, A. Kent and H. Lancour, Editors. 1972, R. R. Bowker Company: New York. p. 43- 49.
- [24] Watt, R., *Copyright and Economic Theory*. Books, 2000.
- [25] Dubin, J.S., *Copyright Aspects of Sound Recordings*. S. Cal. L. Rev., 1952. **26**: p. 139.
- [26] Tomlinson, D.E. and T. Nielander, *Red Apples and Green Persimmons: A Comparative Analysis of Audio Home-Recording Royalty Laws in the United States and Abroad* Mississippi College Law Review, 2000. **20**(1).
- [27] Dana, J., James D and K.E. Spier, *Revenue sharing and vertical control in the video rental industry*. The Journal of Industrial Economics, 2001. **49**(3): p. 223-245.
- [28] Menell, P.S., *Adapting copyright for the mashup generation*. U. Pa. L. Rev., 2015. **164**: p. 441.
- [29] Bloom, S.R., *Digital collage and painting: Using Photoshop and Painter to create fine art*. 2012: CRC Press.
- [30] Passero, C., *Copyright Implications of Collage Works*. Santa Clara Computer & High Tech. LJ, 1995. **11**: p. 319.
- [31] Misrok, T., *How Playlists Broke the Internet: An Analysis of Copyright in Playlist Ownership*. Cardozo L. Rev., 2018. **40**: p. 1411.
- [32] Kretzschmar, M. and M. Stanfill, *Mods as Lightning Rods: A Typology of Video Game Mods, Intellectual Property, and Social Benefit/Harm*. Social & Legal Studies, 2019. **28**(4): p. 517-536.
- [33] Carroll, M.W., *Pinterest and Copyright's Safe Harbors for Internet Providers*. U. Miami L. Rev., 2013. **68**: p. 421.
- [34] *Digital Millennium Copyright Act*. 1998.
- [35] Pittman, L.D., *Combating Copyright Overreach: Keeping 3D Representations of Cultural Heritage in the Public Domain*. NYUL Rev., 2020. **95**: p. 1192.
- [36] Petri, G., *The public domain vs. the museum: The limits of copyright and reproductions of two-dimensional works of art*. Journal of Conservation and Museum Studies, 2014. **12**(1): p. 8.
- [37] Chen, Y., X. Hu, and F. Xiao, *Digital Media Copyright Protection Technology in the Age of All Media, in Data Processing Techniques and Applications for Cyber-Physical Systems (DPTA 2019)*. 2020, Springer. p. 843-850.
- [38] Hart, T., *More Evidence for Copyright Protection, in Copyhype*. 2012.
- [39] *A&M Records, Inc. v. Napster, Inc.* 2000, N.D. Cal. .
- [40] U.S. Copyright Office, *DMCA Section 104 Report*. 2001.
- [41] *Consolidated Appropriations Act*. 2021.
- [42] Soha, M. and Z.J. McDowell, *Monetizing a meme: YouTube, content ID, and the Harlem Shake*. Social Media+ Society, 2016. **2**(1): p. 2056305115623801.
- [43] Tie, A.-L., *Copyright law issues in the context of video game Let's Plays and livestreams*. Interactive Entertainment Law Review, 2020. **3**(2): p. 121-130.
- [44] Asongu, S.A., *Global software piracy, technology and property rights institutions*. Journal of the Knowledge Economy, 2020: p. 1-28.
- [45] Greenberg, A., *6 Men Admit to Running a Global \$100M Software Piracy Ring, in Wired*. 2015.
- [46] Braddock, J.P., et al., *Mastering in Music*. 2020: CRC Press.
- [47] *ABS Entertainment v. CBS Corporation*. 2017, 9th District Court of Appeals.
- [48] Loren, L.P., *Copyright Jumps the Shark: The Music Modernization Act*. BUL Rev., 2019. **99**: p. 2519.
- [49] Lewis, P.H., *Copyright Suit Fights Lotus 1-2-3, in The New York Times*. 1987: New York.
- [50] Samuelson, P., *Legally speaking: how to interpret the Lotus decision (and how not to)*. Communications of the ACM, 1990. **33**(11): p. 27-33.
- [51] Markoff, J., *Lotus Wins Copyright Decision, in The New York Times*. 1990: New York.
- [52] *Google LLC v. Oracle America, Inc.* 2021, U.S. Supreme Court.
- [53] Shikowitz, R., *License to Kill: MDY v. Blizzard and the Battle over Copyright in World of Warcraft*. Brook. L. Rev., 2009. **75**: p. 1015.
- [54] Bancroft, A., *The darknet and smarter crime: methods for investigating criminal entrepreneurs and the illicit drug economy*. 2019: Springer Nature.
- [55] Stempel, J., *Paul McCartney settles with Sony/ATV over Beatles music rights, in Reuters*. 2017, New York.

- [56] Hassler, S., *Zenph Recreates Sound of Great Musicians*, in *IEEE Spectrum*, S. Hassler, Editor. 2010, IEEE.
- [57] Yamaha. *Dear Glenn - An A.I. system crafted by love*. 2021; Available online from: [https://www.yamaha.com/en/about/ai/dear\\_glenn/](https://www.yamaha.com/en/about/ai/dear_glenn/).
- [58] Leon, G.J.d., *Google's Tone Transfer Can Turn Your Hum Into Violin or Trumpet Tune*, in *Tech Times*. 2020.
- [59] Park, M. and D. Kim, *South Korean AI technology brings back folk singer's voice*, in *Reuters*. 2021.
- [60] Westerlund, M., *The emergence of deepfake technology: A review*. *Technology Innovation Management Review*, 2019. 9(11).
- [61] Shiratori, T., et al., *Motion capture from body-mounted cameras*, in *ACM SIGGRAPH 2011 papers*. 2011. p. 1-10.
- [62] Winick, E., *Actors are digitally preserving themselves to continue their careers beyond the grave*, in *MIT Technology Review*. 2018.
- [63] Wonderful Engineering, *This Is How Hollywood Movies Look Before & After Visual Effects Are Applied*, in *Wonderful Engineering*. 2013.
- [64] Teilmann-Lock, S. *Copyright and public domain works: Highsmith v Getty*, *Intellectual Property Excesses*, E. Banodio and A. O'Connell (eds), Hart Publishing Oxford (forthcoming).

Type of Reuse	Description of Reuse and Partial List of Examples
(1) Simple Reproduction or Re-transmission, Without Quality Changes	Making copies of a book, musical recording, or a photograph; posting and streaming or broadcasting a book, photograph, recording, or video. File sharing and streaming
(2) Reproduction with Higher Quality	Improving the functionality of software under copyright. Improving the user interface of existing software or of an existing game. Adapting a play to a new version or to a musical, adapting a play or a musical to a movie.
(3) Reproduction with Enhancements and extensions	Improving the functionality of software under copyright. <i>Modding</i> an existing game to improve image quality, adapting a play to a new version or to a musical, adapting a play or a musical to a movie, taking single-user versions of software for word processing and spreadsheets, and adapting for multi-user updates.
(4) Extensions	<i>Modding</i> an existing game and adding characters or weapons or new scenarios. Creating a function library for software that is still under copyright protection.
(5) Recombination and Repurposing	Collages, playlists, and other forms of combination to create a new work of art, including movies like <i>Yesterday</i> built around a list of songs
(6) Digital Transformation (both more automated and more transformative than simple enhancements)	Robotically reperforming an old recording, colorizing a movie, digitally transforming characters and background as was done in <i>Avatar</i>

Table 1.—Summary of Forms of Reuse and Transformation

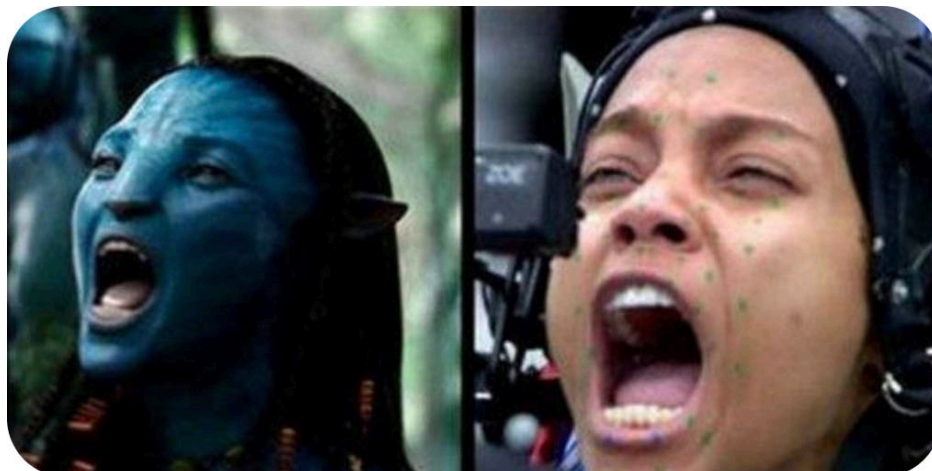


Figure 1.—Digital Image Transformation in the Production of the Movie Avatar.