

Simulating the Past. Digital Preservation of Moving Images and the 'End of Cinema'

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Abstract

In the past decade, the discourse around digital cinema has flourished and given birth to a long series of ontological and phenomenological reflections around the status of the medium in the digital age. Can digital cinema still be called 'cinema'? Does cinema conserve its indexical nature, or is digital cinema just a simulation? What are the effects of the proliferation of screens, and the consequent loss of the centrality of movie theaters as *the* place for consumption of moving images? With my essay, I would like to investigate the status of digital preservation within the world of digital cinema. How is digital preservation different from analog preservation, if at all? And how are digitally restored moving images different from a film shot digitally? If a digital image is a simulation of reality, rather than a trace left by it (as the analog image supposedly was), what is the status of the digitization of an analog photographic image? I will argue that digital preservation forces us to reconsider the analog-digital opposition, and provides a framework through which to rethink not only the present state of cinema, but also its past and the future of its history.

The introduction of digital cinema has fuelled a lively debate in media studies for the past couple of decades, fostering a renewed interest in the ontology of the medium. While some scholars speak of a continuity between analog and digital cinema, mostly focusing on similarities at the level of camera optics, projection and spectatorial experience in a movie theatre, others see a clear rupture on the basis of an ontological difference between the photochemical and the digital moving image, to the point that digital technology is seen as the end of cinema as we know it.¹ This essay is an attempt to rethink the issue through the lens of one

¹ In the first group of scholars we find, among others: John Belton, 'Digital Cinema: A False Revolution', *October*, 100 (Spring 2002), 98–114; Tom Gunning, 'What's the Point of an Index? or, Faking Photographs', in *Still/Moving: Between Cinema and Photography*, ed. by Karen Beckman and Jean Ma (Durham: Duke University Press, 2008), pp. 23–40. Representatives of the second group are, among others: André Gaudreault and Philippe Marion, *The End of Cinema? A Medium in Crisis in the Digital Age* (New York: Columbia University Press, 2015); Lev Manovich, *The*

element that has rarely been put on the table: the digital preservation of analog moving images — that is, the digitization of analog film and the manipulation of the resultant file in order to achieve a result that looks as close as possible to what the original film was supposed to look like in its assumed pristine condition.² I will argue that the hybrid status of digitized film forces us to reconsider the analog-digital opposition, and provides a framework through which to rethink not only the present state of cinema, but also its past and the future of its history. In particular, I will examine the way in which digital preservation challenges our perspective on some of the issues that are at the core of the debate surrounding digital cinema, namely the ontological difference between a film and a file and its consequences on the issue of indexicality. I will also argue that part of the discourse on digital cinema is founded on an implicit understanding of analog cinema as a stable concept — a view that is questioned by archival and restoration practices.

It is often taken for granted that, when we talk about digital cinema, we are referring to moving images captured with a digital camera and projected digitally in a movie theatre, or else presented on a smaller, personal screen. This approach is limited by the fact that it is almost exclusively concerned with the production of new moving images. In addition, it conveniently creates a ‘before’ and ‘after digital’ that can have misleading consequences on our understanding of cinema history. In other words, it implicitly generates the fantasy of a comfortable and safe past where all images had a photochemical basis and an unproblematic indexical relationship with the world. Besides creating this mythical space, this kind of discourse crystallizes cinema’s analogical past and closes it off beyond a hypothetical digital threshold that, as blurred as it may be, divides it from the uncertainties of the present and keeps it untouched from the current tumult.

Supposing that such an idyllic situation ever existed, it is far from being unaffected by the contemporary technological turmoil. Most theoretical studies on the effects of digital technology on cinema have overlooked its employment as a film restoration and preservation tool.³ In their book *The End of Cinema? A Me-*

Language of New Media (Cambridge, MA: MIT Press, 2001); D. N. Rodowick, *The Virtual Life of Film* (Cambridge, MA; London: Harvard University Press, 2007).

² However still limited, the awareness of the importance of digital preservation within the ontological discourse surrounding cinema is fortunately growing. Notable works include Rossella Catanese, ‘The Digital Restoration of Film’, in *BiD: textos universitaris de biblioteconomia i documentació*, 33 (December 2014) <<http://bid.ub.edu/en/33/catanese3.htm>>; Leo Enticknap, *Film Restoration: The Culture and Science of Audiovisual Heritage* (London: Palgrave Macmillan UK, 2013). For a broader discussion on preservation of time-based media, including but not limited to film, see *Preserving and Exhibiting Media Art: Challenges and Perspectives*, ed. by Julia Noordegraaf and others (Amsterdam: Amsterdam University Press, 2013).

³ I use the terms ‘restoration’ and ‘preservation’ as indicated by Paolo Cherchi Usai in his book *Silent Cinema: An Introduction* (London: British Film Institute, 2000), pp. 66–67. Cherchi Usai defines ‘preservation’ as ‘the overall complex of procedures, principles, techniques and practices necessary for maintaining the integrity, restoring the content, and organizing the intellectual expe-

dium in Crisis in the Digital Age, André Gaudreault and Philippe Marion briefly mention preservation as one of the fields in which digital technology is employed, but do not differentiate it from digital cinema production at a theoretical level.⁴ This treatment of digital preservation is a mistake insofar as it overlooks the hybrid nature of digitized images and throws them into an undifferentiated group labeled simply 'digital'.

Alternatively, John Belton limits his discussion of digital preservation to the issue of conservation of digital files, giving voice to concerns that archivists have been expressing for years: digital storage is not a viable means of conservation as it subjects the materials to a much higher risk of obsolescence and decay.⁵ This problem has been discussed at length in technical literature but hardly ever has it been approached theoretically. After all, there is not much to theorize upon: that digital files have a much shorter lifespan than film is a fact proved by numerous studies.⁶ All archivists and scholars can do in this respect is to advocate for the continuation of film stock manufacture and for more reliable digital storage systems.

There are other aspects of digital preservation that deserve a more thorough theorization, but so far few scholars tackled the issue. The main reason for this is probably to be found in the longstanding separation between archival practices and academic thought. Unsurprisingly, the works that more directly attempt to draw a theory from archival practices come from scholars who are also archivists and restorers.⁷ But I believe that there is a more profound reason behind

rience of a moving image on a permanent basis.' 'Restoration' is a more specific term, and is part of the preservation process: it 'is the set of technical, editorial and intellectual procedures aimed at compensating for the loss or degradation of the moving image artifact, thus bringing it back to a state as close as possible to its original condition'. Unfortunately, there is no official consensus on the use of these terms. 'Preservation' and 'restoration' are often used interchangeably, sometimes to indicate simply a duplication with no curatorial intervention. On terminological confusions and their marketing value, see Vinzenz Hediger, 'The Original is Always Lost: Film History, Copyright Industries and the Problem of Reconstruction', in *Cinephilia. Movies, Love, and Memory*, ed. by Malte Hagener and Marijke de Valck (Amsterdam: Amsterdam University Press, 2005), pp. 133–47.

⁴ Gaudreault and Marion, p. 6.

⁵ Belton, p. 114.

⁶ See, among others: *The Digital Dilemma. Strategic Issues in Archiving and Accessing Digital Motion Picture Materials*, ed. by Milton Shefter and Andy Maltz (Hollywood: Academy of Motion Picture Arts and Sciences, 2007) and *The Digital Dilemma 2. Perspectives from Independent Filmmakers, Documentarians and Nonprofit Audiovisual Archives*, ed. by Milton Shefter and Andy Maltz (Hollywood: Academy of Motion Picture Arts and Sciences, 2012); Howard Besser, 'Digital Preservation of Moving Image Material', *The Moving Image*, 1.2 (Fall 2001), 39–55; David S. H. Rosenthal et al., 'The Economics of Long-Term Digital Storage', in *The Memory of the World in the Digital Age: Digitization and Preservation Conference Proceedings* (UNESCO, 2012), pp. 513–28.

⁷ See, among others, Paolo Cherchi Usai, *The Death of Cinema: History, Cultural Memory and the Digital Dark Age* (London: British Film Institute, 2001); Giovanna Fossati, *From Grain to Pixel: The Archival Life of Film in Transition* (Amsterdam: Amsterdam University Press, 2009); Jan-Christopher Horak, 'The Gap Between 1 and 0. Digital Video and the Omission of Film History', *Spectator*, 27 (2007), 29–41.

this absence, and it has to do with that fantasy of a safe space of analog cinema that I mentioned earlier. Digital preservation disrupts the stability of our photochemical past, and forces us to reconsider it with potentially uncomfortable consequences.

As John Belton points out with respect to the digital turn, it would be a historiographical mistake to create a parallel between two different moments of technological change, as the conditions in which these changes take place are continually changing.⁸ Nonetheless, I believe that we need to identify and clarify the ways in which the digital shift is different from previous, seemingly similar moments. If we look at this shift from a preservation perspective, the newness of this latest transition appears in all its clarity: unlike the transition to sound, colour, or widescreen, digital technology affects the nature of past moving images as much as future ones. Here we find the aspect that embodies the real revolutionary force of digital technology applied to moving images. The question ‘What is cinema going to be in the future?’ should be asked side-by-side with another question that specifies and redefines it: ‘What is the future of cinema’s past?’ Digital technology applied to preservation wipes away the threshold dividing an analog past from a digital present. If those scholars who see the digital as the death of cinema are right, then we should be ready to not even have a corpse to lament. The preservation of analog films on digital carriers, concurrently with the switch from analog to digital technology in most exhibition venues, *de facto* takes out of circulation photochemical copies of the same title — if digital cinema is not cinema, then digital preservation erases our cinematic past as much as it renders impossible a future. The key characteristic of digital technology is therefore its power to act retroactively, operating a re-writing of film history that shakes the foundations of the very idea of ‘cinema’.

At the present stage, of course, only a small percentage of analog films have been digitized. Even though their number will certainly grow in the future, it is unclear whether we will reach a point where all films made in the analog era will only be available in digital formats.⁹ A number of factors are at play, including the future availability of film stock for photochemical preservation. As much as this scenario might sound apocalyptic, it is possible that it may become reality in the distant future. Either way, the influence of digital preservation on film history is an understudied issue that deserves a theoretical formulation to guide us beyond the conundrum of the disappearance of film history with the disappearance of film. An analysis of preservation techniques under the light of the theoretical problems posed by the emergence of digital cinema is therefore beneficial both for archival practices and for the advancement of theoretical questions. Although I am aware that the entity ‘cinema’ is composed of several different

⁸ Belton, p. 100.

⁹ The shift to digital technology also poses issues of availability and access. In a way, digital preservation is also re-writing the canon of film history. On this very fascinating subject, see Horak, ‘The Gap Between 1 and 0’.

elements, I will focus on aspects that are more directly affected by the practice of preservation: the passage from film stock to file formats, and the contextual shift from photochemical to digital images.

As Dan Streible points out in an article with a seemingly tautological thesis, digital film is not film. It is a file.¹⁰ Streible elaborates on the consequences of this distinction and on the reasons why it is important to maintain it so as 'not to lose important historical knowledge and awareness'.¹¹ That there is a historical difference between a film reel and a digital file is apparent to everyone, but the theoretical consequences of this distinction take us into more prickly territory. The most discussed issue with regards to digital images is the potential disappearance of the indexical relationship between a photograph and the object it represents. Tom Gunning summarizes the terms of the problem very clearly:

The indexicality of the photograph depends on a physical relationship between the object photographed and the image finally created. The image on the photographic negative derives from the transformation of light sensitive emulsion caused by light reflecting off the object photographed filtered through the lens and the diaphragm. In a digital image, however, instead of light sensitive emulsion affected by the luminous object, the image is formed through data about light that is encoded in a matrix of numbers.¹²

Gunning rejects the conclusion that a digital image loses its indexical relationship to the object represented, and therefore claims that the so-called 'truth claim' of photography remains virtually untouched in the digital age. However, he acknowledges that digital technology offers extraordinary means of manipulation of the image, to the extent that its indexical and iconic relationship to its referent may be stretched to the point of rupture. Although manipulation was certainly possible in the photochemical age, the ease and range of modifications offered by digital technology are unprecedented. Nonetheless, Gunning maintains that this potential for fakery does not jeopardize the truth claim of digital images, but rather opens up new possibilities for creative manipulation. However, I believe that the digitization of analog images complicates this discourse and forces us to reconsider the notion of 'indexicality' itself. With this in mind, I will approach the relationship between digital preservation and film history in two areas: the range of manipulation that digital technology allows and the distinction between film and file that Streible insists upon.

The relationship between an analog film and its digitization gives new meaning to what I previously dismissed as a tautological claim. A digitized image may retain an indexical relationship with the object represented, but it complicates

¹⁰ Dan Streible, 'Moving Image History and the F -Word; or, "Digital Film" Is an Oxymoron', *Film History*, 25.1-2 (2013), 227-35.

¹¹ Ivi, p. 229.

¹² Gunning, p. 40.

the concept of index in its relationship to the film it digitizes, or at least with parts of it. Before being an index of the world, a film is a film: namely, it carries information that go beyond its so-called 'content', or the object it represents. In other words, digitization does not reproduce film-specific elements such as edge codes, type of emulsion, colour system, chemical composition of the film base, etc. Digitization reproduces the image recorded on film, but does not reproduce the film itself with all the information it carries with it. Film is both image and artifact.¹³ Although some argue that digital cinema lacks this duality, digital files also have a twofold nature: they are stored on a material carrier that undergoes a process of decay just as film does, although much faster. However, the dual nature of films and files overlaps only at the level of content; as artifacts, their nature is radically different.

The issue of manipulation complicates things even further. Here D. N. Rodowick's concept of 'digital event' as simulation, discussed in his book *The Virtual Life of Film*, is helpful.¹⁴ 'A digital event', he writes, 'is any discrete alteration of image or sound data at whatever scale internal to the image'.¹⁵ The peculiarity of the digital event stands in the undifferentiated nature of the pixels that compose the captured image from those that compose the synthesized additions to it. The consequence, as Rodowick writes, is that 'The basis of all representation is virtuality: mathematical abstractions that render all signs as equivalent regardless of their output medium. Digital media are neither visual, nor textual, nor musical — they are simulations'.¹⁶

Image compositing, as Rodowick acknowledges, is not a digital exclusive; matte shots and superimpositions are common examples of analog compositing. But the digital event is something different insofar as it combines captured images with computer-generated ones in ways that collapse ontological differentiation between the two. When dealing with fiction cinema, this peculiarity has purely ontological implications, opening up an enormous array of creative options for filmmakers. However, if the same technique is applied to digital restoration, I believe it is necessary to shift the emphasis from ontology to ethics.

At this point, the truth claim of photography needs to be re-examined with respect to the manipulation of digital images in the restoration process. Digital technology offers to the restorer a creative freedom that was unforeseeable in the photochemical age. Once the print source is digitized, the resulting file can be manipulated indefinitely before it is transferred back either to film stock or to a digital carrier. Certain kinds of manipulation were just not possible with photochemical restoration; severe colour film fading, for instance, could not be corrected with analog means. Digital technology also allows the reconstruction of parts of the frame that were lost in the print source due to decomposition or

¹³ See Fossati, pp. 104–05.

¹⁴ Rodowick, pp. 163–74.

¹⁵ Ivi, p. 167.

¹⁶ Ivi, p. 11.

mechanical damage to the emulsion — an operation that was also impossible in photochemical printing.

Given the extent of potential intervention that digital restoration offers, can we say that a digitally manipulated file is truthful to its print source? This question can have several different answers depending on our definition of ‘truthful’ and on the object of investigation. If we refer to the physical print source, then a digital restoration is definitely not truthful, and it is not supposed to be. What is being restored is not the print source but rather the idea of what that print source looked like when it was in pristine condition.¹⁷ In other words, digital restoration is a *simulation* based on an educated guess. This is where ontology and ethics become intertwined: digital simulations offer the possibility to over-correct, adding elements that were never there or removing unwanted details. Archival ethics prevent restorers from intervening on a file with a different goal than restoring the ideal look of the film, but not all restorations are carried out by archives. Private companies’ ethics might be guided by different principles. The risk is that of a proliferation of simulations that have little in common with how the film looked like before the restoration. But the concept of simulation has farther reaching implications than its malleability to the will of the restorer. Manipulating the image digitally means mixing captured elements with synthesized ones in an undifferentiated way: digital restoration creates a series of digital events. In other words, it creates a simulation without differentiation between past and present.

As this power is unprecedented in the history of film and film preservation, it is important not to overlook elements of continuity between photochemical and digital restoration. According to Giovanna Fossati, all restorations are simulations regardless of their output carrier.¹⁸ Modern film stock simulates the look of obsolete film technologies — the restoration of a Technicolor print will necessarily lose the technological peculiarities of Technicolor insofar as the technology to reproduce it is no longer available. In this respect, what I said about the loss of a complete indexical relationship between a film print and its digital copy also holds true in the case of a ‘film-to-film’ preservation. Elements that are unique to a print, such as edge codes, chemical composition of the emulsion or film stock, splices, scratches, and so on, cannot be reproduced. This is a necessary consequence of the twofold nature of film, which gives the illusion of infinite reproducibility but renders impossible the reproduction of the material nature of individual objects. Reproduction is intrinsically an art of simulation. Film preservation unveils the complexities and the incoherences of that historical period that too often is labeled as simply ‘analog cinema’. The

¹⁷ Here, I am referring to the restoration of the image quality of a print. Other, more complex types of restoration involving editorial decisions with regards to the completeness of a mutilated text would deserve a separate discussion, although the principle of ‘restoring an idea’ would hold true (probably truer) in these cases too.

¹⁸ Fossati, pp. 140–45.

peculiarity of digital technology, therefore, stands not in its act of simulation of analog technology, but in its placement of the output of the restoration in an eternal present, where images from the past and contemporary interventions are indistinguishably blurred in a flow of pixels and can be reproduced indefinitely in this new form.

Digital preservation changes our relationship with the history of moving images; in a way, it re-historicizes them by placing them in an undifferentiated present. But digital preservation also offers a lens through which to look at the history of film in a way that destabilizes our preconceptions about the analog past of cinema, and its potential for simulation reveals the many forms that 'simulation' assumes as an act intrinsic to the creation of faithful reproductions. The nature of digital images also reconfigures our perception of analog film technology: their 'presentness' contrasts with the historicity that *each film print* carries with it. And here is where I would place the last, fundamental distinction between analog and digital images: whereas the former have the potential to carry the sign of their history, the latter are forced to live in a permanent present. Digital files must migrate to new carriers at least every five years to prevent digital decay. The migration is completely lossless as concerns the information embedded in the file, yet implies the loss of the carrier that used to store it. Conversely, unlike what happens when a photochemical print shows sign of decomposition, a file that is even only partially corrupted cannot be played back. The passing of time cannot leave traces on digital objects. It can leave them untouched or destroy them completely.

The consequences of digital preservation might not be immediately visible in the experience of cinema; in a movie theatre, very few spectators will be aware of the changed condition of the object they are experiencing. Actually, digital restoration offers a much more precise simulation of the look of old film stock than photochemical reproduction does, somehow enhancing the spectatorial experience. In this respect, I believe that digital technology offers a perfect example of the resilience and flexibility of the concept of 'cinema' rather than decreeing its end. At the same time, though, an approach that considers only the look of digital images and the similarities between analog and digital projection risks overshadowing the complexity of the interplay between film, digital technology, and history that I have sketched out so far.

A historiography of digital technology has yet to be written, but it faces difficulties that are radically different than those posed by photochemical artifacts. What will happen to analog cinema when all its copies will be digitized is uncertain, but the diffusion of digital images across a plethora of screens might in return foster a new awareness of the physicality of film in a way that brings cinema closer to other visual arts. The future of film might be in its relevance as

an embodiment of a set of technological peculiarities that are not reproducible.¹⁹ Digital images would therefore be copies that do not mirror the technological complexity of the original (or originals) just as the reproduction of the Mona Lisa on a computer screen cannot be considered a substitute for Leonardo's painting. This approach would help us avoid the danger of considering analog cinema as a safe, stable and undifferentiated space that is defined exclusively in opposition to digital technology. Similarly, we should be aware of the risk of considering digital technology in similar terms, overlooking the technological complexities that the term 'digital' overshadows. The hybrid status of digitally preserved film invites us to go beyond a simple analog-digital opposition, and forces us to go back and explore the complexity, the conflicts, and the contradictions within the seemingly stable and coherent space of analog cinema that the digital revolution so conveniently created.

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¹⁹ See Michele Canosa, 'Per una teoria del restauro cinematografico', in *Storia del cinema mondiale. Teorie, strumenti, memorie*, ed by. Giampiero Brunetta, 5 vols (Torino: Einaudi, 2001), v, pp. 1069–118 (p. 1086): 'Ciascun esemplare di film diventa un *unicum*, cioè autentico. [...] L'autenticità non è connaturata ai prodotti tecnicamente riproducibili, e dunque ai film, ma a questo punto possiamo sottolineare: non lo è immediatamente. L'autenticità vi si aggiunge (è un valore aggiunto). Perché accada deve prodursi una distanza, uno scarto e un gesto di riconoscimento – che sono esattamente le condizioni del restauro'.