The ways in which film historians study archival sources are changing. In the past decades, a growing number of film heritage institutions have begun digitising parts of their collections of films and film-related sources. As a consequence, film historians can obtain access to, organise and study archival sources in new ways. They can contemplate them in their own research settings, arrange them in personal databases, analyse them with digital tools and disseminate their results in a variety of multimedia formats.¹ In the past approximately twenty years, this has reflected in how film and media historians working within different traditions have begun using computational, quantitative tools to analyse and visualise data patterns in digitised archival sources. In stylistic film history, tools such as Cinemetrics and ImageJ are becoming increasingly prominent for measuring and visualising historical developments in genres, editing and narration.² And in socio-economic cinema history, geographic information system (GIS) technologies and digital cartography are opening new avenues for historical network analysis of film distribution and exhibition using spatial data.³ The research results obtained with such tools are for the most part visual. They appear as various forms of data visualisation - diagrams, graphs and interactive maps - which scholars use to reason from as the basis for historical interpretation of developments in film aesthetics and cinema-going. Moreover, scholars attribute them evidentiary status by giving them a structuring function in traditional, written scholarship and in multimedia publications such as websites, DVDs, and audiovisual essays.

Several scholars embrace this development enthusiastically and consider it a welcome re-invigoration of film studies because it allows them to interact more freely with audiovisual objects than in written publications.⁴ For scholars who work with textual structured data, such as film-related sources, data visualisations allow for making patterns visible that are otherwise too time-consuming or difficult to detect.⁵ Furthermore, in media studies an important reason for embracing

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this development is also that it puts scholars in a particularly privileged position as it invites them to
draw on their vast knowledge of visual theories to develop visualisations, interfaces and multimedia
formats for analysis and knowledge dissemination. In recent years, this enthusiasm has gained
momentum in the concurrently emerging field of the digital humanities which proffers and
facilitates visual research methods and publication formats. As stated in one of the digital
humanities' key introductory monographs the field allows scholars to "explor[e] a universe in which
print is no longer the primary medium in which knowledge is produced and disseminated".

In addition to marking a shift in the analytical and representational practices of film historians
this development also forges collaboration between fields of knowledge that have traditionally
remained separate. It nourishes an encounter between computer science, film archiving and film
historiography. Emerging uses of visual analytics software - often originating from the natural
sciences - for analysis of films or related materials testy to this. Consequently, historians begin to
look at and historicise their source material differently. An example of how scientific visual
analytics can change the way scholars analyse their sources is the use of the ImageJ software for
style analysis - a software which combines microscopy with computation - by media scholars such
as Lev Manovich and Kevin L. Ferguson. Recently, Ferguson's work used ImageJ to produce genre
studies of Westerns, gialli and various national cinemas, focusing on colour and lighting patterns.

To give an example, using the software to layer large image sets of frames, which he had
extracted from digital video files of films, Ferguson created a so-called summary visualisation, or
simply a “sum”, as he refers to them. In statistical terms, a sum shows the median values of the
colour events which take place in a film’s frame. The predominance of one hue, saturation or
brightness in one area of the frame reflects a persistent occurrence of its specific value in that
particular area of the frame along the film's entire length. The image below (fig. 1) is a “sum” of
Nicholas Ray's *Johnny Guitar* (USA, 1954) created by Ferguson with ImageJ in 2013. On the basis
of such a visualisation, one may study a film's chromatic events and characteristics, compare it to
other films in a director’s work or to films from the same period. In doing so, one may discover
unexpected conventions of for instance framing and lighting and may be prompted to reconsider
hitherto established assumptions.

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As Ferguson noted with regard to his experiments, making such visualisations reflects a drastically new analytical intervention which affects how he contemplates, analyses and researches film style. The software, he argues, defamiliarises his object of study and challenges a traditional analytical mode of film viewing because it directs his attention to characteristic stylistic features beyond the films’ narrative regime which he might not otherwise have observed.\(^9\) This invites him to identify stylistic features of potential analytical interest to develop new research questions about for instance lighting. Among other things, this has allowed him to discover developments, similarities and differences in features such as vignetting in films in remarkably different genres, periods and production contexts and make concrete inferences about the relation between lighting in exterior and interior scenes and the overall lighting schemes of films.\(^10\) By facilitating such observations, ImageJ can invite scholars to articulate new questions and research paths to potentially challenge and undermine hitherto established assumptions about film style’s conventions. To provocatively highlight the value of such visual analytics, Ferguson has invoked the cinephile surrealists’ belief in the automatisms of cinematography in the 1920s to alter our perception of reality. If scholars embrace visual analytics with such an attitude, he contends, scholars might nurture fundamental reconsiderations of their assumptions.

While still reflecting a limited tendency in film studies - and film historiography more

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\(^10\) Ibid., 286.
specifically - digital research projects currently proliferate at the nexus of film archiving, film studies and computer science. When I embarked on my PhD research in the fall of 2012, the development which I have described above, and which Ferguson's visualisation work exemplifies, had sparked my curiosity. As I saw visual research methods, software and dissemination formats increasingly becoming signifiers of film historiography I felt an urge to understand what implications they have for scholarly practices and their traditions' epistemologies. Beyond a personal interest my curiosity was also nourished by what I considered to be a larger problem for the field of media studies, namely the circumstance that most film and media historians today are not familiar with making nor analysing such visualisations. Broadly speaking, scholars tend not to have critical insights into their underlying, methodological procedures and the processes and conditioning factors through which they establish historical discourse. Media scholar Deb Verhoeven succinctly articulated this when she recently remarked concerning the preponderance of visualisations in digital research formats, that their making is largely blackboxed and characterised by a “technical and methodological invisibility [which] has led to a deficit in our understanding of the very processes by which we simultaneously produce and derive meaning from our data in visual forms”. It was the gap constituted by this knowledge deficit that I wished to contribute to filling with my research by analysing the emergence of digital methods in greater depth. I felt that if we do not shed light on the procedures and epistemological implications of making visualisations and reasoning from them in digital research formats, we risk losing our ability to critically navigate among today's research methods for historical analysis and evaluate their results.

In my research I identified three key questions in relation to the overall problem of the knowledge deficit I have just described. I would like to introduce these questions by discussing a brief example of making a sum visualisation. Eager to become familiar with film data visualisation and reflect on its methodological implications and analytical potential I began experimenting myself. One and a half years into my PhD trajectory an opportunity presented itself to do this when, in 2014, I became involved in a small research project funded by the Netherlands Organisation for Scientific Research (NWO) titled Data-driven Film History: a Demonstrator of EYE's Jean Desmet Collection. The project's aim was to build a digital interface for studying the business and film archives of film distributor and cinema owner Jean Desmet, preserved at the EYE Filmmuseum in Amsterdam. In the project we experimented with mapping distribution data on the films as well as stylistic analysis by making, as Ferguson, sum visualisations. Thus, using the ImageJ software, I

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11 Deb Verhoeven, “Visualising Data in Digital Cinema Studies: More than Just Going through the Motions?”, in Alphaville: Journal of Film and Screen Media, No. 11 (2016)
broke down digitised films from the collection into image sequences to visualise their colour patterns. One such film was *L'obsession du souvenir*, a Gaumont production from 1913 directed by Léonce Perret, which consisted of 20543 film frames. With the software I summarised and merged the film's stenciled, tinted, toned and combined tinted and toned sequences into a colourful, abstract image. The result can be seen below (fig. 2). Having produced this image, the participants in the project could now experiment with comparing the colour patterns in the collection's films.

The reflections which producing this image sparked in me were in many ways similar to those which Ferguson has articulated. Indeed, such a visualisation invites us to look differently at films because it shows a film’s colour and light patterns condensed in one single image. However, I also felt that there were several fundamental aspects of creating such a visualisation, which Ferguson's discussion had not fully considered and which appeared crucial for me to elucidate to understand how they form a basis for historical interpretation.

![Fig. 2 Sum visualisation of L'obsession du souvenir (France, 1913) which I created with ImageJ in 2015.](image)

It struck me how many scholarly and institutional processes of interpretation had conditioned this visualisation of Perret's film, from the film's making over 100 years ago to my analytical intervention with ImageJ. Consider for instance the circumstances which have fundamentally shaped its making and appearance today which, though they are not immediately visible, are embedded in the visualisation. First of all, this image was created on the basis of a digitised version of the restored film and thus reflects the archival life of a filmic element preserved in a film heritage institution. The digital video file I worked with was created from a copy of the film preserved at EYE Filmmuseum in Amsterdam where it has been the subject of shifting preservation and
Film Historiography, Digitised Archives and Digital Research Dispositifs

restoration procedures. In addition to its history within EYE, the element also bears the marks of the print’s distribution history from before it entered the archive. Both the film's archival life and distribution history have shaped its material characteristics and appearance, for instance its colour features, and thus greatly affect the analysis of it today. Second, the visualisation has also been conditioned by academic scholarship. Research on the film's director, Léonce Perret, saw an invigoration in the early 2000s. Among other things, this was marked by two retrospective programmes at the important archival film festival Il Cinema Ritrovato in Bologna as well as the publication of monographs which re-evaluated Perret’s place in film history. Thus, the access to and study of Perret’s films, is also conditioned by shifting priorities of film historiography marked, in this particular case, by a recently increased scholarly interest in and archival research on his work. Third, and finally, to make the visualisation I drew on emerging methods in the digital humanities and the expertise of other scholars - in particular that of Lev Manovich and Kevin L. Ferguson - to use visual analytics software from the natural sciences in media history research. In doing so, while seeking to critically ideate and position my own analysis within the field to the greatest possible degree, my analysis also relied on and reproduced a set of formalised procedures and its specific discursive implications.

In my reflection on these analytical interventions I began realising that in order to understand the epistemological implications of digital methods in film historiography, there is a need to develop a deeper understanding of how the archive and the field of historiography influence their interpretation. Digital research methods and techniques should be considered in a historical perspective focusing on the very development of the discipline of film studies and, more specifically, on the intertwined history of film historiography and film archiving. Rather than, as Ferguson, pointing primarily to the present perspective of how technological change seems to transform our objects of study, it appeared urgent to understand how these techniques became embedded in and shaped by scholarly discourses, archival practices and traditions. This led me to articulate three key questions concerning the epistemology of emerging digital methodologies in film historical research, which fall into three interrelated lines of inquiry and which I follow throughout my dissertation.

The first line of inquiry focuses on the following question: how do film heritage institutions, their restoration and preservation deontologies and in particular their digitisation work, condition film historical research with digital techniques and methods? With this question I wish to analyse

how the steps and processes of digitisation in (film) archives determine both what digitised material scholars can study and which analytical interventions they can make. The selection of sources for preservation, restoration and digitisation by film heritage institutions follow specific institutional values and models of history which develop in interrelation with film historians, critics and policy makers and establish reference frames for scholarship. In this regard, I wanted to understand if there are (institutional) patterns in the digitisation work of film heritage institutions and if they privilege for instance specific genres, periods or countries of production or types of source material. Furthermore, the question addresses how technical aspects of digitisation bear upon scholarly analytical interventions. For instance, with regard to the visualisation of median values of colour in Léonce Perret's *L'obsession du souvenir* it is pertinent to consider how a whole range of interventions in the restoration and scanning process affect the scholarly analytical process. More broadly, the technical specificites of a file, its resolution or the appearance of its colours to a great extent determine how scholars can intervene with digital tools and consequently how they can conceptualise it as a historical source. Such details are also crucial to attend to for film-related text sources where for instance scan quality equally plays a great role.

My dissertation's second line of inquiry, revolves around the following research question: how have digital methods travelled from other disciplines into the film historian's toolkit and which disciplinary negotiations do they undergo in this process? Beyond the example of ImageJ, digital research methods in film studies draw heavily on techniques and visual analytics from diverse fields such as medicine, the earth sciences, human and cultural geography and statistics. While film studies has always been inherently interdisciplinary, especially in the years of its institutionalisation in the 1960s and 1970s, where it lent theoretical models from semiotics, literary studies and critical theory, digital methods are to a greater degree indebted to the natural sciences. With regard to this development I wanted to know how these methods are appropriated to meet the analytical objectives of established film historical research traditions and correlated to their objects of analysis. In this regard, what do historians consider to be the affordances of different digital methods and how do they distinguish the results and approximations they create to their objects of analysis with them from written film history? What is the difference of studying for instance the work of a director or a genre through a data visualisation included on a DVD, instead of in front of a viewing table in an archive? And, how do historians give shape to their visualisations to attribute them an evidentiary function? These are some of the central questions that branch out from this

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over-arching question and which need to be analysed in order to understand the epistemologies of digital methods.

The third, and final, line of inquiry revolves around the research question: how may digital tools allow for expressing reflexivity, ambiguity and multiple viewpoints in historical interpretation? My reason for raising this question is that film historians, and humanities scholars broadly, value and wish to highlight such aspects in historical interpretation and that a lot of work has currently not been done on this subject. For the most part, film historians do not, as scientists, seek to establish scientific truth and/or hard facts but wish to allow for multiple historical genealogies and to foreground the contingency of historical interpretation and of their source material. Yet, as emerging methods derive primarily from the sciences they are frequently not tailored to visualising the specific complexities of film historians' work. Thus, beyond the question of understanding how scholars appropriate tools from the sciences to fit the scope of their respective research traditions, I also wish to analyse which strategies they develop to express criticality and reflexivity to a greater degree. Furthermore, the results of my tripartite inquiry will also serve to, finally, develop suggestions for conceiving digital research methods which to a greater degree reflect ambiguity and multiple viewpoints.

By answering the questions I have articulated above, I hope that my dissertation will contribute to advancing the discussion of digital film historiography's representational practices and counter our current deficit in understanding them through a critical elucidation of its research methods' epistemological underpinnings, origins in the sciences and conditioning institutional factors. In this regard, the goal of my research is not to normatively reinstate a particular notion of history nor to suggest best practices for research. Rather, I propose a metahistorical perspective on current methods which produces a framework for understanding how film historians conceive of digitised sources as historical objects. With this I wish to incite scholars to use and critically discuss digital methods following their respective, scholarly interests while at the same time nourishing further reflections which may lead scholars to conceive approaches with which to express a wider, and more complex, range of historical models.

0.1 Theoretical Framework: Film History ‘in the Making’

*Developing A Metahistorical Approach to Digital Film Historiography*

To answer these research questions, I suggest a metahistorical framework which combines
perspectives from theory of (film) history, contemporary media theory, epistemology and visual studies. The term metahistory is closely associated with theorist of history and literature Hayden White's seminal work *Metahistory: Historical Imagination in the Nineteenth Century* (Johns Hopkins University Press, 1973) and used as a denominator for approaches which study history as discourse. In *Metahistory*, White proposed an ironic stance towards history which did not seek to normatively ground historiography in a specific methodology, but instead elucidated history's underpinning narrative conventions by analysing its shared affinities with contemporary literary fiction. In doing so, White illustrated how historians emplotted events into different modes and chains of causality and highlighted their contingencies and limitations to create a typology of nineteenth century historical discourses.\(^{14}\) While inspired by White's metahistory I take, as I will discuss below, the core of my theoretical framework primarily from historian and anthropologist Michel de Certeau's theory of history. Different from White's primary focus on language and narrative, de Certeau's notion of 'historiographical operation', developed in *The Writing of History* (first published in French as *L'écriture de l'histoire*, Editions Gallimard, 1975), also attends to history's social and technical circumstances of production. It analyses history as a situated, socio-technical operation which, through a "combination of a social place, 'scientific' practices and writing", follows specific institutional conventions and traditions, in order to challenge and possibly develop new historical approaches.\(^{15}\) In this regard, I consider digital film history as the product of both poetic and scientific gestures or - as Michel de Certeau once labelled computational history - as a "science-fiction" which combines historical narration and metaphors with technical practice.\(^{16}\)

Before discussing what de Certeau's theory entails in greater detail in the following sections, I would like to stress why I find a metahistorical perspective particularly relevant for studying digital methods in film historiography and, with regard to existing debates in film studies, what I believe such a framework should take into consideration.

There are two main reasons why I find a metahistorical perspective particularly relevant for my research and for digital scholarship in film studies in general. First, because metahistory is to a large extent not concerned with reinstating a normative notion of history but rather with understanding its production at a distance. Therefore, it is highly suited for developing typologies which elucidate how methods establish historical discourse. Concretely, I believe that a metahistorical study which


produces a typology of current methods will be of great benefit for other scholars in several aspects. It may lead them to think more critically about their methods' discursive implications, in order to revise or improve them or make more informed choices. It may also awaken the interest of scholars who have not yet used nor considered the relevance of digital methods for specific types of historical inquiry and in this way contribute to greater methodological plurality and insights in film historical research. Second – and admittedly this is perhaps an aspect in which metahistory is normative - I believe this approach may nourish the development of digital methods which can express greater reflexivity, ambiguity and complexity. By continuously confronting and problematising the underlying assumptions and enabling tools of historical interpretation, metahistory foregrounds the distance which separates the scholar from its object of study to a greater degree than other approaches. In doing so it can nurture the development and discovery of new interpretive frameworks which break free from conventions and traditions, rather than trying to close this gap by establishing best practices or perfecting methodologies. As I will discuss further on in my dissertation, I believe this is urgently needed at a point in time when digital methods are yet relatively new.

What then, does a metahistorical framework need to consider in order to analyse the discourses of contemporary digital methods in film historical research and answer the research questions I have raised? In this regard I would like to briefly consider the important work which has already been done to theorise the consequences of the digital turn in film archives for historiography in film and media studies with regard to my questions, to position my research and clarify how and why I will develop this work.

With regard to the first question on how film heritage institutions condition film historical research, a number of scholars and curators have attended to and produced in-depth analyses of archival practices of restoration, curation and access drawing on media theory and critical theory to address its challenges for different institutions and deontologies. In this regard, especially film curator and theorist Giovanna Fossati's *From Grain to Pixel. The Archival Life of Film in Transition* (Amsterdam University Press, 2009) has been vital in developing an analytical framework for understanding how contemporary digital restoration procedures are underpinned by a wide array of divergent historical discourses which shape archival films as historical artefacts. Moreover, Paolo Cherchi Usai, David Francis, Michael Loebenstein and Alexander Horwath's book *Film Curatorship: Archives, Museums and the Digital Marketplace* (SYNEMA, 2008) presents a conversation around the challenges which film heritage institutions face in order to maintain or
rearticulate a position as critical institutions in the face of increased marketisation of cultural heritage and planned technological obsolescence. These publications have produced fundamental insights into restoration and curation deontologies after the digital turn and their bearings upon archival films' historicity. However, as they attend mainly to museum presentation and projection, the implications for film scholarship fall outside their scope. In this regard, I believe a metahistorical framework would need to build on this work, by focusing on how different curatorial policies delimit the types of analytical interventions which scholars can make with their tools into digitised archives, for instance in terms of availability and technical and material specificities.

Concerning the second and third research questions, several media theorists have theorised the interrelation between the digitisation of audiovisual archives and historiography as constituting an end point for the latter. Recently, media theorist Wolfgang Ernst, in the lineage of Friedrich Kittler’s post-hermeneutical media theory, has focused on the material and technical specificities of digital archives to study their consequences for historiography.\textsuperscript{17} Ernst argues that the technical configuration of digital archives essentially undermine narrative historiography's causality and that they are inherently reflexive.\textsuperscript{18} In particular, Ernst argues that a characteristic technique such as hyperlinking, which constantly refreshes and adds new links between documents, strips sources of their historically constituted narratives and stable referentiality and instead situates them in a constantly changing network of relations.\textsuperscript{19} This argument can be regarded as a ramification of early new media theory. Along similar lines, media theorist Lev Manovich argued in the early 2000s that hyperlinking is essentially anti-hierarchical and breaks down established narratives because it invites open-ended navigation through digitised sources.\textsuperscript{20} Consequently, the relations between items are never fixed, just as their signs become inherently dynamic and lose their indexicality.\textsuperscript{21}

While I appreciate and value these analyses for highlighting historiography’s and narration’s contingent nature, I consider the conclusion that digitisation marks an end point for history making problematic. I find that the circumstance that historians formalise methodological procedures to create visualisations, as I discussed above, to contemplate and analyse patterns in historical sources instead suggests that a reconfiguration of historical interpretation is taking place. Rather than experiencing a loss of history, historians make digital tools to reimagine their traditions and


\textsuperscript{19} Ibid., 87 & 45.


\textsuperscript{21} Ibid., 230-231.
attribute meaning to digitised sources. In this regard, I consider, along the lines of film scholar Philip Rosen's discussion of the digital turn, Ernst’s and Manovich’s analyses representative of a utopianist and techno-determinist strand in new media theory, because it identifies a radical rupture between the interpretive realms of old and new - analog and digital - technologies. This stance implies that digitised sources’ are on a technical level essentially devoid of indexicality and are “practically infinitely manipulable” across different contexts which leads to the loss of a stable historicity as a consequence of digitisation. I find the central problem with this stance’s premise succinctly elicited in media historian Steve F. Anderson’s contention that “[c]ultural theories that describe contemporary historical consciousness in terms of debasement and loss mendaciously imply that there once was a secure access to an authentic past, when past and present spoke to each other more directly.” What I lack from current theorisations is a deeper understanding of how methods are formalised, how discursive formations emerge and a typology of their historical epistemologies. Therefore, I believe a metahistorical framework should step away from predominantly essentialist accounts of media change, to equally focus on media representations, uses and users, in order to identify and elucidate how scholars produce historicity in the digital age.

To illustrate what I miss today, I find it helpful to consider how film historians in the past produced metahistorical perspectives on written histories and created typologies of their discourses. As film scholar André Gaudreault has remarked, during the 1970s and 1980s, when film studies became a widely institutionalised academic discipline, film historians created close alliances with theory of history as well as with film archives to critically reconceptualise and challenge existing film historiography. In what has later been characterised as a 'historical turn' in film studies, these years nourished intense metahistorical reflection on the discourses and contingencies of history writing among film scholars, to critically question previous methodological assumptions and conceive new critical and often politically informed approaches. Emerging from contemporary marxist film criticism, such theoretical endeavours arguably epitomised in Jean-Louis Comolli’s influential *Technique et idéologie* article series (1971-1972). Confronting and problematising prevailing notions of teleology, periodisations and origin points, Comolli’s articles reframed the

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23 Ibid., 319.
Introduction

history of cinema's emergence by attending to cultural and ideological conventions rather than privileging its roots in scientific cinematography.27

<table>
<thead>
<tr>
<th>ASPECTS OF HISTORICAL TIME</th>
<th>RAMSAYE: adventure history</th>
<th>OGLE: technical history</th>
<th>GOMERY: industrial history</th>
<th>COMOLLI: ideological history</th>
</tr>
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<tbody>
<tr>
<td>CAUSE</td>
<td>Linear (events, anecdotes; non-historical unities)</td>
<td>Relational among Technologies (science)</td>
<td>Economic Context (long-run profits); industrial organization theory</td>
<td>Social and Economic Context (Marxist economic theory)</td>
</tr>
<tr>
<td>CHANGE</td>
<td>Evolution (birth, growth, death)</td>
<td>Perfection of technique</td>
<td>Economic Cycle (invention, innovation, diffusion)</td>
<td>Marxist Change (dialectical change)</td>
</tr>
<tr>
<td>SUBJECT (role of individual)</td>
<td>Organic Metaphor and Axiomatizes about Individuals (psychology)</td>
<td>Inventors and Cinematographers</td>
<td>Creative Management</td>
<td>Member of Economic Class and Subject in Ideology</td>
</tr>
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Fig. 3 Metahistorical table from Edward Branigan's article "Color and Cinema: Problems in the Writing of History" (1979).

Thinking along the lines of White's Metahistory, in addition to Comolli, a number of scholars formulated similar critiques by drawing on literary theory to analyse the assumptions of previous histories.28 In this regard, an illustrative example of the resonance of metahistory in film studies can be seen in Edward Branigan's article "Color and Cinema: Problems in the Writing of History" from 1979.29 Analysing and charting the narrative conventions and historical agents of early as well as contemporary film histories in a table outlining their different "types of historical inquiry", it suggested a reflexive, industrial history of film colours which pointed to the contingent assumptions of its own writing (see fig. 3). By making this analysis, Branigan suggested a new history which, while not suggesting it was better than previous histories, produced new insights while highlighting the problems of their assumptions.

In the following decades, several monographs and anthologies produced critical typologies of research methods and stimulated in-depth discussions among scholars along these lines. Film scholar Michèle Lagny's De l'histoire du cinéma. Méthode historique et histoire du cinéma (Armand Colin, 1992) provided a critical catalogue of developments and methods in film history writing, perhaps the most comprehensive of its kind, by thoroughly eliciting their relations to different traditions in art, literary and socio-economic history. The multi-authored anthology Recherche:

29 Edward Branigan, “Color and Cinema: Problems in the Writing of History” in Film Reader 4 (1979) 29
Film Historiography, Digitised Archives and Digital Research Dispositifs

Film – Quellen und Methoden der Filmforschung (CineGraph, 1997) edited by Hans-Michael Bock and Wolfgang Jacobsen, focused in particular on the historiography of German cinema while including articles on different, historiographic traditions in especially France and the US. Likewise, North American and French journals such as Film Reader, Iris, Film History, Les Cahiers de la cinémathèque and Cinema Journal, have, throughout the years, devoted special issues to theory of film history which have been vital in creating overviews of current epistemological discussions in film historiography. Not to forget the landmark discussion of Robert C. Allen and Douglas Gomery's Film History. Theory and Practice (Knopf, 1985) which articulated a model for socio-economic film history as a critical response to conventionalist critiques of empiricism, as articulated in the classic reflections on epistemology in the works of Thomas Kuhn and Paul Feyerabend.

It is along these lines that I situate my research to suggest a metahistorical framework for analysing digital methods and their "types of historical inquiry". I wish to reinvigorate metahistorical debates which, as film scholar Jane M. Gaines has recently contended in her article "Whatever Happened to the Philosophy of Film History?", are less prominent in scholarly debates today but urgently needed to reconsider how digitisation condition our historical models. However, written throughout the 1970s, 1980s and the 1990s, the large part of these key texts, remain within a moment which, in addition to being qualified as a "historical turn", is also often referred to as the "linguistic turn" in theory of history, that critically analysed methodologies by attending to their language, narrative modes and discourses. With regard to the currently emerging digital research methods and their strong reliance on visual analytics, this reference literature’s emphasis on language seems to offer insufficient frameworks for elucidating the implications of producing historical knowledge. Therefore, while I find inspiration in the metahistorical perspectives produced in this period, I believe that they need reframing through new theoretical alliances – in particular with media theory, visual studies and philosophy and history of science - to analyse digital analytical and representational practices. At this moment, this has only sparsely, and mostly sporadically, been suggested. For instance, media theorist Trond Lundemo has advocated for historicising the technological transitions of the film historian's tools and techniques to understand the digital turn’s consequences for historical interpretation. More recently The Arclight Guidebook

31 Jane M. Gaines, "Whatever Happened to the Philosophy of Film History", in Film History, Vol. 25, No. 1-2 (2013) 77
to Media History and the Digital Humanities (REFRAME Books, 2016) edited by media scholars Charles Acland and Eric Hoyt made a significant contribution to bringing media historians and the digital humanities into closer dialogue and invited practitioners to take a reflexive stance towards digital methods, by providing an extensive overview of case studies from primarily a North American context.34 Yet, focusing either primarily on technological change, methodological best practices or case studies, these publications have to a lesser extent explored the questions which I have raised above to fill the gap of our understanding of especially film historiography’s visual forms and their underlying procedures.

To analyse the methodological procedures and representational practices of digital methods and their underlying discourses it no longer suffices to attend to history as a language system which establishes causal relations or follows narrative conventions. Instead, we need a framework which considers how digital techniques and visual analytics are used to establish analogies between historical events, motifs and moments to study historical tropes with data visualisations. Therefore, beyond literary studies and linguistics-inspired theories of history, metahistory needs to engage with philosophy and sociology of science and visual studies. For examples of how such theoretical perspectives can be productively combined, the disciplinary subfield of digital historiography provides a productive point of comparison. A good example is historian David J. Staley's monograph Computers, Visualization, and History. How New Technology Will Transform Our Understanding of the Past (M.E. Sharpe, 2003). As Staley observed in this work, there existed a number of visual formats in the discipline of history in the early 2000s which had not yet been perceived or discussed as historical sources on their own terms. As he wrote: "Without our recognising them as such, visual secondary sources do exist in our profession in the form of diagrams, maps, films, dramatic recreations, and museum displays. While these visual secondary sources surround us daily, historians accord them supplementary status to the 'real history' we believe is written".35 Staley's monograph raises similar questions and identifies a similar deficit, as those I have discussed above with regard to film historiography and the digital turn. He answered them by combining perspectives from classic media theory (McLuhan), philosophy of history and science (White) and visual studies (Rudolf Arnheim), to elucidate how visual forms mediate historical research. While not suggesting the entirely same theoretical coordinates for my research,


the combination of media theory, theory of history and visual studies in Staley's book provided an inspiration for combining my own theoretical framework to analyse the discourses of digital methods. In this regard I find de Certeau's theory, as the primary theory of history I draw on, at the same time systematic and open enough to be complemented by theoretical insights from other fields and it is therefore along the lines of his notion of 'historiographical operation' that I develop a metahistorical approach to digital film historiography. In the following sections, I shall lay out, how I apply this notion and its analytical foci in the present dissertation and how I develop them.

**Digital Film Historiography's Places of Production**

The “historiographical operation”, as de Certeau characterises it, is partly constituted by a place of production which follows a set of socially accepted conventions, values and rules to constitute its object of study and methods.\(^{36}\) In this respect, historiography's claims to “objectivity” and establishment of “facts”, de Certeau argues, are always conditioned by the specificity of the place and milieu it emanates from and should therefore be regarded as the results of a localised, “collective fabrication” of knowledge, akin to the product of factory or laboratory work.\(^{37}\) The institutional conventions which condition historical knowledge production can be manifold. The geographical region and language of a place can determine the sources which a historian chooses, as can its doctrine, methodology or legislative or political framework.\(^{38}\) Thinking along these lines, I analyse primarily academic settings – in addition to film heritage institutions - as the primary socio-cultural conditioning places of digital film historiography to yield an understanding of why film historians attribute importance to specific digitised sources, analytical interventions and tools in their research.

In a present perspective, it may to a certain extent seem counter-intuitive to put an analytical emphasis on the places and institutions of knowledge production when the digital turn is so frequently taken to forecast a dissolution of institutions and their replacement with on-line platforms. Yet, I find this analytical focus particularly necessary, when considering that one of the most visible consequences of the digital turn in media studies is the proliferation of media and digital humanities labs as spaces for knowledge production and transfer between scholars. As new media scholars Theo Röhle and Bernhard Rieder point out, while the sciences have made use of

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37. Ibid., 64.
38. De Certeau evokes for example how the geographical scope of French historiography at the time appeared to be confined by language, by studying mainly regions in which Romance languages are spoken such as Southern Europe and South America.
laboratories for centuries, the humanities in particular began doing so in the 1960s— in history, in the social and political sciences and the arts — to incorporate mechanising equipment as heuristic tools in methodological chains. 39 This tendency has increased significantly with the digital humanities' emergence. 40 Attending to this development, media theorists Lori Emerson and Jussi Parikka have for instance recently argued that the current proliferation of media and digital humanities labs should be seen as one of its most significant implications and requires our analytical attention to understand how these spaces' organisation sustain and (re)produce modern conceptions of knowledge and scientificity. 41 Writing at an earlier point, in the late 1990s, cultural and political theorist Régis Debray observed a similar tendency when he contended with regard to archives and museums that:

In our day of delocalized on-line access and long-distance digital consultation, electronic circulation should for all intents and purposes render the concentration of materials in physical sites useless. But in fact the centrifugal dematerialization of data's supporting base increases our collective need to recenter ourselves on the basis of symbolic reference points. 42

With regard to increased digitisation and, more broadly, technology’s rapid development, Debray argued that institutions tend to respond by founding new institutions to make sense of these developments. 43 As a consequence new techniques become embedded in ideas and mentalities with a *longue durée* and turn them into techniques of tradition through institutional processes of formalisation. 44 In order to apprehend the digital turn then, it is necessary, first, to take a diachronic look at how traditions' "founding ideas [were] themselves founded" to then apply a synchronic perspective which analyses how contemporary techniques transmit established ideas and change them and their institutions. 45 In line with Debray I find it crucial to understand how established traditions and tropes anchored in film historiography’s institutions play a vital role in giving film history's digital representations scientificity and determine their success as socially accepted scholarly practices.


43 Ibid.


From this vantage point, I create a typology of scholarly traditions within the contemporary field of digital film historiography and analyse how they are being recast with digital tools of analysis and visualisation. I do so by analysing a variety of research projects as case studies and attending in each case to the institutions they emanate from and their conventions. First, I am attentive to the ways in which the place of production affects the selection of source material as historical object of study. As an example, one might consider how, as film scholar Jan-Christopher Horak has argued with attention to North American academia, the choice of films for film studies curricula or scholarly publications in the digital age continues to reflect established canons for the reason that it facilitates quicker and more easily publishable research, than entirely original archival research.\(^\text{46}\)

Mindful of this circumstance, I am interested in understanding how the selection of specific digitised films and documents as source material pertain to and reproduce local research traditions and value systems such as for example concepts of authorship, style, canons or a focus on cinema exhibition, with attention to the shifting knowledge formations of these places over time.

Second, I observe how places of production attribute evidential status to digital formats and techniques to render historical research factual. As sociologists of science Bruno Latour and Steve Woolgar have argued with regard to scientific diagrams, their use and development in research laboratories always depend upon a social place's literary inscriptions of knowledge, such as papers and articles, to which it provides evidence and upon which they are in turn constructed.\(^\text{47}\)

Drawing on this perspective, I understand how a place's knowledge, in the form of research publications, is mobilised in developing digital methods for film historical research, lend scientificity to analytical visualisations and in turn how digital tools become evidential in film historical research. When considering, as I shall do further on, how contemporary digital research tools draw heavily on the 1970s film historiographical frameworks by engaging some of its key theorists, I attend to the dynamic between scholarly publications and their discourse as a unifying body of knowledge in tool creation.

While the dissertation's primary focus is devoted to academic institutions, I am also attentive to the role of different film heritage institutions which condition film historical research: film archives, archival film festivals and political bodies. With regard to film archives, film preservationists and scholars Christophe Gauthier and Karen F. Gracy, have for instance analysed –


drawing on sociologist Pierre Bourdieu's notion of *habitus* – how these places' social systems (re)produce and sustain notions of film art, heritage and history through critical appreciation and taste-making. Christophe Gauthier, studying the roots of film archiving in 1920s film club culture, has foregrounded how the emergence of French film criticism and its listings of aesthetically significant films led to a theoretical discernment of cinema as an art form with its own aesthetic history which legitimised and guided collection building and film preservation in the 1930s to today.\(^{48}\) Along similar lines, Karen F. Gracy’s sociological research on film archiving in the US, has brought to the fore how archival and scholarly processes of taste-making fundamentally shape film preservation, by determining for example archival taxonomies and the selection of films for restoration.\(^{49}\) Drawing on such insights and perspectives, my discussion of digital film historiography's social places also considers the values and priorities which permeate these institutions as important conditioning factors on different levels. For example, individual archival policies determine the scope of digitisation, restoration and forms of access granted to scholars and in this respect condition the range of sources to choose from and the analytical interventions which scholars can make. I also attend to the programming at archival festivals such as Le Giornate del Cinema Muto in Pordenone and Il Cinema Ritrovato in Bologna which constitute meeting places between cinephiles, film historians and film archivists and, often surrounded by an aura of “rewriting film history”, are crucial in bringing scholarly attention to rediscovered archival films.\(^{50}\) Lastly, official entities such as ministries and councils of culture or work committees in the European Union, reflect political priorities of film heritage digitisation which affect the priorities of film heritage institutions.

By bringing to the fore the social dimension and values of these places of film historiography, I aim at emphasising to a greater degree than current debates suggest how historians mobilise existing historical scholarship in selecting their sources and reconceptualise their methodologies with new tools. In doing so, I do not imply, nor necessarily endorse, that digital film historiography runs in a direct continuous line from existing scholarship and traditions, but emphasise that social systems of knowledge institutions often induce a less dramatic rupture with existing historiographies than debates surrounding media change tend to suggest.

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\(^{50}\) Francesco di Chiara and Valentina Re, “Film Festival/Film History: The Impact of Film Festivals on Cinema Historiography. *Il cinema ritrovato* and beyond.” in *Cinémas- Revue d'études cinématographiques/Journal of Film Studies*, vol. 21/Nos. 2-3 (2011) 136.
Practices and Techniques

Within de Certeau's framework, the “historiographical operation” cannot be analysed solely by focusing on the social value systems which determine scholarly research. It equally necessitates an analysis of how historicities become embedded in a set of formalised methods, techniques and inscription devices which are used to organise and analyse archival sources. In turn it should also attend to how these apparatuses' material properties condition and confine how historians perceive of, intervene in and mediate their source material. In other words, in addition to being the product of a social place, history making is also a technical operation and practice.51 As historian of science Luce Giard has pointed out, de Certeau's framework can be aligned with Actor-Network Theory's analysis of the socio-technical constellations and interactions of scientific laboratories, which seek to avoid both social and technical determinism in its accounts of scientific knowledge production.52 Or, as Jonathan Crary has put it with regard to late nineteenth-century instruments of scientific visualisation, while techniques acquire discursive identities in specific settings as bearers of meaning, they also force us to observe our objects of analysis differently and make us reach new knowledge.53 For this reason, the historian's toolkit must be understood as constitutive of historical knowledge rather than merely auxiliary; from inscriptions in stones in ancient times, to computer-generated statistics in the late-twentieth century, the materialities of the historian's instruments change his or her interpretative enterprise.54 Mindful of the shifting material specificities of historiography's techniques, de Certeau argues that one must draw on insights from a number of adjacent fields to understand them - epigraphy in the case of stone inscriptions, or computer science in the case of late-twentieth century historiography.55 In my analysis of digital film historiography I am attentive to the material specificities of respectively digital archives and techniques of visual analytics, drawing insights from archival, film and media theory as well as on technical practices of visual analytics in a number of adjacent disciplines such as statistics, (human) geography and the natural sciences.

For instance, I consider the implications for film historiography of the shift that occurs with the organisation of film archives in the transition from index cards to databases. As de Certeau notes

51 Michel de Certeau, op. cit., 1988 [1975], 73.
54 Michel de Certeau, op. cit., 1988 [1975], 69.
55 Ibid.
with regard to historiography, the use of computers in archiving for example introduces “seriality”, statistics or mathematical structurations of the archive which change the historian's hermeneutic enterprise in accessing or indexing archival sources – a development which also holds true for moving image archiving.\textsuperscript{56} Around ten years ago, database systems became increasingly complex, enabling for example the inclusion of not only text descriptions in index files, but also audiovisual items.\textsuperscript{57} While still only used to a limited extent, this has led to new forms of archiving moving image material, where patterns of editing and style can be automatically recognised by software and included in metadata descriptions to enable new access points for retrieving archival film.\textsuperscript{58} Furthermore, there exist a broader range of database systems of which some rely on distinct institutional systems of interlinking, while others can be linked to other institutional databases or put online.\textsuperscript{59} With regard to this development, I consider how different forms of metadata, annotations and descriptions condition analysis of archival film, mindful of the different access points it enables for digital techniques of analysis.

Second, I consider the implications which different analytical techniques and their combinations hold for film historical research traditions. Here, I distinguish between different types of techniques which film historians have adopted and combined in a wide variety of formats; for instance digital editing and annotation, data mining, hyperlinking, mapping with geographic information system (GIS) software as well as techniques of semantic recognition and visualisation. Digital editing and annotation are for instance becoming prominent techniques in film historical research to develop analytical forms of moving image appropriation. In discussing the digital turn's consequences, several scholars have retrospectively cited film theorist Raymond Bellour's famous essay “The Unattainable Text” (first published in french as “Le texte introuvable”, 1975) and Jean-Luc Godard's plea for an “iconographic criticism”, which lamented the impossibility of including moving image excerpts in written publications while heralding a time when this would become possible.\textsuperscript{60} Along those lines, scholars today edit, appropriate and annotate digitised archival films

\textsuperscript{56} Ibid., 75.
\textsuperscript{59} Werner Sünderdorfer and Jürgen Keiper, op.cit.
to their own analytical ends by comparing fragments, manipulating playback speed and zooming in on them. With regard to this development, my analysis of the digital film historian's toolkit considers among other things how digital editing and annotation form the basis for stylistic analysis, DVD editing and essayistic appropriation practices.

Furthermore, in databases, DVDs, CD-ROMs and websites, hyperlinking has been central in analysing archival films, by enabling the inclusion of links between annotated films and related sources in multimedia presentations to facilitate analogous comparison between film segments or contextualisation through archival documents or explanatory notes. In addition, the emergence of an array of algorithmic data mining approaches enable different forms of pattern recognition in text documents or in moving images to study for instance movement, editing, colour and sound within a binary analytical regime. In particular socio-economic film historians have used data mining approaches for the analysis of digitised newspapers to discern patterns in cinema consumption, exhibition and distribution. With regard to stylistic analysis, algorithmic approaches enables the discernment of larger patterns in style and aesthetics. Concerning this development, Lev Manovich has been a key instigator in exploring applications of visual analytics for data sets which are significantly larger than film historians were previously able to process.

These techniques will be discussed in greater depth in the dissertation's third, fourth and fifth chapters. In my analysis of them I consider, how and if they have led scholars to discern new series and patterns of inquiry in film historical research, and I consider their emergence and applications in adjacent disciplines, their material specificities and the analytical interventions which they enable.

*Writings - Dispositifs*

In de Certeau's framework, the last part of the 'historiographical operation' constitutes a *writing*; an edited and “staged” end product, which functions as a representation and dissemination format for historical research. Contrary to scientific practice which, while formalised, is more experimental in nature, historical writing mediates a scientific discourse through the arrangement of textual elements to serve a didactic function for a readership. It does so by structuring research results into a chronologically ordered text which establishes causal chains between events and results to create

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61 Jeffrey Klenotic, op.cit., 58.
63 Michel de Certeau, op. cit., 1988 [1975], 86.
Introduction

a historical narration. Writing is in this respect a figuration, which redistributes the insights and
symbolic references yielded in and with its social place and techniques of production, to provide a
reader a lesson about history by telling a story.\textsuperscript{64}

While the notion of \textit{writing} proposed by de Certeau is mindful of history's mediation and its
multifarious technical practices, it attends primarily to literary forms of publications. As pointed out
by David J. Staley, as opposed to written histories where writing tends to work by ordering
historical events in causal chains in a linear fashion, “visual secondary sources” are non-linear,
have multiple entry points and depend on different forms of interaction between a representation
and its user.\textsuperscript{65} In this respect, digital formats inarguably instantiate new ways of representing and
experiencing history and require a different analytical framework than the one offered by literary
theory. Therefore, with regard to the 'staged' formats I analyse - DVD editions, GIS maps, data
visualisations, websites and audiovisual essays – though I remain inspired by it, I do not strictly
follow this part of de Certeau's framework. Instead, I propose an appropriation of de Certeau's
notion of writing by way of recent film and media theory to analyse how they mediate film
historical research. Instead of thinking in terms of writing I use the concept of \textit{dispositif}, taken from
and widely used in film and media theory, to understand non-linear publication formats as
composite devices that combine and arrange different techniques, media and modes of access,
according to a specific, situated scientific epistemology.

Appearing in French around 1860, the word \textit{dispositif} first denoted the arrangement of components in mechanical devices as the “way in which the organs of an apparatus are disposed”.\textsuperscript{66} Later, in the 1870s, the word's meaning became extended to also mean an ”ensemble of mechanical elements combined \textit{to an effect} a result” in for example patents.\textsuperscript{67} In the 1970s, the term was
developed into a theoretical concept in philosophy and in film theory used for analysing the
configuration and structuring role of technology in social situations. In film theory, Jean-Louis
Baudry's Marxist-Freudian “apparatus theory”, used the term to characterise and criticise the
ideological and psychological foundations of the cinematic screening situation upon the spectator,
by regarding cinema as rooted in bourgeois, Western conventions such as for example renaissance
perspective.\textsuperscript{68} Jean-Louis Baudry's two texts ”Effets idéologiques de l'appareil de base” (1970) and

\begin{itemize}
\item \textsuperscript{64} Ibid., 87.
\item \textsuperscript{65} David J. Staley, op.cit., 55.
\item \textsuperscript{66} François Albera and Maria Tortajada, "Le dispositif n'existe pas!", in François Albera and Maria Tortajada (eds.), \textit{Ciné-dispositifs. Spectacles, cinéma, télévision, littérature}. (Lausanne: L'age d'Homme, 2011) 13. Original quote: ”la manière dont sont disposés les organes d’un appareil”.
\item \textsuperscript{67} Ibid. Original quote: ”d’ensemble d'éléments mécaniques combinés \textit{en vue d'un effet}, d'un résultat”.
\item \textsuperscript{68} Thomas Elsaesser and Malte Hagener, \textit{Film Theory. An Introduction through the Senses}, (New York: Routledge, 2010) 67.
\end{itemize}
"Le dispositif: Approches métapsychologiques de l'impression de réalité” (1975) gradually introduced and developed the concept, first as “disposition” then as “dispositif”. In philosophy, Michel Foucault developed the concept in particular in his work *Discipline and Punish: The Birth of the Prison*’s (first published in French as *Surveiller et Punir: Naissance de la prison*, Gallimard, 1975) investigation of how power, punishment and social order were maintained and reformed in the nineteenth century through the spatial arrangement and bodily control of penitentiary surveillance institutions. Using the concept in several works, Foucault defines it - in an oft-cited passage - in an interview from 1977 as:

...an absolutely heterogeneous assembly which involves discourses, institutions, architectural structures, regulatory decisions, laws, administrative measures, scientific enunciations, philosophical, moral, and philanthropic propositions; in short: as much the said as the un-said, these are the elements of the dispositive. The dispositive is the network which is arranged between these elements.\(^{69}\)

In this respect Foucault, as Baudry, suggests that a *dispositif* is a heterogeneous socio-technical ensemble, a machinery of seeing, of which the arrangement reflects a specific knowledge formation or episteme to a user, who becomes inscribed within this structure.

The concept, as applied in my dissertation, is conceived along the lines of these definitions. However, I apply it in a pragmatic fashion, mindful of critiques which have been put forward with regard to Foucault’s and Baudry’s definitions in the fields of philosophy and media theory. In these fields their definitions have been critiqued for implying too rigid a conception of power, which does not account for multiple configurations, appropriations and agencies on different levels. For example, Michel de Certeau criticises Foucault's use of the concept for suggesting that every micro-technique of a *dispositif*’s arrangement confines its subject within a specific power formation, thereby neglecting that appropriations of it can occur within its structure which may turn its purpose in a different direction.\(^{70}\) In a like-minded fashion, media theorist and film historian Frank Kessler, with regard to early cinema distribution, contests Baudry's concept by analysing how the meaning of a film changes in different viewing situations and institutional framings to argue that spectators play an active role in shaping film exhibition, contrary to what Baudry’s concept implies.\(^{71}\) In line


with these points, I use the concept to analyse a multiplicity of technical arrangements and modes of access in digital dissemination formats as film historical knowledge formations. On a technical level, I understand how different combinations of techniques, tools and visualisations in dissemination formats represent film historical knowledge. In the case of for example a DVD, this means that I am attentive to the numerous ways in which such a format can be arranged to represent digitised archival material; while some DVDs only enable playback of a film without additional features, others make use of a wide range of functions and analytic tools in addition to a playback mode; a diagram, an annotation, or for example a ROM-section which connects the DVD to a website. Specifically with regard to diagrams and visual analytics I also think along the lines of visual studies, which intersect the histories of art and science to analyse how scientific visualisations guide our attention, understanding and analysis of observed phenomena. For the digital humanities, especially Johanna Drucker and Edward Tufte, from very different standpoints, have brought to the fore the importance of attending to the graphic arrangement of visualisations to understand the forms of reasoning they sustain. Beyond the field of digital humanities, epistemologists and art historians such as Lorraine Daston, Peter Galison and Horst Bredekamp have produced groundbreaking, historical studies on the role of scientific and technical images in research. In my case studies, I draw on such perspectives to elucidate the role which data visualisations play in structuring information and readings of it.

In addition to analysing the technical and visual arrangements of the dispositifs discussed in my case studies, I also consider how they involve users by positioning them in certain ways and require specific bodily gestures to engage with them and in some cases allow for alterations of their representation. In this respect, I draw on a set of questions which film scholars François Albera and Maria Tortajada have outlined to sketch a method and analytical scheme for discerning the interrelations between spectators and machinery which constitute a dispositif. For example, one can ask whether a spectator is mobile or immobile when using a format, what the dimensional relation are between the user and the format - is one watching a representation on a small screen or surrounded by multiple screens - and to what degree the user can alter the representation or

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74 François Albera and Maria Tortajada, "The 1900 Episteme", in François Albera and Maria Tortajada, *Cinema Beyond Film. Media Epistemology in"
Film Historiography, Digitised Archives and Digital Research Dispositifs

rearrange a format’s configuration. In total, Albera and Tortajada outline the following five human-machinery interrelations: (1.) The relation between the spectators and the machinery, (2.) The relation between, on the one hand, the spectators and, on the other, the machinery and the representation, (3.) The relation between the spectators and the representation, (4.) The relation between the machinery and the representation, (5.) The overall qualification of the dispositive. In my case studies I use the guiding questions concerning these interrelations as an analytical scheme to discern how scholars are positioned by, interact with and have the possibility of changing digital research dispositifs to develop them in new directions. This line of inquiry ties in with both de Certeau’s and Kessler’s approach which, by drawing on Foucault and Baudry, holds that a dispositif confines a user within a certain knowledge formation, but that users in turn may also affect the configuration of a representation.

In this way, by replacing de Certeau's notion of writing with that of a pragmatic understanding of the dispositif, I argue it is possible to obtain a detailed understanding of the ways in which digital formats represent film historical discourse through specific user-machinery interrelations and visual arrangements, while being mindful of how different configurations and modes of access sustain them and may allow for changing and challenging them.

0.2 Structure of Research, Key Examples and Case Studies

The dissertation is divided into three parts, containing five chapters in total. Part One, Sources, Repertories and Theories of Film History which contains the first two chapters, analyses the interrelation between film archiving and film historiography and how different institutions and agents have shaped it.

Chapter One, "Film Historiography and Film Archives”, provides a historical perspective on the interrelation between historiography and film archiving, its shifting material basis, and the discourses which have underpinned shifting conceptualisations of film and related material as historical source material. In doing so, the chapter gives an account of how a network of institutions, sites, social groups and techniques – in particular cinephile film critics, historians, archivists, filmmakers, laboratories and projection technologies - has emerged and inflected changing definitions of film historiography. The chapter spans the late nineteenth century's early pleas for scientific film archives, the 1920s' cinephile canon formation and universalist model of the Modern Era. (Amsterdam: Amsterdam University Press, 2010) 37-39.

Ibid., 37.

Ibid.
film history in especially France, the creation of the International Federation of Film Archives (FIAF) in the 1930s, the emergence of general, universalist film histories in the post World War II years and the 1970s and 1980s style history and New Film History. With this account I produce an outline of historical epistemologies, which I regard as a matrix within which the interrelation between film archiving and historiography develops, and which I refer to in my case studies to understand how different traditions are currently brought into play and being recast with contemporary digital techniques and dispositifs.

Chapter two, "Film Heritage Digitisation Between Europeanisation and Cinephile, Curatorial Agendas” discusses digitisation of archival film and related materials in European film archives against the backdrop of especially the European Commission's Digital Agenda and its goal to turn cultural heritage collections into an asset for a digital economy. The chapter’s focus on European film heritage institutions results at the same time from pragmatic and historical considerations. First of all it reflects my research’s situatednes in a European context. Being situated in Europe I have had a more immediate access to and understanding of the sociopolitical implications of the frameworks which European film heritage institutions work within. For this reason I find that this focus offers a feasible delimitation for my research instead of pursuing a global outlook. Second, the emergence of film preservation is also in many aspects a phenomenon which first occurred in Europe, especially from the 1920s onwards. For this reason, a European focus productively allows for discerning changes in the interrelation between film historiography and archiving in a longer perspective. The chapter first attends to FIAF’s expansion and increased professionalisation from the 1960s onwards to analyse how this created closer ties to governmental institutions and cultural policy making. The part in particular investigates how recent decades' emerging cultural policies of Europeanisation have shaped cultural heritage digitisation in the European Union and created fundamental challenges, as well as opportunities, which individual film heritage institutions need to negotiate in relation to their respective curatorial agendas. Second, the chapter goes beyond the framework of the European Commission to analyse which values and historical models characterise the discussions around film heritage digitisation, restoration and access among film archives. This part of the chapter considers in particular a site such as Il Cinema Ritrovato in Bologna, and the status which especially the DVD format has held in the past decade as an interface between film archives and historians. Combining institutional analysis and basic descriptive statistics I investigate how European film heritage institutions' DVD releases represent for instance specific periods, countries and reflect different curatorial strategies of programming and restoration to understand
how digitisation conditions scholarly research.

The dissertation's second part, *Data-Driven Mediations of Film History: Traditions, Techniques and Dispositifs*, focuses on the methodological steps which scholars take when conceptualising and conducting film historical research with digital tools of analysis. It analyses how various digital techniques are used within the two primary scholarly research traditions discussed in Chapter One – style analysis and New Cinema History – to produce historical facts from digitised sources and mediate them using visualisations in digital formats. In doing so, the chapter attends to how scholarly traditions function as hermeneutic antecedents in digital research projects and inform the choice and methodical uses of digitised source material and techniques to create new research dispositifs. Through two separate case studies, and a number of key examples, the chapters analyse these processes by focusing on the interplay between scholarly traditions and techniques such as annotation, hyperlinking, montage and data mining and formats such as DVDs, and interactive maps. Summarising the key points of the case studies, each chapter's final discussion and conclusion proposes an outline of the dispositifs' methodological assumptions, steps and user-machinery interrelations, using Albera and Tortajada's categories to discuss their key differences and shared characteristics. The discussions focus on how and why the respective dispositifs are becoming accepted scholarly formats for a visually anchored film historical interpretation, while recasting their traditions’ assumptions, methods and instrumentations. My discussion of these new digital dispositifs also suggests points for further developments, which could help make the methods more reflexive or more internally consistent with their respective approaches.

The second part falls into two chapters, respectively the third and fourth of my dissertation. Chapter Three, “Microscopic Visions of the Film-Text: Stylometry, Film Philology and DVD editions”, analyses how the DVD format has been developed into a ‘philological’ research dispositif at a juncture of quantitative style analysis, scientific visualisation and film philological restoration theory. I consider in particular how video editing, hyperlinking and pattern recognition software enable the visualisation and comparative study of micropatterns in cutting rates, movements and colours in archival films. These techniques, I argue, play a vital role in conceptualising the DVD as a scholarly format by lending scientificity to the philological study of archival film. I support this conclusion by attending to the adoption of these techniques in academic contexts and projects rooted in stylistic and philological analysis. For example in the academic Hyperkino DVD editions and the scholarly discussions of the University of Udine's FilmForum throughout the 2000s and its commitment to developing digital, historical-critical annotations of archival films. As the primary
case study which exemplifies this dynamic between tradition and techniques, the part analyses the Austrian Filmmuseum's DVD release of Soviet director Dziga Vertov's two films Šestaja čast' mira Odinnadcatyj (A Sixth Part of the World, USSR, 1926) and Odinnadcatyj (The Eleventh Year, USSR, 1928) and its comparison of digitised film prints and supporting use of film related sources.

Chapter Four “Writing Film History from Below and Seeing it from Above: GIS Mapping and New Cinema History's Macroscopic Vision” analyses the use of data mining and GIS techniques in New Cinema History research. Attentive to this research tradition’s primarily contextual focus and use of film related sources, I discuss how information on locations, dates and persons is extracted from digitised collections of periodicals and business documents with data mining techniques to visualise and historicise distribution and exhibition networks with interactive maps. With regard to these techniques’ use in New Cinema History research, I argue that they draw on the methodologies of especially socio-economic and Annales historiography’s serial, quantitative approaches to discern macrostructures in film distribution. I base this argument on the theoretical underpinnings of the discussions taking place within the scholarly network History of Moviegoing, Exhibition and Reception (HoMER), which connects research projects from especially the UK, Australia, Belgium and the Netherlands. As its central case study the chapter discusses the project Data-driven Film History: a Demonstrator of EYE’s Jean Desmet Collection developed in collaboration between the University of Amsterdam, the EYE Filmmuseum and the University of Utrecht, in which I was involved as a researcher and project manager. The project sought to combine both textual and contextual techniques of analysis and required a methodological reflection and apprehension of them from its participants. Observing the project develop as a participant, it provided particularly fruitful insights for discussing the epistemological implications and the negotiation between techniques and tradition in New Cinema History research. Furthermore, as literary scholar and digital humanist Stephen Ramsay has polemically argued, it is crucial for humanities scholars to build new tools, projects and presentation formats in order to understand how they work and not only use them to support the writing of traditional, scholarly articles.\footnote{Stephen Ramsay. "On Building" (2011), last accessed January 24, 2017, \url{http://stephenramsay.us/text/2011/01/11/on-building/}.} The very process of building is a valuable learning process in itself which provides an in-depth understanding of the complex hermeneutical processes of the digital humanities. This project provided such an opportunity for me. Drawing on this experience, I also suggest in the chapter's conclusion a couple of points for further development for New Cinema History research, which in particular considers the longue durée model of Annales historiography.
Taking the second part's discussions and conclusions as a departure point, the dissertation’s final part, *Further Perspectives and Conclusions*, contains a short fifth chapter and a conclusion, which suggest ways of making existing methods more reflexive and critical. It does so by discussing the possibility of combining to a greater degree different annotation and visualisation techniques at an intersection of scientific and artistic research to nurture more idiosyncratic and less methodologically rule-bound data visualisations. In Chapter 5, “From Figures to Figurations – The Subjective Projections of Cinephilia and Data Art”, I present further suggestions for challenging scientistic conceptions of software operations and statistical figures to give way to an understanding of histories as contingent figurations which may sustain more idiosyncratic and anecdotal observations. To argue this I find a departure point in recent critiques of cinemetric methods and visualisations by film scholars Tom Gunning, André Habib and Kevin L. Ferguson which point back to the subjective, anecdotal and poetic strategies of cinephile historiography and its appropriations of scientific, analytic procedures. The chapter also thinks along the lines of the neo-cinephile stance of audio-visual essayists such as Catherine Grant, Christian Keathley and Laura Mulvey and their techniques of appropriation to suggest new scholarly approaches and collaborations with media artists.

In the dissertation's conclusion I reflect on the prospects of integrating and developing the methods discussed in the dissertation into film and media studies curricula considering a set of both conceptual and institutional challenges.