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Writing Cinema Histories with Digital Databases: The Case of Cinema Context[1]

Abstract

The increasing availability of films and cinema-related heritage in digital form, as well as the creation and use of structured datasets related to the contexts of film production, distribution and consumption, have invited the use of new, computational approaches for studying cinema and its history. In this article, we review the online database Cinema Context (www.cinemacontext.nl) and its impact on the study of historical film cultures. Cinema Context is a relational database and research instrument for studying the history of film culture in the Netherlands. After an introduction to Cinema Context and its position within the international research context, we address its usage in order to discuss the opportunities and challenges of transforming a complex phenomenon such as Dutch film culture into structured data, and we reflect on its implications for film historical research.

Keywords: Cinema Context; digital databases; cinema history; film exhibition; digital humanities

The past decade has witnessed a growing interest in the application of computational research methods in the study of film as a cultural, social, and economic phenomenon. The increasing availability of films and cinema-related heritage in digital form, as well as the creation and use of structured datasets related to the contexts of film production, distribution and consumption, have invited the use of new, computational approaches for studying cinema and its history.[2] Experiments to date with computational research in film studies generally fall into two categories: those using computational tools for the stylistic analysis of film texts, and those involving social and economic historical research into the production, distribution and reception of cinema.[3] The latter mirrors a shift in film studies from a focus on the analysis of the film text itself towards contextual factors in the production, circulation and consumption of films.

The interest in more contextual approaches to the study of film started in the 1980s, and was partly inspired by Robert C. Allen and Douglas Gomery's book *Film History: Theory and Practice* (1985).[4] In this influential book, which continues to be used in many courses on film historiography, the authors propose theories and methods for extending the study of film history from aesthetics to the technological, economic and social contexts in which the medium evolved, presenting sample studies showing how all these factors are interconnected. More recently, the contextual approach has become institutionalised in the emergence of 'New Cinema History' as a strand in film historical research.[5]

Since the contexts in which films were produced, distributed and consumed have changed over time, scholars studying these dimensions of film history have to capture traces of objects, places, people, and events as documented in archival sources. The data thus collected are then stored in structured databases that can be consulted to identify the factors that explain the interconnected network of past cinema culture.[6] These databases on cinema's social, economic and cultural history can be combined with other types of data – for example, socio-demographic data that allow one to relate cinema programming to the social and demographic composition of a neighbourhood.[7] In this sense, the contextual approach to cinema history allows scholars to involve more explanatory factors for understanding cinema culture in all its dimensions than before – a development that is further supported by the efforts of scholars and archives to provide these data in a linked data format, increasing the possibility to interlink and query structured datasets of different types and origin.

The emergence of databases documenting the various dimensions of cinema cultures allows scholars to broaden the geographical and temporal scope of their research and the number of included explanatory variables, thus providing a more comprehensive view on the history of film as part of a broader cinema culture. At the same time, it also entails the need to bring in theoretical and methodological expertise from other disciplines. As Deb Verhoeven states in a paper on New Cinema History and the computational turn, the study of cinema cultures with digital data and tools involves 'a variety of fields including statistics, information management, geospatial science, computer science, applied mathematics, and economics.'[8] Each of these fields has its own methods that are informed by specific theoretical assumptions and thus have methodological and epistemological implications. As Johanna Drucker warns humanities scholars in her contribution to *Debates in the Digital Humanities*,

> a host of protocols for information visualization, data mining, geospatial representation, and other research instruments have been absorbed from disciplines whose epistemological foundations and fundamental values are at odds with, or even hostile to, the humanities.[9]

And, as Stephen Ramsay and Geoffrey Rockwell argue in the same volume, the digital artefacts built in the context of digital humanities research are theoretical, in the sense that they convey knowledge.[10]

The use of digital databases by film scholars for writing histories of cinema cultures, then, has implications for the knowledge produced. Before being able to assess the epistemological implications of this research practice, we first need to know how such databases are constructed and how they are used in the practice of film historical research. In this article, we present the results of an inventory of the use of digital databases in recent film historiography. We do so by focusing on a specific case: the online database Cinema Context (www.cinemacontext.nl). Cinema Context provides contextual data to reconstruct and understand practices of film exhibition, distribution and consumption which, in the view of its creator Karel Dibbets, constitute the 'DNA of Dutch film culture.'[11] In this study, we review Cinema Context and how it relates to,

and shapes, the study of historical film cultures. We discuss the opportunities and challenges of transforming a complex phenomenon such as Dutch film culture into structured data and reflect on its implications for film historical research methods and practices.

Cinema Context is a relational database and research instrument and consists of four linked collections (on films, cinemas, people and companies) providing information on the distribution and exhibition of films at the level of individual cinemas in various cities, towns and villages in the Netherlands. Currently, it comprises structured data on 107,235 film programmes including 45,623 films screened in 1,646 cinemas in 400 cities, towns and villages.[12] At present, Cinema Context is the only publicly accessible database that lists nearly every film screening venue in the country from 1896 until the present day. Since its launch, it has been inspirational and also unparalleled worldwide in its capacity as both public film historical encyclopaedia and research tool for the exploration of local film exhibition, distribution and consumption. It therefore offers a good point of departure to examine the opportunities and challenges of digital databases for data-driven historical explorations of the dynamics in local cinema cultures.

The article is divided into three parts. First, we introduce Cinema Context, including a brief description of its underlying architecture, as well as the sources used and the choices made when building the database. Also, we compare Cinema Context with examples of similar databases from other countries in order to position Cinema Context in the context of a broader trend towards context-orientated, data-driven film historiography. The second part provides insights into the use of Cinema Context in twelve years of film historical research practice (from its launch in 2006 until recently). Dibbets identifies three types of usage the database facilitates: encyclopaedic use; ranking and counting; and more complex analyses, such as network analysis and statistical analysis.[13] A survey of publications that report on usage of Cinema Context serves to investigate the extent to which these types of usage can be recognised in film historiographical practice. Our findings suggest that the database is mainly used for encyclopaedic use and for ranking and counting, which are types of usage that can be easily integrated into the hermeneutic, interpretative method that traditionally characterises most humanities research. The use of Cinema Context data for quantitative studies that are more experimental in their design is still limited, which partly relates to the challenge of accessing the required technical and statistical expertise.[14] In the third and final part, we reflect on the methodological implications of working with structured data in media historical research, comparing the actual use of the Cinema Context database with its potential for new directions in film historiography that employ comparative approaches and experimental research methods.

A Contextual Approach to Cinema Culture

Over the past decade, the interest in broader, contextual approaches to the study of films has gained momentum with the emergence of what has been labelled ‘New Cinema History’, a subfield of film studies that focuses on social and economic factors shaping practices of film

exhibition, distribution and consumption.[15] Building on insights of established research traditions, predominantly social and economic film history, New Cinema History shifted attention from the study of film texts to their contexts of circulation and consumption.[16] This film historiographical shift coincided with the digital turn in the humanities, which constituted a fundamental change in access to sources and data as well as ways of collecting, storing, presenting and analysing them.[17] Digital collections and databases have been embraced by an increasing number of media scholars as welcome research instruments, stimulating and facilitating comparative research (interdisciplinary, international, longitudinal).

While collaboration with cultural heritage institutions, libraries and archives has resulted in broader access to collections and data (see Europeana as the most prominent example), thereby enhancing research possibilities, little attention has been paid to the collection and presentation of contextual information that links the cultural objects and artefacts. Yet, cultural objects are not produced, circulated and consumed in isolation. They are part of a 'much wider "infrastructure" of the cultural and socio-economic context.'[18] In addition, as cultural events, whether film screenings, theatre performances or concerts, cannot be preserved and stored as such – at least not in an unmediated way – they can only be historically reconstructed on the basis of residual contextual information.[19] The online database Cinema Context is 'a digital resource which aims to create exactly this form of contextual infrastructure for the history of film culture in the Netherlands.'[20]

Cinema Context

The foundations for Cinema Context were laid in the late 1970s when historian Karel Dibbets was analysing chain formation in the Dutch cinema sector between 1928 and 1977.[21] Drawing on membership lists from the Dutch cinema association Nederlandse Bioscoopbond (NBB[22]), he collected data on venues, people and companies, which he analysed by means of what was then the new method of social network analysis: using punch cards and computational calculation to deal with the enormous datasets he had created and to solve (at least some of) his questions.[23] Within the framework of a large-scale research project funded by the Netherlands Organisation for Scientific Research, Dibbets, in collaboration with the library of the University of Amsterdam, developed a digital infrastructure and the Cinema Context website for accessibility and expansion of the existing datasets, as well as for additional tutorials and maps. In addition to the membership listings of the NBB mentioned above, records kept by the Netherlands Board of Film Censors (Centrale Commissie voor Filmkeuring) provided data on the films and advertisements in local newspapers for the film programmes. Moreover, the comprehensive archive of exhibitor and distributor Jean Desmet (1875–1956) yielded additional information on exhibition and distribution practices in the Netherlands during the first decades of the twentieth century.[24]

Cinema Context is a relational database, where four data collections – on films, cinemas, people and companies – constitute the 'basic building blocks, the genes of film culture.'[25] The 'Films' collection contains data about the films themselves, such as their original and Dutch titles, year of production, country of origin and first rating by the Netherlands Board of Film

Censors. More specific details concerning film production are provided via corresponding links to the Internet Movie Database (IMDb), based on the premise that Cinema Context should not serve as a reproduction of IMDb, but as an addition.[26] The 'Cinemas' collection comprises data of all cinemas in the Netherlands since 1900, with their opening and closing dates, addresses (including coordinates) and data relating to their management and architecture. The 'People' collection contains data relating to persons active in film exhibition and distribution in the Netherlands, including names of managers, shareholders, musicians, technicians and narrators, and their respective positions in companies related to film exhibition and distribution – data that in turn are documented in the final collection: 'Companies'. In addition to these four collections, the website lists a tab to a fifth collection: 'Programmes'. The information under this tab is composed of data taken from the collections Films and Cinemas, and therefore is a composite data category. On the website, the five interconnected lists are marked in tabs with different colours and can be searched and explored via an online search interface (see Figure 1). Cinema Context also offers the possibility to save personal subsets of the data and download them as XML files. Although Cinema Context contains an extensive amount of data on the Dutch cinema landscape, parts of the collections are either geographically or temporally limited, mostly due to restricted availability of sources and capacities for data collection and management.[27]

The choice of films, cinemas, people and companies as the basis for researching Dutch film culture implicitly positions practices of film exhibition and distribution as Cinema Context's central aspects, rather than film production, form and content. The latter type of information, relating to the films themselves, can be combined with Cinema Context data indirectly via links to IMDb (see above). Cinema Context allows for the study of socio-economic processes and

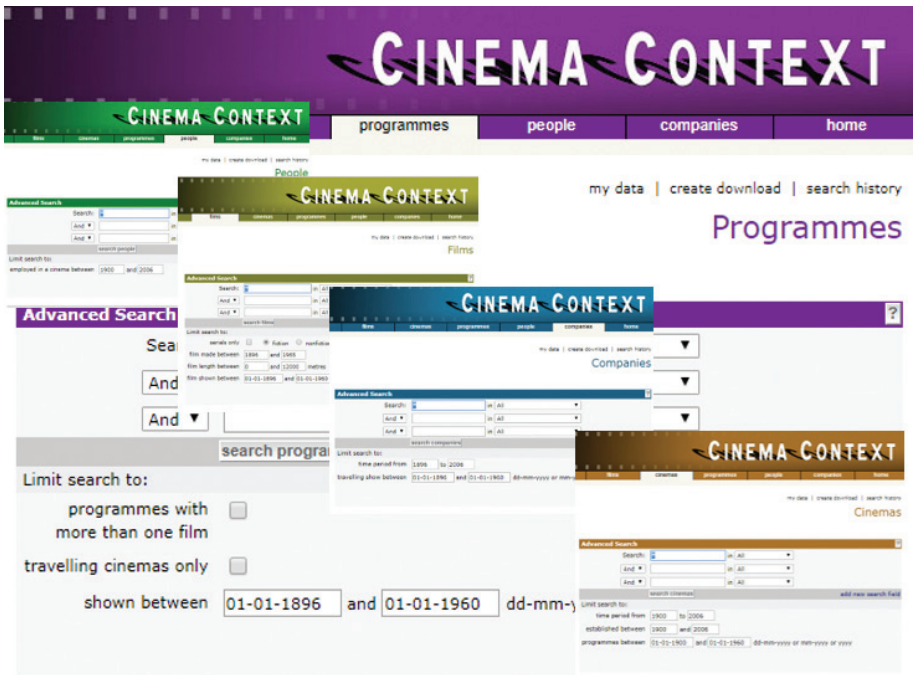

Figure 1. The coloured search tabs on the Cinema Context website each offer a tailor-made faceted search interface for the individual lists of Films, Cinemas, Programmes, People, and Companies. Source: Cinema Context, accessed 15 March 2018, http://www.cinemacontext.nl/.

relations that mainly concern the supply side of film, placing film screening at its heart, as circulation as well as consumption of films are bound to specific locations and moments. Questions relating to film demand and the ways in which the films were consumed (composition or taste preferences of the audience) can be induced implicitly from the data provided in Cinema Context: box office data and data about the composition of the audience in the Netherlands in the past are not included in the collection, but are presumed to be traceable through film programming (as film supply can be considered an indication for demand).[28]

As Cinema Context is designed as a relational database, the questions that can be addressed vary in complexity. Dibbets distinguishes three types of research questions for which the database may be used.[29] The first type relates to Cinema Context's function as an encyclopaedia and primarily serves the identification and verification of historical facts, such as when and where a particular film was screened or who operated a particular cinema during a particular period. The second type concerns enquiries that involve the counting and ranking of encyclopaedic facts, such as 'How long was *Tarzan of the Apes* screened in cinemas in Amsterdam?' The third and most complex type of research questions relates to changing patterns and networks in film exhibition and distribution, including such examples as 'Who were the key exhibitors in Rotterdam during the interbellum?' The individual details of the encyclopaedia can be joined, regrouped and computed, opening the door to advanced analytical methods for researchers. Cinema Context thus supports both qualitative and quantitative research into Dutch cinema culture.

International Counterparts

At the time of its launch in 2006, Cinema Context was a pioneer in the online, open-access presentation of data related to the history of film exhibition and distribution.[30] Since then, it has been regularly referred to by scholars as an exemplary research tool for contextual film historical research and inspirational for the creation of similar databases.[31] While a number of film historical databases and collections containing structured data on film exhibition and distribution have since been created within the frameworks of academic research projects and non-academic initiatives worldwide, only a few of these data collections are accessible online or otherwise publicly available. As many such research projects and initiatives are linked to particular (groups of) persons and institutions and lack resources necessary to maintain them once the projects have ended, they are often of a temporary nature. This contributes to a growing number of 'graveyards' of cinema-related websites, which are no longer maintained and contain dead links. Not only does the temporary nature of many datasets pose an additional challenge for scholars in finding and using relevant datasets on cinema culture, it also points to the challenge of finding sustainable solutions for data storage and curation.

Given the scope of this article, it is not our intention to provide an exhaustive overview of all projects currently available online.[32] Rather, based on an inspection of a selection of the most prominent databases that provide contextual information about film exhibition, distribution and reception and that are currently freely accessible online, we explore which types of databases there are, which kinds and numbers of data they contain and how they are organised,

thus providing insights into the ways in which they (implicitly) define local film culture. For this purpose, our focus is on databases dedicated to the collection and presentation of structured data relating to the historical contexts of film exhibition, distribution and consumption (exemplifying three major concerns within New Cinema History research). In addition, we concentrate on databases with a provenance in academic research projects. One reason (emerging from a precursory exploration of twenty cinema-related databases in seven countries) is that they generally provide ample references and access to sources, often in the form of linked data. A second reason is that we can assume that the systematic collection of data is motivated by a specific research question. This helps us to gain insights into the different ways the databases (implicitly) define film culture and translate it into structured data.

Although the databases share a common focus on local cinema history, they vary in content, scope, and accessibility. With regard to content, three aspects of local film culture figure prominently in the databases: the film-screening venues, the film screenings, and cinemagoing experiences. These three aspects have different weight in the databases. A database that, similar to Cinema Context, concentrates on data related to film-screening venues and film programming is the Cinema and Audiences Research Project (CAARP), providing access to structured data on venues and film programmes for a selection of periods and places in Australia.[33] Other databases, such as London's Silent Cinemas and Early Cinemas in Scotland, focus primarily on information about the venues and their locations.[34] A database that combines all three aspects (film-screening venues, film screenings, and cinemagoing experiences) is Cinematic Brno, which, in addition to information about venues and screenings, integrates experiences of cinemagoing in the form of oral histories. It does so in two ways: first, by transforming demographic data of the respondents and thematically coded passages from the interviews into metadata according to which the interviews can be searched and grouped; and second, by linking named entities (such as stars and cinemas) in the interviews to the corresponding data in the exhibition and film programming database.[35]

Aside from their content, databases also vary in geographical and temporal scope. As shown above, Cinema Context covers data about venues on a national level spanning more than a century, and is locally and temporally more limited for data on film programming (focusing on selected – larger – cities and roughly four decades). As we have observed, many cinema-related historical datasets are temporally and geographically limited and comprise structured data spanning a few decades and several places and regions in a particular country, such as Going to the Show (covering the US state of North Carolina),[36] or the Australian Cinema Map (mapping the Australian film weekly Motion Picture Directory cinema data from 1948 through 1971).[37] At present, the Australian Kinomatics Global Movie Screenings Database is one of the exceptions, offering film screening data for all venues in 48 countries worldwide and box office data from December 2012 onwards.[38]

Finally, databases also differ in the ways in which they provide access to the datasets. Commonly, access to the datasets is facilitated via keyword or faceted search interfaces, often in combination with mapping tools that allow for other user interactions, like geovisualisation of the datasets. The Mapping Movies project, for example, uses a geographic information system

(GIS), allowing users to digitally explore local cinema history.[39] In addition to search and mapping functions, data from Cinema Context can be downloaded for reuse. Closest to Cinema Context in this respect is the website of the Siegener Kino-Datenbanken: its design facilitates access to, and data extraction from, separate databases about films, film programmes and cinemas.[40] However, because of dead links, it is very hard to search for or extract data from this database, which underlines the problem of sustaining the storage of and access to structured cinema datasets mentioned above. While direct online access to the datasets is not always provided, this is not to say that the data are not accessible at all: researchers are often willing to share and provide access to (parts of) the datasets, reflecting a trend towards open access and the sharing and exchange of data.[41]

What becomes clear from this first exploration and comparison of databases that provide contextual data about film exhibition, distribution and reception is that despite the different foci of the individual data collections, many of the databases share similar ways of defining film culture and transforming it into structured data. Like Cinema Context, they define films, venues, associated persons and companies as central aspects of local film culture, with the film screening at its heart. The notion of the film screening as the intersection of exhibition, distribution and consumption is based on the premise that the circulation and consumption of films are embedded in the specific socio-geographic and socio-economic contexts (such as consumption and recreational patterns, transport and urban infrastructure) of a particular place at a particular moment. This emphasis on place and space, in combination with the provision of search and mapping tools, mirrors the 'spatial turn' in the humanities and in film studies in particular.[42]

Cinema Context in Film Historical Research Practice

As indicated above, Dibbets distinguished three types of research for which a database centred on film screening locations and events such as Cinema Context may be employed: first, identification and verification of historical facts (encyclopaedic use); second, counting and ranking of facts on who, what, when and where; and third, complex statistical analysis to detect patterns or networks in film exhibition, distribution and reception. In the following, we provide an inventory of the use of the database since its first launch in 2006. The analysis is based on two sources: statistics of the web interface for Cinema Context and our own inventory of scholarly literature that reports on usage of Cinema Context. This analysis serves to assess the extent to which the three types of usage that Dibbets distinguishes can be recognised in practice, and which conclusions can be drawn for future perspectives on data-driven approaches to cinema historical research.

Usage of the Cinema Context Web Interface

The statistics for the Cinema Context website are provided by the Digital Production Centre (DPC) of the University Library Amsterdam (UBA), the organisation that hosts and maintains the database and web interface.[43] The statistics are collected with the program Advanced Web Statistics (AWStats, version 7.0). However, we cannot precisely determine the reliability of this

program when it comes to excluding robots from the total number of unique users,[44] and thus the following analysis serves as an indication of possible use rather than an analysis of actual use.

Analysis of the user statistics for Cinema Context for the period 2011 (the first year for which complete user statistics are available) until 2017 (the last year for which we have complete statistics) shows that the website attracts, on average, around 20,000 unique visitors per year, accounting for around 45,000 visits with an average duration of just over four minutes.[45] The duration of the visits is very skewed, with the majority (80%) lasting between zero and thirty seconds. Since this is too short for a human user to meaningfully engage with the Cinema Context website, it might be expected that a significant number of the visits are by robots or web crawlers.[46] If we start from the assumption that 80% of the unique visitors are bots, we can roughly estimate that the website attracts, on average, 4,000 unique human visitors per year, accounting for around 9,000 visits ranging in duration from 30 seconds to over an hour. The majority of visits are from the Netherlands, as may be expected from a database on Dutch cinema culture. Besides the Netherlands, most visits to Cinema Context originate from other European countries, in particular from the neighbouring countries Germany, Belgium, the United Kingdom and France.

The number of unique visitors and the number of visits has gradually increased over the past seven years (see Figure 2). It is not entirely clear who these visitors are. However, the statistics do give a general impression of the purpose of their visits. A look at the list of keywords and key phrases used in search engines reveals that the majority are unique searches for specific film titles, cinema theatres or people or place names – suggesting an encyclopaedic use of the website.[47] The list of keywords used in search engines in 2015, for example, is dominated by cities, such as The Hague ('den' and 'haag' jointly have 162 hits), Rotterdam (48 hits), and Amsterdam (45 hits), as well as the smaller town of Huissen (20 hits), suggesting a specific research interest in these local cinema cultures. The list of downloads shows that, on average, there are around 50 downloads per year of subsets from the five tables on films (in particular the Internet Movie Database film title IDs), cinemas, programmes, people and companies,

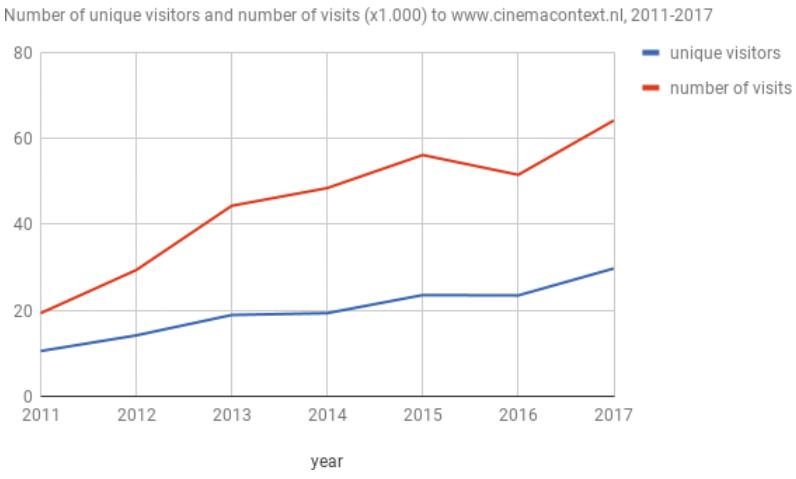

Figure 2. Number of unique visitors and number of visits (×1,000) to www.cinemacontext.nl, 2011–2017. Source: Julia Noordegraaf (2018): Cinema Context web statistics 2011-2017.xlsx. figshare. https://doi.org/10.6084/m9.figshare.5972146.v1.

jointly amounting to around 50KB per year. This relatively low number of downloads suggests that usage of the database for the third type of research, involving complex statistical analysis to detect patterns or networks in film exhibition, distribution and reception, is not yet very widespread.

Literature Review

In order to examine the use of Cinema Context in research practice, we compiled a corpus of literature that reports on its usage of the database. A bibliographic search in various databases (JSTOR Data for Research, the FIAF International Index to Film Periodicals and EBSCO's Film & Television Literature Index with Full Text) did not yield a comprehensive overview. This is due to the fact that the PhD theses and the Dutch journals in which research into Cinema Context data has been published are not indexed in these databases. Therefore, we hand-compiled an overview of journal articles, books and PhD dissertations that report on usage of Cinema Context. Many of these publications are related to research projects that have been presented at various events via the HoMER Network and, thus, are generally known in the cinema studies community.[48] A search in Google Books and Google Scholar (with the query <cinemacontext.nl>) yielded an additional set of relevant publications, and Google Search (<"cinema context" database> and <"cinema in context" database>) provided a handful of others. This has resulted in a corpus of 76 texts, including 32 journal articles, 9 books (including 3 published PhD theses), 30 book chapters and 5 PhD dissertations.[49] Of these texts, 47 have been written by Dutch researchers, which is not surprising considering the focus of the database on Dutch cinema culture.

Among the literature studied, most of the texts written by non-Dutch scholars refer to Cinema Context only in general terms, mentioning it as an example of emerging large-scale databases on cinema culture. An exception is a study by María Vélez-Serna on Scottish exhibitors in the 1910s, which used the database for an inventory of film lecturers active in the Netherlands – which is a clear example of counting (type two in Dibbets' classification).[50] In the publications that do report on actual usage of the Cinema Context data, encyclopaedic use is the most prominent category. This mostly concerns references to information on specific films, cinemas, persons or companies, as in a study by Ferry de Goey on the ties between the Dutch and American film markets, for which he used the database to retrieve information on American movie studios.[51] Occasionally, authors also refer to information contained in the censorship reports included in Cinema Context, in particular the original titles of the films.[52]

The second category of usage, counting and ranking of facts was harder to identify in the literature. We did encounter studies where Cinema Context is used for counting and ranking facts within one of its four collections: films, cinema theatres, people and companies. In most of these cases, Cinema Context data have been complemented with data from other (archival) sources. For example, Cinema Context has been used to count the amount of cinema theatres in a particular spatio-temporal context in order to assess the emergence and growth of cinema theatres in the Netherlands, as in the study by Judith Thissen,

Andre van der Velden and Thunnis van Oort that used Cinema Context data to map the geographical distribution of cinema theatres in the period 1910–1940.[53] Another example is the use of the database to assess the origins of cinema theatre ownership, as Fransje de Jong has done for her PhD research on Jewish film and cinema entrepreneurs in the Netherlands before 1940.[54]

In a similar vein, various scholars made use of the 'programmes' section of the Cinema Context website to count the number of screenings of a particular film in order to estimate a film's popularity, or that of an actor who appeared in particular films, as Ansje van Beusekom did for her study on the films of the silent cinema star Asta Nielsen in the Netherlands in the 1910s.[55] This investigation involves an extra step, as it requires a combination of the programming data with data from IMDb, as Cinema Context does not include information on the cast of the films screened. Nevertheless, it still belongs to the second type of usage – counting and ranking of facts – since it primarily involves creating lists (of the ten most popular films in the Netherlands before 1920, or the ten most popular films starring Nielsen).

In order to better understand the mechanisms underlying historical film distribution and consumption in all their complexities, various researchers have performed more advanced statistical analyses on a combination of different types of data in experimental research. These studies, in others words, may be seen as examples of the third category, involving multiple variables with the purpose of detecting correlations or causal relations. To our knowledge, there are very few examples of such studies based on Cinema Context data. The clearest examples of usage of this type that we found are all related to the research of Clara Pafort-Overduin, who, together with John Sedgwick and/or Jaap Boter, performed a cluster analysis of programming data from Cinema Context and Pafort-Overduin's own database in order to determine the popularity of Dutch films screened in cinema theatres in 22 Dutch cities and towns during 1934–1936.[56] Similarly, studies by the same researchers on film distribution combine Cinema Context data on cinema theatres and their location with a number of other data to detect and explain patterns in the way cinema found its place in culture and society.[57]

Taken together, the analysis of the web statistics and the literature seems to suggest that, currently, the opportunities of Cinema Context for film historical research are not all exploited to the same extent. The majority of publications either refer to the database in passing or cite it as a source for specific facts, thus using it in its encyclopaedic capacity. In addition, the database is used by a smaller group in a 'descriptive' way for the creation of lists of facts on the number of screenings of specific films or the number of cinemas owned by a specific group of entrepreneurs. Finally, we identified a small group of researchers who employ the database to perform more complex statistical analyses of data related to film distribution and consumption. The number of publications that mention the database and the growing number of visits in the past decade suggest that Cinema Context is a well-known database frequently used in studies that integrate facts on specific films, cinemas and people in qualitative studies on specific cinema cultures. At the same time, as Cinema Context was initially set up as a tool to also facilitate more large-scale, experimental digital scholarly research, the fact that the utilisation of Cinema

Context is mainly restricted to fact-finding and descriptive ranking and counting signals that it is not yet used to its full potential.[58] In the third and final part, we reflect on this discrepancy and its possible causes.

Methodological Implications

When looking at the user profiles that emerge from the literature review, we can clearly see that besides the 'traditional historian',[59] who uses Cinema Context primarily as an encyclopaedia, quite a few scholars can be qualified as 'digital explorers', who are interested in using Cinema Context to explore and answer more complex research questions yet may not be able to make sense of the data without the help of a statistician or programmer. A third type of user, who may be described as the 'digital native' and is equipped with sufficient computational expertise to build more complex queries and work directly with the raw data, does not really seem to exist yet among film history scholars working with Cinema Context.[60]

The limited usage of Cinema Context for more complex analyses can be explained by the nature of the database itself. Notwithstanding its comprehensive, national and longitudinal scope, the data in Cinema Context are far from complete and thus not fully representative of Dutch cinema culture. As Clara Pafort-Overduin pointed out, the database contains programming data of films screened before 1940 in cinemas in four larger cities: Amsterdam, Rotterdam, The Hague and Groningen. In order to generate a representative dataset for the popularity of Dutch films in the period 1934–1936, therefore, she created a dataset herself, with programming data of eighteen other smaller cities across the country.[61] Another element is a perceived lack of transparency of the origin of the data. Recognising Cinema Context's potential for quantitative analysis, Judith Thissen, Thunnis van Oort and André van der Velden warn that because the sources used for the data collection are 'rarely clearly mentioned', statistical operations on these data may give a wrong impression. They illustrate this with reference to the fact that the sharp increase in the number of cinemas in 1928, besides demonstrating an actual, explosive growth, may also be somewhat the result of a new, nationwide registration system for cinema permits.[62]

Quantitative analyses based on structured data involve methods and techniques with which not all film historians are familiar. Cinema historians see the advantages of these computational approaches, but they do not all possess the required knowledge and skills to adopt them, or do not have access to this expertise in collaborations with scholars from other domains. As a consequence, the use of structured databases such as Cinema Context, rather than capitalising on the opportunities of large-scale databases to test hypotheses by detecting correlations or causal relations between variables based on empirical evidence, often remains on an exploratory, descriptive level. An example is the 2009 study by Judith Thissen, Thunnis van Oort and André van der Velden on the relatively restricted cinema market in the Netherlands in the period 1910–1940, for which they compared the geographical spread of cinemas with maps of the religious orientation of the population across the country. Starting from the assumption that there must be a correlation between the location of cinemas and the religious orientation of the local

communities, the authors used Cinema Context to map and analyse the geographical spread of all cinemas in the period between 1910 and 1940, and manually compared this overview to maps of religious orientation in the period 1920–1930. On the basis of this exploratory research, they concluded that, contrary to what Karel Dibbets had previously stated, religious orientation of local and regional communities was one of the factors that influenced the acceptance of film and cinema.[63] In principle, this study aims to conduct research of the more complex type of analysis that Dibbets identified: to combine different datasets to detect and explain the relation between different variables in order to identify patterns. At the same time, since the comparison is conducted manually, these relations are established rather intuitively and are largely based on counting and ranking.

Notwithstanding the above-mentioned limitations of the database, Cinema Context does allow for the more comprehensive, empirically supported understanding of complex relations, providing insight, for instance, into the reasons for the relatively restrained Dutch cinema market. An example is the study by John Sedgwick, Clara Pafort-Overduin and Jaap Boter in which they used Cinema Context data in combination with other data to explain the restrained Dutch cinema market in the 1930s.[64] Analysing, among others, the market share of films censored by the Catholic Film Centre (KFC), using programming data from Cinema Context and Pafort-Overduin's own dataset in combination with Sedgwick's POPSTAT method for establishing the relative popularity of films, they conclude that 'it would appear that Dutch censorship legislation, not dissimilar to that which existed elsewhere in the developed world at the time, made little impact on the demand for films in the Netherlands' (with only about 5% of films submitted to the censorship not receiving release certificates).[65] Combining the programming data with censorship data and more macro-economic data on consumer expenditure on going to the cinema, and joining their expertise in film history, economic history and statistics, they are able to provide a thorough, empirically supported basis for explaining the restrained Dutch cinema market in terms of causes and effects. At the same time, such an approach requires much more statistical expertise than the average humanities scholar possesses, or can organise. It also introduces entirely new theoretical and methodological paradigms, for which new interpretative frameworks are needed. As Charles Acland and Eric Hoyt point out in *The Arclight Guidebook to Media History and the Digital Humanities*, 'It is not enough to develop technical processes and user interfaces to explore media history's data. What is equally important, if not more so, is to develop interpretive frameworks for analysing the results.'[66]

Besides getting acquainted with new methods and collaborating with experts from other disciplines, training, practice and technical support is needed for researchers to use the opportunities of structured databases for answering questions of the third, most complex type. Cinema Context partly meets this need by offering support via a 'frequently asked questions' section and tutorials focused on typical film historical research questions.[67] In addition, hands-on workshops offer opportunities for researchers to test and experiment the research affordances of the database, where they not only train and enhance their technical skills and knowledge, but can also apply it to their own research questions.[68] Furthermore, Cinema Context is increasingly used by information retrieval specialists and entrepreneurs in the

creative industries to design applications that demonstrate its wider public appeal, such as linking the Cinema Context data on Amsterdam to Wikipedia entries on the films, including the opportunity to view some of the films that were screened in the Amsterdam cinemas.[69] At the same time, there is still room to improve access to the data and to update the tutorials to further support 'digital explorers' in seizing the opportunities of the database for more large-scale types of research, which allow for the identification of patterns and causes that are not visible when surveying data manually.

Explicit remarks about the way Cinema Context should evolve in the future in order to improve as a research tool were sparse in the reviewed literature. In addition to the comments about a more extensive geographical coverage and more transparency regarding data provenance, beta testers of Cinema Context indicated that the database provides a good basis but should ideally be used in combination with other sources and data to allow for more complex analyses.[70] In their view, the database should inspire the creation of internationally comparative film history databases based on the same data model.

New Directions

The emergence of New Cinema History, with its focus on the location in which cinema distribution, exhibition and consumption takes place, entailed an increasing number of local case studies and related structured datasets. This first phase, which focused on microhistories of specific locations, has laid the foundations for a next phase, in which the various datasets are integrated and used for more large-scale, comparative approaches.[71] Given its relatively simple design, and allowing for the performance of various types of analyses (both qualitative and quantitative), Cinema Context could provide a model for collecting and organising the data required for international comparative research into cinema culture, either by expanding the dataset itself with similar data from other countries, or by facilitating the interoperability of different databases. Joseph Garncarz's publication *Wechselnde Vorlieben: Über die Filmpräferenzen der Europäer, 1896–1939* (2015) might be considered as an example of the kind of research that then would become possible. Partly also drawing on data from Cinema Context, *Wechselnde Vorlieben* is the most recent and most ambitious example of international comparative research, where data from different countries are compared within one research project – in this case, about changing film preferences in eight European countries.[72] Other recent initiatives, including the CINEMAPS research project, the European Cinema Audiences research project and the Cinema Ecosystem infrastructure project, which plan to adopt the Cinema Context data model for their own purposes, mirror this trend towards comparative research, where similar datasets are compared in order 'to understand larger trends, factors or conditions explaining differences and similarities in cinema cultures.'[73] Such larger trends in the data can only be made visible in research that employs more large-scale, quantitative methods. In turn, the patterns identified can then be interpreted with more focused, qualitative case studies.

The systematic collection of data for different countries to enable cross-national research is promising yet requires agreement on models and standards for data collection, and the need for sustainable storage and infrastructure is equally important. As we have addressed above,

the databases are prone to obsolescence due to ceased maintenance. Proper data storage and infrastructure along with editorial responsibility requires financial means and organisational infrastructure, which for Cinema Context is ensured by hosting it at a university library and by relocating editorial responsibility to an institutional research centre. Collaboration with other scholars in international networks and with research infrastructures such as DARIAH might further support the creation of interoperable, sustainable data repositories for film culture.[74]

A second trend is towards interdisciplinary research – comparing data on cinema with data on other creative and/or performative industries, such as theatre, music and publishing. While the mutual interdependence of different recreational sectors and the need for interdisciplinary approaches to cultural historical research has long been emphasised,[75] truly comparative research is still scarce, partly due to the incompatibility of data but also because of the tendency of scholars to stay within the boundaries of their own discipline.[76] In this context, it could actually be the emergence of a growing number of performing arts-related databases that drives scholars towards more interdisciplinary scholarship.[77]

Conclusion

The concurrence of the recent historiographical shift in cinema studies towards contextual approaches of film exhibition and consumption, and the digital turn in the humanities in general, is providing scholars with new research methods and tools. This has led to a fundamental change in the way data are collected, stored and made accessible, thereby enhancing opportunities for research of complex cultural-historical phenomena such as the exhibition and consumption of film and other forms of spectacular culture. Cinema Context was designed as a research instrument to meet the high standards of such research by facilitating investigations at different levels of complexity. However, as our investigation of the ways in which Cinema Context is used in film historical research has shown, the database's potential has yet to be fully exploited.

There are various reasons for the lack of uptake of Cinema Context's affordances among film scholars. The first one is historiographical. The quantifying nature of databases easily gives the impression of completeness of sources and data, which hides a more complex reality. As we have shown, in the case of Cinema Context, researchers often complement the data with external datasets, whether existing or self-created. This calls for transparency concerning the composition of the datasets. In order to allow for an adequate estimation of the 'completeness' of the data, the creators of such databases have to clearly explain how the data were collected and on which underlying principles of selection and presentation they are based.[78] In addition, on the side of the researcher, it requires critical awareness of the origins and composition of digital databases for media-historical research and the implications thereof for interpreting the findings.

Second, as suggested by our analysis of the usage of Cinema Context, researchers interested in the history of local film culture might lack the digital and statistical skills to engage with a database like Cinema Context in experimental research designs that allow identification of patterns that cannot be observed with qualitative methods. In the case of digital explorers who

are open to experimenting with advanced technologies but do not always know how, this calls for collaboration but also for individual support – for instance, in the form of frequently asked question pages, tutorials and workshops or teaching sessions, offering a space where tools and methods can be tested and enhanced.

Finally, there are also methodological-technical challenges regarding the creation of digital databases to meet the standards of new trends in research. Specifically, this concerns questions of integrating different datasets to allow for cross-national, cross-sectoral, and cross-temporal comparisons. In addition to developing clear methodological frameworks and harmonising data, this requires interdisciplinary collaboration and exchange of ideas on a regular basis, as well as safeguarding the interoperability of existing databases.

Besides serving as inspiration for the creation of new or similar models of digital databases for cinema historical research, Cinema Context can also serve as an example that helps to reflect on, and enhance, the ways in which complex cultural-historical phenomena can be translated into machine-readable information. By casting films, cinemas, associated persons and companies as the building blocks of film culture, Cinema Context makes it possible to study their relations as networks and to reconstruct changes and patterns in which films were circulated and consumed in the past. This and similar databases thus help us to think about the ways historical events and actions are encoded and subsequently made accessible, and how this impacts our interpretation of these events and actions and thus our understanding of larger media-historical processes.

Notes

1. An earlier version of this article was discussed in the Digital Cinema Studies workshop at KU Leuven, February 2016. The authors kindly thank the participants for their comments and suggestions.
2. See M. Ross, M. Grauer and B. Freisleben, ed., *Digital Tools in Media Studies: Analysis and Review, An Overview* (Berlin: Transcript, 2009); C. R. Acland and E. Hoyt, ed., *The Arclight Guidebook to Media History and the Digital Humanities* (Falmer: Reframe Books, 2016).
3. For the first category, see, for example, Y. Tsivian, "Cinemetrics, Part of the Humanities' Cyberinfrastructure," in *Digital Tools in Media Studies: Analysis and Review, An Overview*, ed. M. Ross, M. Grauer and B. Freisleben (Berlin: Transcript, 2009), 93–100, or V. Kropf, M. Zeppelzauer, S. Hahn and D. Mitrovic, "First Steps Towards Digital Formalism: The Vienna Vertov collection," in Ibid., 117–131. For the second, see, for example, J. Sedgwick, "Measuring Film Popularity," in Ibid., 43–54; J. Klenotic, "Putting Cinema History on the Map: Using GIS to Explore the Spatiality of Cinema," in *Explorations in New Cinema History: Approaches and Case Studies*, ed. R. Maltby, D. Biltereyst and P. Meers (Malden, Oxford: Wiley-Blackwell, 2011), 58–84, or C. G. Olesen, J. van Gorp, E. L. Masson, J. van Wees, N. Sondervan, G. Fossati and J. Noordegraaf, "Mapping Desmet: A Tool for Visualizing Early Film Distribution and Screening," published 2015, http://mapping-desmet.humanities.uva.nl/#/.
4. R. C. Allen and D. Gomery. *Film History: Theory and Practice* (New York: Knopf, 1985).
5. See R. Maltby, D. Biltereyst and P. Meers, ed., *Explorations in New Cinema History: Approaches and Case Studies* (Malden, Oxford: Wiley-Blackwell, 2011).
6. The term 'structured database' indicates that it stores discrete elements in separate tables, such as names (e.g. film titles, persons active in the industry, cinema theatres), dates (e.g. years in which cinemas opened and closed, specific film screenings), locations (e.g. addresses and/or geocodes of cinema theatres) and classifications (e.g. type of cinema, role of persons involved).
7. An example is Robert C. Allen's project 'Going to the Show' that uses a database of cinema locations in forty-five towns and cities in North Carolina between 1896 and 1922, in combination with structured data from other

archival sources, to identify the racial segregation of early North Carolina cinema culture. *Going to the Show*, accessed 19 July 2018, http://gtts.oasis.unc.edu/.

8. D. Verhoeven, "New Cinema History and the Computational Turn," in *WCCA 2012: "Beyond Art, Beyond Humanities, Beyond Technology : A New Creativity," World Congress of Communication and the Arts Conference Proceedings* (Guimarães, Portugal: OPEC – Science and Education Research Council, 2012), accessed 18 July 201, retrieved from http://dro.deakin.edu.au/view/DU:30044939.
9. J. Drucker. "Humanistic Theory and Digital Scholarship," in *Debates in the Digital Humanities*, ed. M. K. Gold (Minneapolis, MN: University of Minnesota Press, 2012), 85–95.
10. S. Ramsay and G. Rockwell, "Developing Things: Notes toward an Epistemology of Building in the Digital Humanities," in *Debates in the Digital Humanities*, ed. M. K. Gold (Minneapolis, MN: University of Minnesota Press, 2012), 75–84.
11. K. Dibbets, "Cinema Context and the Genes of Film History," *New Review of Film and Television Studies* 8, no. 3 (September 2010).
12. Cinema Context, last accessed 20 February 2018, http://www.cinemacontext.nl.
13. Dibbets, "Cinema Context and the Genes of Film History," 336.
14. J. Noordegraaf, "Computational Research in Media Studies: Methodological Implications," *KWALON* 21, no. 1 (2016), 55.
15. R. Maltby et al., *Explorations in New Cinema History*; C. Pafort-Overduin and T. van Oort, ed., "New Cinema History in de Lage Landen," themed issue of *Tijdschrift voor mediageschiedenis* 21, no. 1 (2018).
16. See, for example, Robert Allen and Douglas Gomery's seminal work from 1985, in which they call for a distinction of four approaches to film history: aesthetic, technological, social, and economic. Allen and Gomery, *Film History*. In parallel, there was a call for more text-based contextual approaches with the emergence of what has been labelled 'new film history'. See T. Elsaesser, "The New Film History," *Sight & Sound* (Autumn 1986), 246–251; J. Chapman, M. Glancy and S. Harper, ed., *The New Film History* (London: Palgrave, 2007).
17. E. Hoyt, K. Hughes and C. R. Acland, "A Guide to the Arclight Book," in *The Arclight Guidebook to Media History and the Digital Humanities*, ed. C. R. Acland and E. Hoyt (Falmer: Reframe Books, 2016), 1–29.
18. H. van Vliet, K. Dibbets and H. Gras, "Culture in Context," in *Digital Tools in Media Studies: Analysis and Review, An Overview*, ed. M. Ross, M. Grauer and B. Freisleben (Berlin: Transcript, 2009), 28–29.
19. Van Vliet, Dibbets and Gras, "Culture in Context".
20. Dibbets, "Cinema Context and the Genes of Film History," 333.
21. K. Dibbets, "Bioscoopketens in Nederland: Ekonomiese koncentratie en geografiese spreiding van een bedrijfstak, 1928–1977" (MA thesis, Universiteit van Amsterdam, 1980).
22. Until 1992, NBB membership was obligatory to operate a cinema. B. Hofstede, "In het wereldfilmstelsel. Identiteit en organisatie van de Nederlandse film sedert 1945" (PhD thesis, Erasmus Universiteit Rotterdam, 2000) Delft, Eburon, 147–148.
23. Based on this inventory, Dibbets created an online encyclopedia of all existing and closed cinemas in the Netherlands on his personal home page and gradually extended the dataset with data on films screened at these cinemas. Karel Dibbets home page, accessed 19 February 2018, https://kd.home.xs4all.nl/. With the official launch of Cinema Context, the link to the original encyclopedia was replaced by the link to the Cinema Context website.
24. Dibbets, "Cinema Context and the Genes of Film History," 334, 337.
25. Ibid., 336. In a relational database, the data are organised into different tables, where each table represents one entity (such as films, cinemas, persons, or companies) and the different tables are linked with each other via unique identifiers.
26. Ibid., 336. The link is made via the IMDb identification numbers for the film titles included in Cinema Context.
27. Cinema Context comprises: (a) data on almost all film screening venues that have existed in the Netherlands, including travelling cinemas, (b) data on all films that were submitted to the Netherlands Board of Film Censors from 1928 to 1960, and (c) film programming data for the major Dutch cities and Limburg from 1896 to 1940.
28. The exclusion of box office data or other data related to film demand is mainly due to a lack of sources. Dibbets, "Cinema Context and the genes of film history," 336. John Sedgwick and Michael Pokorny have constructed a proxy index of film popularity (the POPSTAT formula) to remedy the lack or deficiency of box office data. This index allows measuring of the relative revenue potential of each feature film that is programmed in a sample set of cinemas, by assigning a relative weight to each cinema according to its seating capacity and average ticket prices. See J. Sedgwick and M. Pokorny, "The Film Business in the United States and Britain during the 1930s," *Economic History Review* 58, no. 1 (2005), 79–112.

29. Dibbets, "Cinema Context and the Genes of Film History," 335.
30. I. Blom and W. Strauven, "Cinema in context: het einde van filmstudies?," *Tijdschrift voor mediageschiedenis* 9, no. 2 (2006), 4.
31. See, for example, R. C. Allen, "Getting to Going to the Show," *New Review of Film and Television Studies* 8, no. 3 (2010), 275, note 1; M. Vélez-Serna, "Film Distribution in Scotland Before 1918," (PhD thesis, University of Glasgow, 2012), 39; Verhoeven, "New Cinema History and the Computational Turn"; P. Ercole, D. Treveri Gennari and C. O'Rawe, "Mapping Cinema Memories: Emotional Geographies of Cinemagoing in Rome In the 1950s," *Memory Studies* 10, no. 1 (2017), 74, note 4.
32. For a recent attempt to provide an overview of projects and collections related to cinema history, see, for example, "Found online # 5 – Cinema Websites," L. McKernan, accessed 31 January 2018, http://lukemckernan.com/2017/11/18/found-online-5-cinema-websites. Furthermore, the website of the HoMER Network offers a dynamic overview of projects and/or databases related to the history of moviegoing, exhibition and reception: "HoMER projects", HoMER Network, accessed 31 January 2018, http://homernetwork.org/dhp-projects/homer-projects-2/#.
33. For details, see CAARP. Cinema and Audience Research Project, accessed 27 February 2018, http://caarp.edu.au/about.
34. See *London's Silent Cinemas*, accessed 27 February 2018, http://www.londonssilentcinemas.com/, and the *Early Cinema in Scotland Research Project*, accessed 26 February 2018, http://earlycinema.gla.ac.uk/. Although the latter does contain a list of films, these films did not necessarily screen at the cinemas, but represent films containing Scottish narratives and places.
35. *Cinematic Brno*, accessed 27 February 2018, www.phil.muni.cz/filmovebrno/?id=0&lang=1.
36. *Going to the Show*, accessed 26 February 2018, http://gtts.oasis.unc.edu/.
37. *Australian Cinemas Map*, accessed 27 February 2018, http://auscinemas.flinders.edu.au/.
38. *Kinomatics*, accessed 27 February 2018, http://kinomatics.com/. The dataset itself cannot be accessed freely online.
39. *ERMA: Mapping Movies*, accessed 27 February 2018, http://mappingmovies.unh.edu/maps.
40. *Siegener Kino-Datenbanken*, accessed 27 February 2018, http://fk615.221b.de/siegen/start/show/. Until very recently, the Siegen Database was accessible via the website of the Early German Cinema Database, which is (currently) not accessible online.
41. Another example that supports this trend towards the increased collaboration between scholars from different countries to jointly collect and make available data related to cinema distribution, exhibition and reception is the project European Cinema Audiences, involving partners from several European countries. See *European Cinema Audiences*, accessed 13 July 2018, https://europeancinemaaudiences.org.
42. J. Hallam and L. Roberts, *Locating the Moving Image: New Approaches to Film and Place* (Bloomington: University of Indiana Press, 2014). For more philosophical thoughts on the spatial turn in the social sciences and humanities in general see, for example, D. Massey, *For Space* (Los Angeles et al.: Sage, 2005).
43. DPC, "Statistics for: www.cinemacontext.nl," last accessed 16 February 2018, https://dpc.uba.uva.nl/awstats/awstats.pl?config=www.cinemacontext.nl (UvA user ID and password required).
44. For example, when comparing the results of AWStats with another, COUNTER compliant Web Statistics program for the University of Amsterdam's Digital Academic Repository DARE (see https://www.projectcounter.org/), the Digital Production Centre (DPC) found that the other program, while operating with the same list of blacklisted robots, was much more 'defensive' and counted only half the downloads that AWStats gave for the same repository. Oral communication to Julia Noordegraaf by Caspar Treijtel of the DPC, 8 March 2018.
45. For the purpose of this article, the statistics used have been collected in a file: J. J. Noordegraaf. Cinema Context web statistics 2011-2017.xlsx., figshare (2018), available from https://doi.org/10.6084/m9.figshare.5972146.v1.
46. In principle, AWStats ignores the visits by robots when analysing usage. The program identifies crawlers that download the robot.txt file, such as Google bot, Yahoo Slurp, BaiDuSpider and archive.org bot. However, since it is easy for bots to mask themselves, it is reasonable to assume that they are responsible for the 80% of visits that are extremely short, besides accidental hits, etcetera.
47. For example, of the key phrases used in search engines ten times or more in 2012, 17% concerned generic topics such as 'cinema context' and the others were all specific and highly diverse (for example: 'autobioscoop Landgraaf'; 'als de dauw hangt komt er regen film'; or 'herman bollongino').
48. Founded by an international group of cinema scholars in 2004, the History of Movie-going, Exhibition and Reception (HoMER) Network seeks to promote an understanding of the complex, international phenomena of

film going, exhibition, and reception by stimulating international collaboration between researchers and offering platforms to disseminate and publish results. See http://homernetwork.org, last accessed 14 March 2018.

49. The full list is provided in the file J. J. Noordegraaf. Overview of publications reporting use of Cinema Context. xlsx. figshare (2018). Dataset., available from https://figshare.com/s/01108710976962fd32f. The search in Google Scholar (<cinemacontext.nl>) also pointed to the referencing of Cinema Context in around 35 bachelor's and master's theses, mostly from the University of Utrecht. Although the extensive use of the database in this educational context is very interesting, it falls outside the scope of this study, which focuses on more advanced scholarly work.
50. M. A. Vélez-Serna, "Showmanship Skills and the Changing Role of the Exhibitor in 1910s Scotland," in *Performing New Media, 1890–1915,* ed. K. Askari, S. Curtis, F. Gray, L. Pelletier, T. Williams and J. Yumibe (Bloomington: Indiana University Press, 2015), 88.
51. F. de Goey, "Dutch Companies in the United States and American Companies in the Netherlands," in *Four Centuries of Dutch–American Relations: 1609–2009*, ed. H. Krabbendam, C.A. van Minnen and G. Scott-Smith (Albany: SUNY, 2009), 553, note 14.
52. As in C. Pafort-Overduin, "Hollandse films met een Hollands Hart: Nationale identiteit en de Jordaanfilms 1934–1936" (PhD thesis, Utrecht University, 2012) and L. Depauw, "The Monsters That Failed to Scare: The Atypical Reception of the 1930s Horror Films in Belgium," in *Hosting the Monster*, ed. H.L. Baumgartner and R. Davis (Amsterdam: Rodopi, 2008), 217–236.
53. J. Thissen, A. van der Velden and T. van Oort, "Over de eigenheid van de Nederlandse filmcultuur," *Leidschrift* 24, no. 3 (2009), 111–130.
54. F. de Jong, "Joodse ondernemers in het Nederlandse film- en bioscoopbedrijf tot 1940" (PhD thesis, Universiteit Utrecht, 2013).
55. A. van Beusekom, "Distributing, Programming and Recycling Asta Nielsen Films in the Netherlands, 1911–1920," in *Importing Asta Nielsen: The International Film Star in the Making 1910–1914*, ed. M. Loiperdinger and U. Jung (New Barnet: Libbey, 2013), 259–272.
56. J. Sedgwick and C. Pafort-Overduin, "Understanding Audience Behaviour Through Statistical Evidence: London and Amsterdam in the Mid-1930s," in *Audiences: Defining and Researching Screen Entertainment Reception*, ed. I. Christie (Amsterdam: Amsterdam University Press, 2012), 96–110; C. Pafort-Overduin, "Hollandse films met een Hollands Hart".
57. J. Boter and C. Pafort-Overduin, "Compartmentalisation and Its Influence on Film Distribution and Exhibition in the Netherlands, 1934–1936," in *Digital Tools in Media Studies: Analysis and Research, An Overview*, ed. M. Ross and M. Grauer (Bielefeld: transcript verlag, 2009), 55–68.
58. Dibbets, "Cinema Context and the Genes of Film History".
59. T. Weller, ed., *History in the Digital Age* (Routledge, 2013).
60. This is further supported by the contributions to the recent overview of digital humanities research in the field of media history by Acland and Hoyt, *The Arclight Guidebook*.
61. C. Pafort-Overduin, "Hollandse films met een Hollands Hart".
62. Thissen et al., "Over de eigenheid van de Nederlandse filmcultuur," 115. This is a more general problem in working with existing historical databases. It must be noted, however, that for most of the items in Cinema Context a source is mentioned under 'publications' on the result pages, and a more general description of the sources used is provided on the 'About' page.
63. Thissen et al., "Over de eigenheid van de Nederlandse filmcultuur," 115–116; compare K. Dibbets, "Het taboe van de Nederlandse filmcultuur: neutraal in een verzuild land," *Tijdschrift voor mediageschiedenis* 9, no. 2 (2006).
64. J. Sedgwick, C. Pafort-Overduin and J. Boter, "Explanations for the Restrained Development of the Dutch Cinema Market in the 1930s," *Enterprise & Society* 13, 3 (2012), 634–671.
65. Sedgwick et al., "Explanations for the Restrained Development," 656; for Sedgwick's POPSTAT method, see J. Sedgwick, "Cinemagoing in Portsmouth during the 1930s," *Cinema Journal* 46, no. 1 (2006), 52–85.
66. Acland and Hoyt, *The Arclight Guidebook*, 19.
67. Provided under 'Resources' in the 'How to Do' section of the website.
68. In October 2016, for example, a THATcamp workshop was organised in which researchers were invited to conduct a social network analysis based on data from Cinema Context for cinemas and exhibitors, and using Gephi as network analysis and visualisation software. "Proposal for a Teach session: Cinema Context workshop," last accessed 14 March 2018, http://amsterdam2016.thatcamp.org/2016/05/24/proposal-for-a-teach-session-cinema-context-workshop/.

69. H. Kranen, *Cinémadam*, accessed 14 March 2018, https://projects.haykranen.nl/cinemadam/#/. Another example is the dynamic map of active cinemas in Amsterdam between 1900 and 2006, based on the datasets in Cinema Context and created by Rosa Merino-Claros within the context of the CREATE project. "Active Cinemas in Amsterdam," last accessed 14 March 2018, http://rosa.humanities.uva.nl/dynamic_map.html.
70. F. de Jong, T. van Oort, C. Pafort-Overduin and A. van der Velden, "Cinema Context en onderzoek naar sociale netwerken binnen de filmgeschiedschrijving: een aanzet tot discussie," *Tijdschrift voor mediageschiedenis* 9, no. 2 (2006), 28–45.
71. See the special issue of *Alphaville* on Cinema Heritage in Europe: *Alphaville* 11 (2016), accessed 14 March 2018, http://www.alphavillejournal.com/Issue11.html.
72. Joseph Garncarz, *Wechselnde Vorlieben: Über die Filmpräferenzen der Europäer, 1896–1939* (Frankfurt am Main, Basel: Stroemfeld, 2015).
73. See Ercole et al., "Cinema Heritage in Europe," 7. For the resources themselves, see *CINEMAPS*, accessed 15 March 2018, http://www.create.humanities.uva.nl/results/cinemaps-a-data-driven-investigation-of-cinema-markets-in-the-netherlands-and-flanders-1950-1975/ (and see also J. Noordegraaf, J. Visser, J. Boter, D. Biltereyst, P. Meers and I. Kisjes, "(Not) Going to the Movies: A Geospatial Analysis of Cinema Markets in The Netherlands and Flanders (1950–1970)," in *Digital Humanities 2017: Conference Abstracts* [Montréal: McGill University/Université de Montréal, 2017], 545–547, https://dh2017.adho.org/program/abstracts/); *European Cinema Audiences*, accessed 14 March 2018, https://europeancinemaaudiences.org/; *Cinema Ecosystem*, accessed 14 March 2018, https://www.ugent.be/ps/communicatiewetenschappen/cims/en/research/cinema-ecosystem.htm.
74. DARIAH is a pan-European infrastructure for arts and humanities scholars working with computational methods that supports digital research as well as the teaching of digital research methods. *DARIAH*, accessed 15 March 2018, https://www.dariah.eu/.
75. For example, by Van Vliet et al., "Culture in Context".
76. L. Engelen, L. van de Vijver and R. vande Winkel, "Spektakelcultuur in de Lage Landen: naar een geïntegreerde en interdisciplinaire benadering," in *Tijdschrift voor mediageschiedenis* 20, no. 2 (2017), 1–2.
77. An example of such a data-driven initiative is the symposium European Performing Arts Dataverse, organised by the CREATE research programme at the University of Amsterdam on 9 November 2017, which aimed to bring together scholars working with structured data in order to explore the opportunities for exchange and collaboration in interdisciplinary research. "Symposium: European Performing Arts Dataverse," accessed 15 March 2018, http://www.create.humanities.uva.nl/events/epad-symposium/. See also the home page of the Belgian scientific research community on Spectacular Culture, accessed on 15 March 2018, https://www.ugent.be/lw/kunstwetenschappen/spam/en/research/spektakelcultuur.htm.
78. For Cinema Context, the editors are currently preparing a data publication explaining the origin and choices made regarding the collection, organisation and presentation of the data for the *Research Data Journal for the Humanities and Social Sciences*.

Biographies

Julia Noordegraaf is professor of digital heritage in the Department of Media Studies at the University of Amsterdam, and she is also director of the Amsterdam Centre for Cultural Heritage and Identity (ACHI). Her research focuses on the preservation and reuse of audiovisual and digital heritage. She is editor-in-chief of the Cinema Context database and acts as board member for Media Studies in CLARIAH. Noordegraaf also leads research projects on the conservation of digital art (in the Horizon 2020 Marie Curie ITN project NACCA) and on the reuse of digital heritage in data-driven historical research (in the eHumanities project CREATE and the Amsterdam data science project Perspectives on Data Quality).

Kathleen Lotze has been involved in media-related research projects at different universities in Germany, Belgium, and the Netherlands since 1999, including Cinema Context (University of Amsterdam), Enlightened City (University of Antwerp), CREATE: Creative Amsterdam – An E-Humanities Perspective (University of Amsterdam) and CLARIAH-project MIMEHIST (University of Amsterdam). Currently, she works for the international comparative research project European Cinema Audiences (Oxford Brookes University) that explores local film cultures in seven mid-sized European cities in the post-war period. For her PhD project

Antwerp Cinema City, she focuses on changes in film exhibition and experiences of cinemagoing in Antwerp between 1945 and 1995. Results of her work have been presented at international conferences and have been published in several peer-reviewed journals and books.

Jaap Boter studied Musicology (MA) at Utrecht University. Continuing as a lecturer in Arts Marketing (Film and Television Studies Department), he later switched to the Marketing Department of the Vrije Universiteit Amsterdam to complete his PhD in Marketing on the analysis of large-scale transaction data of cultural organisations. While GIS originally was simply included to map the customers in the data, his enthusiasm for the potential of GIS techniques in mapping big data became an important foundation of his research. Alongside his current work within the Marketing Department of the VU University Amsterdam, Jaap Boter also holds the Royal Booksellers Association chair at the University of Amsterdam; a field in which, again, his interest in culture, business economics, and location all come together.