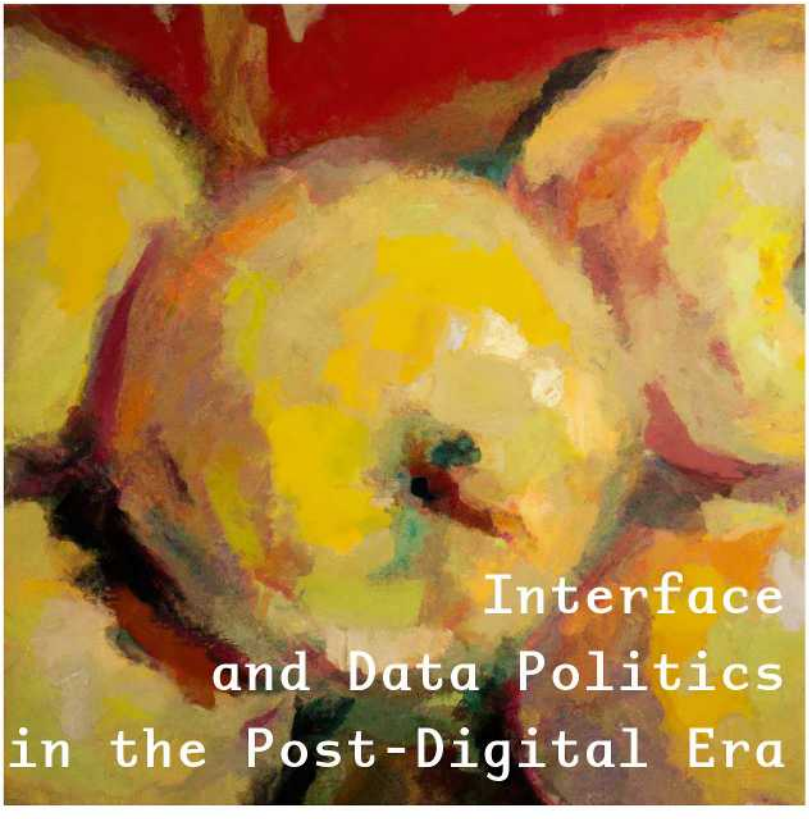

Critical Digital
Art History


Interface
and Data Politics
in the Post-Digital Era


Edited by
Amanda Wasielewski
& Anna Näslund

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Preface

This anthology has its origins in early 2020 when we first proposed a panel for the 2021 Association for Art History annual conference titled, 'Critical Digital Art History: Interface and Data Politics in Exhibitions, Museums, and Collections'. We held a double panel at the 2021 conference, which was over Zoom due to the pandemic. The contents of this book, therefore, grew out of and expanded the contributions to this panel. After the conference, as the project developed, we decided to include several invited contributing authors alongside our panel members.

Digital Art History has often aligned itself with the practical concerns of digital technology and the responsibilities of art institutions and associated institutional roles such as collection managers, information specialists, curators, and conservators. This emphasis on practicalities and implementation, while undeniably important, has often meant that there is little room for critical examination of the broader implications of digital technology and computational methodologies in art history. Our panel – and this resultant book – seeks to address the dearth of critical reflection by approaching the use of digital technology in art history from a theoretical perspective and critically assessing specific case study examples. This book also considers the political dimensions associated with the large-scale digitization and the application of digital tools within museums and collection management.

Since 2020, the field of Digital Art History has evolved and changed quite a bit but many of the core concerns remain the same. One of the long-standing concerns of the field – and also a major focal point of this book – is museum and collecting practices in the digital era. While there is a certain degree of continuity in the field, there are some important shifts and changes too. One of the key changes is the widespread uptake of artificial intelligence tools and an increased attention to both the broader historical and societal aspects of the use of digital repositories and tools. We have, thus, tried to reflect these intervening changes in the contents of this book. Finally, we would like to express our gratitude for the funding from the Swedish Research Council (grants VR 2018-06057 and VR 2018-01068), which have made the production and publication of this book possible.

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Critical Digital Art History: An Introduction

Amanda Wasielewski and Anna Näslund

A decade ago, Johanna Drucker asked, 'Is there a "digital" art history?' (2013). Since that time, the body of scholarly work published within the field of Digital Art History (DAH) has continued to grow. This scholarship has been concerned with both defining the field and producing scholarly work in accordance with the tools or principles laid out in those definitions. As an offshoot of the Digital Humanities, DAH has typically been defined as the use of computational tools and methods for the study of art history and visual culture and/or the digitization, sorting, dissemination, and experience of art and visual culture within digital collections and institutional settings (Baca and Helmreich 2013; Klinke and Surkemper 2015; Bishop 2018; Brown 2020). However, despite the growth and consolidation of DAH as a field, Drucker's question remains unresolved. Scholars continue to debate what the term 'digital' means in the context of art history.[1]

The primary aim of this anthology is not to once again renew the debate over whether there *is* a DAH nor even define *what* it is. Instead, we seek to reframe the questions around the relationship between art history/visual culture and the digital, asking, '*Where* is the digital in art history?' and '*How* is it (or can it be) digital?' In addressing these questions, new possibilities for DAH as a field of critical inquiry begin to emerge.

Digital culture has left an expansive imprint on art history, visual culture, and the cultural heritage institutions that collect, preserve, and exhibit the material we study. In other words, digital tools and methods cannot be separated from our experience of and academic interest in art and visual culture. There are complex personal, societal, and political relationships that contribute to our understanding of any given artwork or artefact – both in the present and at the time the work was created. A contemporary reading of an artwork will often be mediated through a variety of physical and virtual framing devices. We may first encounter a medieval altarpiece, for example, in a museum collection. This work will likely

have been removed from a church, i.e. its context in devotional practice, to appear in a modern gallery setting. In studying this work, we may compare it with similar works in other institutional collections that we can find through online image collections. Searches for these works might be based on visual similarity or metadata describing its motif, artist, or historical milieu. Digital reproductions may then be collected together, be collaged, or share virtual space in personal or public databases. Secondary and primary sources that analyse or describe these works may have been digitized and are thus accessible by searching text or keywords in different libraries or academic databases. In this way, research in art history operates simultaneously in different registers of interpretation and subjectivity, as part of digital practices of representation, sorting, and collecting. Contemporary research on a work, such as this hypothetical altarpiece, is thus a manifestation of complex dynamics: power, identity, diversity, and participation.

Critical methodologies can help elucidate the network of social and political forces at play in our contemporary understanding of art history, which is inextricably wedded to digital tools. Characterizing the traditional point of view of the art historian, Rosalind Krauss writes:

> The art historian thinks with the mind of a scholastic. Typologies. Recensions. The world seen through old men's eyes, looking with that fixedly backward stare that intends to find ladders of precedent, ladders by means of which to climb, slowly, painfully, into the experience of the present. Into a present that will already have been stabilized by already having been predicted.
>
> (1993: 35)

In formulating this introduction looking to both the past and the future, we are not attempting to build the ladders Krauss describes. Instead, we see this as a critical inquiry into what constitutes or what *can* constitute the digital in art history. What larger field comes into play when we think beyond methodological debates and trace the digital through a broader purview for the art historian's work? How can we reframe the territory of this field? Ultimately, the influence and incursion of the digital into art history is a question of evolution not revolution. Or, perhaps, it is useful to think of it in computational terms as a reconstitution or reframing of art history in the form of a network, not a ladder.

Towards a critical DAH

What is today known as critical theory or inquiry is grounded in Marxist and anti-fascist writing, and its roots can be found in the Frankfurt School of social

analysis in the 1930s. Critique of this kind is often confused with criticism (generically defined) as a counter-argument or negative assessment. However, this volume seeks to harness the former meaning of critique and, in so doing, position research in DAH as historically and theoretically situated.

Alongside Marxism and anti-fascism, methodological perspectives such as psychoanalytic theory, structuralism, post-structuralism, theories of race and gender identity, and postcolonial theory are all now part of the critical theory toolbox (Bryson 1988; Tyson 1999; Harris 2007). These perspectives have become the dominant methods of art history over the last 60-plus years. Despite this, critical theory has rarely been applied in DAH. In recent years, however, a movement has been growing among digital humanists more generally to integrate critical theory perspectives with quantitative studies (Risam and Baker Josephs 2021; Prince and Messina 2022). This evolution somehow mirrors the progression of methodologies in art history in the middle of the twentieth century, from issues of taxonomy to critical inquiry.

Methodological transitions do not happen without conflict and gate-keeping, however. Critical theory is, as noted, explicitly political and has thus been the subject of controversy and debate over the years. Opponents of these methods have argued that humanists who engage with them are peddling ideology from a position of authority in knowledge production (Wasielewski 2023: 11–16). In a data-driven field like DAH, where objectivity has been held up as an ideal, the integration of critical theory requires a leap in methodological imagination (Rosa and Suárez 2015; Manovich 2020: 17; Langner, Böttger, and Zeckey 2021). An appeal for critical theory in DAH thus moves the field back away from simple empiricism into a more hybrid territory.

Debates around the value of humanistic study, particularly when compared to the methods and research findings of the natural sciences, are far from new. These debates have been going on so long, in fact, that Frankfurt School theorist Max Horkheimer's statement on the subject from 1937 could easily have been written today: 'In recent periods of contemporary society the so-called human studies (*Geisteswissenschaften*) have had but a fluctuating market value and must try to imitate the more prosperous natural sciences whose practical value is beyond question' (1972: 191). One of the areas where contemporary observers have seen humanists 'try to imitate' the natural sciences is in the rise of quantitative research methods in the humanities.

Many digital humanities researchers, in a rush to embrace new tools, initially promoted quantitative methods as a way to *improve* research on humanistic subjects. Early Digital Humanities proponents saw within these methods a way to achieve scientific rigour and objectivity. In other words, Digital Humanities, for some, promised to banish the pesky issue of subjectivity from hindering the

quest for truth in humanistic research. However, the opponents of this perspective were swift in their critique (Allington, Brouillette, and Golumbia 2016; Bishop 2018; Da 2019). Most self-described digital humanists today are not prepared to dismiss humanistic methods in whole or in part nor are they – for the most part – still making claims regarding the objectivity of quantitative research in the humanities. Digital Humanities and DAH alongside it have matured considerably in a short time and now regularly address bias in both data and method, combining quantitative methods with humanistic self-criticality (Azar, Cox, and Impett 2021; Greenwald 2021; Prokop et al. 2021).

In the context of this book, then, what does *Critical* DAH mean? There are a number of scholars who have sought to define a subfield of Digital Humanities called Critical Digital Humanities (Risam and Baker Josephs 2021; Berry 2022; Prince and Messina 2022). James E. Dobson, approaching this topic from a text and literature perspective, sees the role of critical theory within Digital Humanities as a basis for methodological interrogation:

> By bringing the resources of critical theory to bear on computational methods, we can construct an array of compelling and possible humanistic interpretations […] the ideological biases informing many commonly used algorithms, the complications of a historicist text mining practice, the examination of feature selection for sentiment analysis, and the critique of the fantasies of human-subject-less analysis activated by machine learning and artificial intelligence.
>
> (2019: 2)

Dobson then stakes out a clear position against the primacy of positivism in digital humanities research (p. 3). This is a position we have also taken in previous research on the use of computational methods and digital platforms in art history (Näslund Dahlgren and Wasielewski 2021b). In approaching the relationship between critical inquiry and DAH, however, we propose that the term critical contains more within it than methodological critique. Nancy Fraser, quoting Karl Marx from 1843, defines critical theory as the 'self-clarification of the struggles and wishes of the age' (1985: 97). The struggles and wishes of our age are, undeniably, wrapped up in computational systems. A critical perspective, as Dobson alludes to, is thus one that is committed in the Adornoian sense (Adorno 1974). Like art, academic research and its methods are not autonomous; they are situated in a moment. In some sense, to be critical is to be contemporary.

Critical theory, then, has a two-fold role in relation to DAH. First of all, as Dobson suggests, it allows us to look inward and be methodologically self-critical. It can help us uncover and understand the epistemology at work our discipline. Second, it looks outward, not to assumed universals but as a way to reflect the

'struggles and wishes of the age' from a particular subjective perspective. Critical inquiry explores and exposes the concerns of a contemporary, situated moment without naturalizing them. There are no settled questions or problems solved. As Fraser writes, 'A critical social theory frames its research program and its conceptual framework with an eye to the aims and activities of those oppositional social movements with which it has a partisan though not uncritical identification' (1985: 97). Critical DAH can therefore be defined as a DAH that includes all aspects of digitization and digitalization in relation to art, artists, and the art field and does not shy away from or try to hide its subjectivity, historicity, or contemporaneity (Frenzel et al. 2021).

Post-DAH

At present, both digitized resources and digital tools are embedded in the everyday research practices of art historians. Back in 2013, Drucker downplayed the importance of the quotidian uses of digital technology and seemed to yearn for a readily apparent seismic shift: 'To date no research breakthrough has made the field of art history feel its fundamental approaches, tenets of belief, or methods are altered by digital work' (5). Although changes to the discipline are still underway, it is clear that the study of art history has, in fact, been fundamentally altered by the digital era. That is to say, both digital tools and artefacts are pervasively used (Fisher and Swartz 2014; Hatchwell, Insh, and Leaper 2019).

The term 'post-digital' has been circulating, along with its sister term 'post-internet', since the mid-2000s (Debatty 2008; Ahn 2014; Cramer 2015). There are two main ways to understand the 'post' prefix in this context. The first sees 'post' as a signal that something is over, in this case the historical moment known as 'the digital age'. Taking this line of argument, Florian Cramer posits that the term can 'describe either a contemporary disenchantment with digital information systems and media gadgets or a period in which our fascination with these systems and gadgets has become historical' (2015: 13). Cramer also cites the vogue for using obsolete technology such as typewriters from about the mid-2000s to mid-2010s as an indication of a nostalgic or romanticist turn towards pre-digital tools. The second way of understanding this prefix 'post' in relation to the digital era, however, is as a continuation – 'after' but not 'over'. Thus, post-digital signals a time after the widespread uptake of digital technology that has not ended but rather spread into all facets of life. It is omnipresent but increasingly invisible, found even in what seems to be the non-digital or strictly material world (Paul 2020: 2.03–2.04). Long after the first incursion of digital tools into our society, this idea of the post-digital points to a situation where the digital has become

naturalized, i.e. part of daily life to such an extent that it is inseparable from it. For the purposes of this introduction, we understand post-digital in this second way.

Digital technology has wormed its way into every facet of the day-to-day work of art historians, including those who do not think of what they do as 'digital' art history. From the research to the writing phase, we have used digital software and hardware to produce this text. From our desks, we have consulted digitized books and articles in the field, used software to capture and automatically generate references, a word processer to produce the text and review changes, and email/video conferencing to communicate with each other, our publisher, and the other authors of the volume. However, we also regularly use digital tools to collect, compare, and look at our objects of study. Digital photographic reproductions are very often used in lieu of or as a supplement to studying objects firsthand and digital collections of images and artwork are essential tools for organizing and searching for material. In other words, all the trappings of the digital era – personal computers, mobile phones/apps, the internet, and large corpora of data online – are so commonplace today that they appear natural and, even, invisible to us. The vast majority of art historians are querying and organizing research material from large databases every single day.

One reason why we might not think of our day-to-day art historical business as 'digital' is that the transition from analogue to digital tools has been gradual. The personal computer is a converging medium that includes the functionalities of the analogue type writer, the light box for slides, and the xerox-copies of images and texts – tools that have a long history in the discipline (Drucker 2013: 5; Kamposiori, Mahony, and Warwick 2019). This might also be why the digitization of art historical resources, that is, digital photographic reproductions of art and other objects, are often not thought of as part of the field of DAH. Photographic reproductions have been used in the discipline of Art History for over one hundred years. At the turn of the twentieth century, Heinrich Wölfflin introduced the use of parallel slide projectors in art history lectures, which allowed for comparison between two or more artworks using photographic reproductions. Objects and places, which were spatially distant, could thus be easily compared and analysed using this method. The same basic idea permeates today's digitization efforts, where the goal is to create extensive collections of digital photographic reproductions that can then be formally compared across space and time.

From a historiographic perspective, the development and debate around DAH has followed a similar trajectory to that of Visual Studies in the 1990s (Wasielewski 2021). In both cases, the labels have been a way to brand a new branch of study in relation to the discipline of Art History, creating an implicit (or explicit) critique and paving the way for new scholarly publication outlets, academic departments, centres, and positions. Yet, the work that has appeared under the umbrella of DAH

has thus far not included a comprehensive cross-section of the field of art historical research at large the way that Visual Studies did. Rather, it has been limited to certain types of art, methodologies, and theoretical perspectives.

Surveying research in the field of DAH over the last decade, we can see a particular focus on ordering and analysing two-dimensional artworks like paintings/drawings/illustrations (Saleh and Elgammal 2016; Elgammal, Kang, and Leeuw 2018; Bartosch et al. 2020; Bönisch 2020; Cranston 2020; Wang, Kandemir, and Li 2020), western canonical high art (Saleh and Elgammal 2016; Elgammal, Kang, and Leeuw 2018; Reshetnikov, Marinescu, and Lopez 2022), museum collections (Ballard 2019; Drucker 2019; Westerby and Keegan 2019; Bönisch 2020; Bareither et al. 2021; Rother, Koss, and Mariani 2022), older time periods such as ancient/pre-modern/early modern (Stork 2006; Bell, Schlecht, and Ommer 2013; Yarlagadda et al. 2013; Saleh and Elgammal 2016; Brosens et al. 2019; Bruzelius and Vitolo 2019; Cardinali 2019; Assonitis 2020; Lee et al. 2020; Langner, Böttger, and Zeckey 2021; Whiteman 2021; Cohen 2022), and formalist or connoisseurial methods (Brandhorst 2013; Hristova 2016; Klinke 2016; Ellis and Johnson 2019; Langmead et al. 2021).

The question is: why do these patterns exist in the field? There are certainly exceptions to be found and, overall, these patterns could be said to align with traditional methods and domains in the study of western art history. However, we argue that there is also a technical rationale for these inclinations, which can be understood in relation to four key computational paradigms: the dataset as a collection or construct of digital material, the format of digitized material, the dependence on metadata for describing and ordering this material, and automated processes (such as artificial intelligence) for processing and sorting it.

Dataset (collection)

To be useful or workable, datasets need to be numerically defined and consist of a delimited number of items. The oeuvre of a single, named artist or the collection held in a particular museum therefore neatly fits within the established epistemological framework of the database. In other words, these types of collections contain discrete datapoints organized in relation to one another, are relatively delimited, and are suited to western conventions regarding divisions of media. Conversely, collections of visual culture material – pictures in magazines, daily press, posters, images produced and circulated as fashion, advertising, book illustrations, and amateur photography – do not typically have a clear logic in how they are collected, at least compared to the more highly valued artworks in museum collections (Dahlgren 2018). Put differently, the materials found in the broader

purview of visual culture may lack clear and delimited bodies of data and organizational paradigms regarding classification, from both a user point of view and the point of view of metadata (i.e. clear, unambiguous data regarding the originator, content, year of production). This kind of metadata is routinely collected and preserved by museums, archives for artwork but is less defined in relation to other visual cultural materials. In sum, the use of existing digital tools makes the most sense when organizing discrete works of art and well-defined collections of objects.

Etymologically speaking, the word 'digital' refers to a state that is discrete, discontinuous, and singular, i.e. the individual fingers on a hand. The singular art objects found in much of western visual art from the early modern period to the mid-twentieth century can thus be thought of – in a metaphorical rather than a material sense – as digital. Each work is a discrete quantum. For example, an oil painting by Rembrandt Harmenszoon van Rijn is a self-contained material object with clear boundaries that can be quantified. By contrast, postmodern, contemporary, and digitally born art may *not* be digital in this metaphorical sense, i.e. not discrete. Such art could be described as continuous, integrated into life, culture, and other forms of expression (Steinberg 1972). Generally speaking, such art does not always have a clear, fixed boundary. Instead, it amorphously intersects with its context. This conception of art objects as discrete (digital) or non-discrete may go some way towards explaining why older western art seems to more readily lend itself to digitization and therefore computational analysis. Each can easily be conceptualized as a quantum of art.

Format (digitization)

For many of the tools used in DAH, recognition or classification of visual content is the aim. This is unsurprising given that many of the commonly used image analysis techniques have their origin in object detection for surveillance and warfare applications (Zou et al. 2019 and the special issue on surveillance in *Photographies*, vol. 7, issue 1, 2014). Object recognition elides the representative media in favour of what it depicts, and photographic reproductions are at the core of digitization efforts. To comply with existent digital tools and applications, therefore, art has to be easily 'photographized', i.e. easily captured in a still photograph. When the intent is to see 'what's in' the work, its photographized form is ignored.

Indirectly this demonstrates why there are lacunas in DAH scholarship in relation to the art field at large. For example, both non-figurative and non-visual art are less compatible with the tools and methods of the field since these tools were not developed with these types of works in mind. For example, conceptual art may consist of not only visual elements but also written instructions or text elements.

Art that includes or depends on scale and three-dimensional space, like sculpture and installations, may not be well represented by two-dimensional images. Likewise, performances, happening, relational art, and video art are time-based and may be dispersed in space, and their experiential qualities may not be adequately captured by still images or even a series of images/videos. Additionally, the wide range of diverse practices in non-western or indigenous contexts often does not neatly fall into traditional western media categories or otherwise might not be based around external visual representation, as is common in western art from the Renaissance to Modernism. The photographability of an artwork is thus a crucial factor in determining whether digital visual analysis techniques can be applied to the work.

Metadata (description)

A third core component for computational methods, particularly those methods involving the processing of large corpora of material is metadata, i.e. data about data. Metadata is the vital yet often invisible or unnoticed conceptual framework that facilitates the functioning of large databases. Metadata builds links and relationships between each discrete entry in a database that would otherwise remain unconnected or discontinuous. There are several types of metadata that serve different user needs. Of most relevance in this context is so-called descriptive metadata, which allow users to find and understand a particular resource. Examples of descriptive metadata include the name of the originator or artist, pictorial content, techniques/materials, or year of production (Riley 2017: 10). This type of information has long been part of art historical research, in the pre-digital form of the catalogue raisonné or online via the public interfaces of art museums' digital collections.

In the process of digitizing art collections, it is essential to have professionally produced descriptive metadata that is both extensive and correct (Näslund Dahlgren 2022). However, the amount and quality of metadata are often unevenly distributed. As shown in one of our previous studies, a highly valued oil painting by a known artist is more likely to be furnished with extensive metadata than a graphic print by an unknown artist (Näslund Dahlgren and Wasielewski 2021a). Thus, it appears that the existence and volume of metadata are tied to economic value, based on both material characteristics and originator. Additionally, metadata is not always produced by professional information managers employed within museums, galleries, and archives. Art and cultural heritage institutions also amass metadata through different types of crowdsourcing and social media platforms. The amount and quality of metadata that is produced both in-house and via crowdsourcing

differ significantly. This creates problems with interoperability due to inconsistent labelling practices, particularly when social media platforms like Flickr are used for crowdsourcing. There are also different standards and inconsistencies between metadata producers in different heritage institutions (Näslund Dahlgren and Hansson 2020; Hansson and Näslund Dahlgren 2022; Petersson and Dahlgren 2022).

In sum, the centrality of metadata favours the highly valued, well-monitored, and meticulously described art objects in museum collections before the more mundane parts of visual heritage. This means that single, figurative artworks can be compiled into relatively consistent and well-defined datasets. In turn, such datasets are more useful to DAH studies, given the relative wealth of professionally produced metadata they contain. In this way, the 'rich' art objects, which are often canonical paintings, are favoured in quantitative studies of art.

Automation (artificial intelligence)

The final key component that helps explain the slant towards particular kinds of artworks in DAH is the influence of automated visual analysis via artificial intelligence techniques. As argued in the book *Computational Formalism*, computer vision researchers have been using art datasets in their experiments over the past decade to devise ways to automatically categorize artworks, typically based on learnings from style or artist labels (Wasielewski 2023). This type of categorization equates a particular label as essentially defined by the visual qualities of a single, digital representation of an artwork. In turn, digital humanities scholars working with art objects have picked up on these automatic image analysis techniques in their studies, which has created a renewed emphasis on the formal qualities of artworks and the identification of 'objects' as a core concern (Manovich 2012, 2015; Bender 2015; Hristova 2016). The effect of this turn towards automated visual analysis is that artworks that are understood in the context of style or a single, named artist tend to be western paintings held in museum collections with an established style based on their place in the canon of art.

Style is a highly contested concept in art history, not an essential quality of a work of art (Alpers 1987). In creating systems of categorization, art historians still find style categories useful but use them with the knowledge that they are subjective and relative labels. By essentializing style through automation, this conceptual nuance is lost. In a similar vein, a single artist's style is assumed to be consistent throughout their career, so the artworks that lend themselves to such studies are those in which the artist has remained relatively consistent rather than, as is more common, changed and evolved over the course of time. Especially in the modern period, artists may have produced work in a variety of vastly different styles over

their careers. This means that less canonical works from a single artists' oeuvre are also de-emphasized through the process of automated image analysis.

The digital art world and DAH

The above may help elucidate why there is a historic lack of research on born-digital art within the field of DAH. Like the types of artwork detailed above, digital art often does not fit the model of a singular, discrete work that is easily photographized and slotted in as a database entry. Even though born-digital art may not require the translation to representative media that other artworks do, that does not mean that it is suited to an image database composed of and designed for still photographs and accompanying metadata. The divide between digital art and DAH is even more surprising, given that both fields have gone through similar processes of self-definition and reckoning with the relationship between art, digital tools, and the wider world.

In the 2003 book *Digital Art*, Christiane Paul distinguishes between art that *uses* digital tools versus art that *is* digital in the sense that the digital is its primary medium (p. 8). It is a distinction that resonates with Drucker's bid to distinguish between the creation and use of digitized material and the digital as an essential quality (via the tools used) of the form digital humanities research takes. All digital tools affect the end product or format of academic research, but the aforementioned advanced computational methods are the only tools typically seen as *essentially* digital. As Paul explains with regard to digital art, however, it is very difficult to separate out work that is essentially digital when digital tools have sucked in, combined, and continued the evolution of other media such as video, photography, sculpture, and illustration (2003: 27). This is also true of DAH research. While, for instance, digital humanities visualizations of the sort Drucker describes might be 'new', they are part of a longer history of illustration and chart-making in knowledge production that predates digital computing (2020). Separating the 'boring' evolutionary digital products from the revolutionary ones is thus a fraught endeavour.

The debate over whether the digital is evolutionary or revolutionary for the field of art history seems to be following the same path that the debate over digital art took twenty years ago. Digital art historians would do well to learn from these past debates, but there often seems to be a lack of interest or awareness of the theory around digital art within the field of DAH today.[2] These two subfields thus operate as separate research areas that do not often professionally intersect, although they share many core concerns such as an interest in automation, generation, and visual thinking and an interest in understanding and conceptualizing the relationship between digital culture and art.

Digital art, as Paul's book seeks to clarify, was defined in the 1990s as artwork that takes the digital as its primary medium (a difficult boundary to determine, as noted). In the last two decades, however, it has gone from difficult to nearly impossible to separate digital from non-digital art. The analogue/digital divide may soon be a think of the past. In 2007, Oliver Grau decried the lack of integration of digital art into the mainstream of the contemporary art world and the academic field of art history (p. 3). The ensuing years, however, have done much to change this (Vierkant 2010; Cornell and Droitcour 2013; Kholeif 2014; Cornell and Halter 2015). Even contemporary painting is so deeply embedded in digital culture that it can be hard to make a claim for its exclusion from the category of the digital (Sanchez 2013; Robinson 2014; Fraser and Rothman 2017). We can learn from this and extrapolate that, in fact, all art historical research tools and objects of study will be increasingly inseparable from the digital culture we live in.

This inseparability is not only due to the quotidian uses of digital technology highlighted above. The influence of digital culture on art production will have a direct impact on the nature of art historians' work going forward. The more intwined in digital culture art becomes, the more art historians must engage with digital technology in their analysis. This could, perhaps, make a term like DAH obsolete the way that the term digital art increasingly is today. Digital technology has touched every aspect of artistic practice over the last twenty years. Creative tools in the field of artificial intelligence such as generative adversarial networks (GANs) and text-to-image tools like DALL-E, Midjourney, and Stable Diffusion are allowing artists to implement generative models for both purely screen-based projects and material/physical applications (Zylinska 2020; Audry 2021). Another large field of inquiry that to date has not been included under the label DAH is those scholars who study the preservation and curation of digitally born art (Grau 2017; Dekker 2018; Grau, Hoth, and Wandl-Vogt 2019).

In addition to this, artists regularly engage with the complex ways digital technology impacts society on a conceptual level. As Paul explains:

> Digital art did not develop in an art-historical vacuum either, but has strong connections to previous art movement, among them Dada, Fluxus, and conceptual art. The importance of these movements for digital art resides in their emphasis on formal instructions and in their focus on concept, event, and audience participation, as opposed to unified material objects.
>
> (2003: 11)

Indeed, the engagement of many contemporary artists – such as, for example, Trevor Paglen or Hito Steyerl – with digital culture does not come down to simply the tools they use or the form the work takes but the way they cultivate a critically

engaged artistic practice. Such practices grew in dominance from the 1960s onward and owe much to the influence of critical theory in art writing. In order to understand contemporary art and integrate artistic practice from the last sixty years into the field of DAH, therefore, a knowledge of and use of critical methods is essential. Just as digital art owes its development to the full range of artistic developments that precede it, so does DAH.

Digital technology has touched not only every aspect of artistic practice over the last twenty years but also every aspect of the art world. As the production of art has been transformed by digitalization, so has the selling, display, and consumption of art. In the era of social media and smartphones, platformization has radically altered the workings of the art market – i.e. how galleries, museums, and individual artists display and sell art. Museums and galleries often present their exhibitions or collections through online platforms, databases, mobile apps, or virtual tours, courting a new type of 'digital' visitor in addition to in-person visitors (see for example Wasielewski (2022) and several of the contributions to this anthology). Artists also now engage with and present their work in ways that deviate from traditional modes of display, i.e. commercial galleries or the 'open studio tradition': they have websites or a presence on social media where they either present themselves and their work or do work in/on the platform itself. These new modes of display and creation, in turn, affect the kind of work being produced (Sanchez 2013). Artists also now use digital technology to sell their work (even if it is not created using digital tools). For example, blockchain technology facilitates the sale of artwork as non-fungible tokens (NFTs), which allows artists to cut galleries and dealers out of the equation.

These cross-disciplinary changes open up the possibility that DAH can be a more expansive and inclusive field. This book is a gambit towards a wider idea of what DAH can be. Rather than limiting this field further, we propose a DAH with a higher degree of hybridity and wider purview. The contributions to this volume are, thus, a demonstration of the myriad ways we can understand the post-digital in art history scholarship.

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NOTES

1. Debates regarding the place of digital methods in art history have been the source of constant discussion over the last ten years as evidenced by articles published in the *International Journal for Digital Art History* since 2015 and, among others, the following

special issues and publications: Baca and Helmreich 2013, Bentkowska-Kafel 2015, Baca, Helmreich and Gill 2019, Jaskot 2019, Brown 2020.

2. There have been some instances where the history of digital art has been integrated into the domain of Digital Art History, notably a special issue of the *International Journal for Digital Art History* (2020).

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2

Source, Surrogate, Store, and Search: Significant Sites in Post-Digitized Art History

Nina Lager Vestberg

Introduction

Online art collections have had a major impact on art historians' basic work of looking at and looking for imagery. Leaving aside the possibilities for computational research methods, as developed under the umbrella of Digital Art History, all scholars and students in the discipline today operate within the parameters of what I call a post-digitized art history, where search engines and digital repositories form the primary tools of research as well as learning. Whether it is 'done' online or off-line, art-historical scholarship takes place at four key sites: the *source*, the *surrogate*, the *store*, and the *search*. The premise of this essay is that the everyday work of art history has been and still is structured around these significant sites, whether it is performed in pre- or post-digitized environments of study and research. My purpose in writing it is partly to urge fellow scholars of visual culture to increase their attention towards the consequences of digitization, both for teaching and research, and partly to demonstrate what the effect of such attention might look like when written up as methodological reflection by a 'digitally aware' (Milligan 2022: 8) art historian. To this end, I outline a framework for analysis based on the four sites at which art historians do their work of looking for and looking at images. This framework shares some characteristics with Gillian Rose's (2023) 'four sites of a critical visual methodology'. Where Rose is concerned with mapping the sites 'at which the meanings of an image are made' (Rose 2023: 47), however, my aim is to account for the sites at which the makers of meanings encounter the images. I argue that applying the framework, in teaching as well as research, will improve the discipline's ability to reflect both on the methodological

legacies that form part of art history's history and on the methodological consequences of contemporary digitized research practices.

The practical aim of this essay is to show how the four significant sites can be useful as methodological tools both at the stage of data collection or sampling and at the stage of contextual analysis. For instance, when you select where to look for materials – say, in museum collections, art books, online platforms, or a combination of all three – you are choosing the (secondary or tertiary) sources from which you will derive your primary objects of study. And as we shall see, choosing where to look will to a great extent determine what you find. Since it is impossible to consult every potential source (even, or perhaps rather especially, in the era of post-digitization), the sources that you do end up working from will also function as surrogates of a sort: they are representative of the totality of sources that could theoretically have been explored. Then comes the question of gaining access to the sites where your sources are stored. Store-related considerations at this stage involve deciding whether to limit your research to open-access online repositories and public museums with free entry, or to sign up and pay for subscription-only databases and negotiate admittance to private collections. Finally, there are decisions to make about how to search your sources and surrogates, in their respective places of storage, both in order to find what you are looking for and – perhaps most importantly – to make some new and unexpected discoveries.

In this chapter, I demonstrate how the framework might be applied vis-à-vis three digital platforms: the non-profit subscription service Artstor; the open-access 'public art history' resource Smarthistory, and the self-styled free 'media file repository' Wikimedia Commons. One reason for choosing these platforms as sources of the present inquiry is that they are all widely consulted by both researchers and students of art history. Another is that they exemplify different ways of working with art-historical sources, which vary in accordance with the intended purposes and target audiences that each platform has been designed to serve. Rather than to account for the full range of affordances that each platform offers, I seek to identify and acknowledge the different material conditions under which they enable access to the sites of source, surrogate, store, and search.

Following on from this introduction, the first part of the essay locates its argument within a wider debate on (art)historical methodologies and the extent to which these deserve new or different forms of attention after the adoption of digital technologies for searching, finding, viewing, and reading. The second part defines and exemplifies the four significant sites of the analytical framework that is the essay's main contribution. The third part demonstrates the application of this framework in a brief analysis of the different results returned, from each of the three digital platforms mentioned above, in response to a simple, yet typical art-historical search term. In the concluding part, I suggest four principles for a

critical methodology that should be applied when assessing the results of art-historical research, regardless of whether it has been carried out online or off-line.

Methods, materialities, and digitization

In 2013, Johanna Drucker published an influential essay on the relationship between art history and digital technology where she drew a distinction between 'digital' and 'digitized' art history (Drucker 2013: 7). The former term was reserved for art-historical research that makes use of computational tools of analysis, while the latter described the condition in which most art historians in the 2010s were encountering their research objects: as digitized reproductions in online repositories. The same distinction has been drawn in the discipline of history, where Lara Putnam (Putnam 2016) and Ian Milligan (Milligan 2022) have both noted how scholars who would never identify with the computation-driven research agendas of 'Digital History' nevertheless rely entirely on digitized resources in order to produce their research. 'We now take for granted having access to images in digital form', observed Drucker, to the extent that the 'infrastructure' of digitization had become 'naturalized' on a par with 'indoor plumbing and electric light' (Drucker 2013: 7). This state of naturalization is what I call *post-digitization*, a behavioural pattern in which internet users of all kinds – including humanities scholars who should know better – act as if everything they might possibly want to see, read, or hear will surely be available online (Vestberg 2023: 164). In Milligan's words, 'the sheer amount of digitized materials' that is available at our literal fingertips 'obscures the reality that not everything is digitized' (Milligan 2022: 18). Another way of putting this would be to say that the post-digitized condition rests on a fallacy or, perhaps more precisely, a disavowal: we know that far from everything has been digitized, but nevertheless we behave as if it has.

This state of disavowal about the methods and materialities of historical research is not unique to the era of post-digitization, however. At an early stage of the so-called archival turn that took hold across the humanities during the 1990s, literary scholar Alice Yaeger Kaplan observed how 'conventional academic discourse requires that when you write up the results of your archival work, you tell a story about *what* you found, but not about how you found it' (Kaplan 1990: 103). In a similar vein, art-historical discourse has tended to require that you tell a story about the artworks you have studied, without boring readers with the mundane minutiae of how exactly you studied them. When writing about paintings, sculptures, or installations, for instance, the convention is simply to refer to the current location of the original, e.g. 'Leonardo, *Mona Lisa* (Paris: Louvre)'. When reproductions are published, the sources of the photographs provided to

the publishers are usually credited in the caption (e.g. Leonardo, *Mona Lisa*, Paris: Louvre. Photo: Bridgeman Images). It is rare, however, for art-historical publications to cite the reference for the reproduction(s) that the authors have been using for the purposes of developing their argument, even though these may have been produced at different times, in different media, by different photographers than the ones which appear alongside their analyses in the published version.

This does not mean the role of reproductions in art history has been purposefully ignored. Art history's reliance on photographic reproductions has been recognized by generations of scholars (Caraffa 2009, 2011). Long before Donald Preziosi famously quipped that 'art history as we know it today is the child of photography' (Preziosi 1989: 72), and Heinrich Dilly asserted that the real source materials of art history were photographic reproductions (Dilly 1975: 153), André Malraux had observed that the history of art is 'the history of that which can be photographed' (Malraux 1946: 32). Like so many of the ways of knowing in the humanities, however, the methodological significance of these working objects has largely remained below the 'attention threshold' (Gretton 2005: 371). In the early 2000s, Tom Gretton identified a perceived indifference among art historians toward 'the material method of production' of the very journals in which they publish their research, and suggested that this lack of interest was due to a prevalent conception that the practicalities of illustrated journal printing were 'insignificant, a mystery not worth demystifying' (Gretton 2005: 371). I suspect that many art historians feel something similar vis-à-vis the material methods of producing and maintaining the array of digital platforms that enable us to conduct, present, and publish our research in the 2020s.

The material operations of internet protocols, signal processing, search engine optimization, data compression, and all the other 'stuff of bits' (Dourish 2017) may occasionally mystify us (especially when they draw attention to themselves by breaking down or functioning in unexpected ways), but they are not our puzzles to solve. Nevertheless, digitization's 'stealth attack on systems of production' (Drucker 2013: 7) does offer opportunities to re-consider art-historical methodologies, both in the past and in the present, and to develop improved methodologies that will sustain scholarship in the future.

In recent years, information scholars have coined the word 'paradata' to denote the 'contextual documentation of processes relating to data creation' (Huvila 2022: 31), which is another way of describing what Kaplan called the story about 'how you found it'. In a survey of this discourse, Isto Huvila (2022) has noted that scholarly awareness of paradata, both as data to be produced and as data to be used and re-used by other scholars, is key to fostering understanding of how scholarship is practised and how knowledge is produced within as well as across disciplines. This essay does not engage that term explicitly to describe how art-historical

knowledge and scholarship is produced. As the next section will demonstrate, however, the categories of source, surrogate, store, and search would be a good place to start if compiling a structured set of paradata that aims to account for where and how art-historical scholarship takes place.

The four significant sites

Art historians work with two main types of *sources*: artworks and various kinds of documents pertaining to those works. Long before digitization, researchers were routinely consulting such sources through *surrogates*. As Lotte Philipsen (this volume) puts it: 'Art historians very often study something other than works of art themselves'. Substitutions for original artworks might take the shape of graphic, photographic, or photomechanical reproductions, while archival documentation might be found in edited volumes of correspondence, inventories, or catalogues. Some collections of original artworks have been more frequently and assiduously studied than others, and these have often been more likely to be documented in surrogate forms as well.

Consider the study of Italian Renaissance art as a typical example. The churches, houses, and museums in Florence have been inundated with art historians ever since the discipline was established in the 1800s. Scholars have travelled to Florence to study works by the great Italian masters up close and to consult local archives for original documentation of their origins, meanings, and significance. Yet much actual study of Renaissance art in Florence has been carried out in places such as the Photothek of the Kunsthistorisches Institut (KHI), or the Fototeca Berenson at Villa I Tatti in Settignano, just outside the same city. Both of these institutions hold thousands and thousands of photographic reproductions and detailed views of the very artworks that are in principle on view in the original just around the corner. Even in the proximity of unique, original artworks, in other words, art-historical scholarship has for practical reasons relied on surrogacy.

In the pre-digital era, such surrogacy took the form of engraved reproductions, photographic reproductions, and/or photomechanical prints of original artworks. Among these surrogates, photographic reproductions have enjoyed a primacy as authoritative representations of the originals. As working objects for art historians, photographs have served two particular and related purposes. At the individual level, they have enabled the comparative study of singular artworks that it would be impossible to consult alongside each other in real life. At the level of large-scale collections, meanwhile, the sheer volume of reproductions has afforded students and scholars of art the opportunity to immerse themselves sufficiently in imagery to develop the expert eye, or 'trained judgement' that still form part of 'the scientific

self' within art history (Wasielewski 2023: 27, citing Daston and Galison 2007: 314). For the development and practice of connoisseurship – a skill that straddles the otherwise distinct fields of academic art history and commercial art trade – the study of photographic reproductions has been at least as important as access to the original artworks depicted in them.

The digitized photograph reproduced as Figure 2.1 shows one example of what this way of studying art history looked like in practice. Dated 1939, it depicts three students of art history at Skidmore College in New York State, seated around a table with a pile of mounted photographic and possibly other graphic reproductions in front of them. The caption, which informs us that the photograph has been taken in the 'Art Reading Room', suggests that the reproductions are being studied close to, if not quite inside, their place of storage. In this respect, the photograph

FIGURE 2.1: Hathorn Studio – Art Reading Room – students seated at a table studying mounted reproductions of art, including Manet's *Olympia*, 6 March 1939, George S. Bolster Photograph Collection. Photo: Department of Special Collections. Skidmore College, via JSTOR.

also illustrates that, while the primary *stores* of artworks have traditionally been art museums and private art collections, the work of studying and researching art has for the most part relied on stores of a secondary kind, manifested as photo archives, slide libraries, or printed illustrations in catalogues.

Important institutions for the study of art have amassed significant photographic collections to facilitate the studies of their staff and students. The previously mentioned Kunsthistorisches Institut in Florence is renowned for its Phototek; the The Courtauld Institute of Art in London for its twin libraries, the Witt and the Conway (one dedicated to reproductions of paintings and the other to architecture, sculpture, and drawings); the Metropolitan Museum of Art in New York for its Photograph Reference Collection; and the Frick Collection in Pittsburgh for the Photoarchive of its Art Reference Library. For the best part of the twentieth century, such institutional collections drew researchers from a geographically widespread constituency. Since the turn of the twenty-first century, however, they have been supplemented – and in many senses replaced – by a tertiary form of store: the online repositories created chiefly by digitizing the photographic reproductions assembled in the existing secondary stores. Some of these stores, such as the V&A Museum or Metropolitan Museum websites, function like digital equivalents or avatars of their host museums, located in London and New York, respectively. Others, including the three repositories discussed in this chapter, have more in common with the erstwhile picture libraries or slide collections assembled by teaching institutions, in that they gather reproductions of artworks from a wide range of museums, collectors, and public spaces dispersed across the globe.

In the pre-digital era, *searching* for works of art across both primary repositories and secondary stores required certain skills and resources that in the post-digitized era have been either supplemented or supplanted by others. The work of looking *for* artworks was done either by visual browsing – trawling through published books or printed catalogues from exhibitions and auctions, as well as the directly accessible stacks of reference or study collections such as the New York Public Library Picture Collection (Kamin 2017, 2023) or The Warburg Institute Photographic Collection (Vestberg 2013) – or by keyword-based search through the card catalogues and indexes by which institutions ordered their holdings of visual materials. Searching in this way usually required some form of physical displacement, whether a brief walk to the departmental library or slide collection, or travelling further afield to national or international reference collections. Depending on the character of the store in which the search was carried out, the work of looking *at* artworks, once located, could then take place within the library or collection where the item was held or, as in the case circulating of collections like the NYPL, it could be carried out at home, in the office, or in some other workspace of one's own.

Today, both specialist researchers and members of the public may consult vast numbers of surrogate artworks in the comfort of their homes or offices, thanks to the proliferation of digital platforms that enable seemingly direct access to the virtual stores of public and private collections across the globe. Looking through these stores of surrogates still relies on a combination of browsing and targeted, keyword-aided search, the performance of which has now been automated by means of algorithmic 'engines'. Platforms such as Artstor, Smarthistory, and Wikimedia Commons thus represent the convergence of three out of the four significant sites in one single interface. The brief case study that follows shows how the affordances of each of these platforms in different ways determine their usefulness for studying the same art-historical object. In the process, it also illustrates how researchers seeking access to online collections in the post-digitized era may be at the mercy of institutional funding allocations, no less than those requiring travel to physical stores of surrogates in the pre-digital era.

Three platforms and one search term

In this section, I describe a comparative exercise conducted across three digital platforms, which were chosen for their varying degree of specialization. The first is a specialist subscription service aimed at institutions of higher education. The second is a public and open-access resource mainly aimed at textbook-weary students and a general audience with an interest in art and its histories. And the third platform is a wiki, which is to say a website where users and visitors can publish, edit, and modify content directly. Inspired by the calls for contextualization articulated both by Kaplan in the 1990s and in the paradata discourse of recent years, I tell the story of how my research on these platforms unfolded, including the pragmatic decisions and adjustments to my process that were made along the way. This is a deliberate move, made in order to exemplify a practical enactment of the principles that will be outlined in the conclusion to this essay.

When I conceived of this comparative case study, Artstor was an obvious place to start, because it had been originally created with two discipline-specific aims: first, to provide 'specialized digital collections derived, frequently via direct digital capture, from primary sources', and second, 'to be the digital equivalent of a large academic slide library' (Marmor 2003: 64). Within five years of its official launch in 2004, this platform was being hailed as 'an essential service to colleges, universities, and other educational institutions navigating the transition from physical to virtual image resources' (Schroeder 2009: 549), which above all relieved numerous institutions from the financial and administrative burden of digitizing their own local collections. In short, Artstor provided a virtualized experience of

traditional art-historical research and study. On the one hand, it focused on the close examination and careful documentation of artefacts and, on the other, it maintained the transmission and appreciation of an established canon of artworks.

If Artstor positioned itself as part digitized research collection and part digitized study collection, Smarthistory – which launched its first website in 2008 – offered virtualized excursions to important sites and museums, as well as digital approximations of textbook chapters on key themes in the study of art history at upper secondary and undergraduate level. A digitally born initiative, which began as a series of audio recordings, the platform was rapidly recognized by web and tech communities for its potentially 'large impact on teaching, learning, or creative inquiry on college and university campuses' ('A Smarthistory timeline', 2016) and for 'hav[ing] brought art history to life through audio, video, and still imagery paired with witty text' (Taylor 2010). In the 2020s, the Smarthistory website functions as the platform's main user interface; however, this runs alongside a dedicated channel on videohosting platform YouTube (@smarthistoryvideos), which has been operational since 2009, and a photo archive that since the beginning has been hosted on the photo-sharing platform Flickr, under the username of co-founder Steven Zucker (profzucker). The organization also maintains an active presence across social media platforms such as Facebook and Instagram, where it promotes and cross-posts content available through its website, YouTube channel, and Flickr account. Working with charities and authorities to create curricula certified by exam boards in the United States and the United Kingdom, Smarthistory has also on a regular basis secured funding awards to develop both its content and infrastructure, from organizations including The Andrew W. Mellon Foundation and The Samuel H. Kress Foundation ('A Smarthistory timeline' 2016). In other words, Smarthistory has managed to straddle the worlds of web platforms, education, and arts funding highly successfully.

Even though they were created under very different conditions and for different purposes, Artstor and Smarthistory are both made by art historians for art historians, in the sense that they capitalize (at least metaphorically) on expertise developed and collections amassed through traditional institutions of the discipline. By contrast, Wikimedia Commons is entirely a child of the internet. Its stated aim is to 'provide a media file repository that makes available public domain and freely licensed educational media content to all, and that acts as a common repository for the various projects of the Wikimedia Foundation', where 'the expression "educational" is to be understood according to its broad meaning of "*providing knowledge; instructional or informative*"' ('Commons:Project scope – Wikimedia Commons', 2021). This means in practice that the platform functions as an online repository for reproductions of artworks and photographic representations of monuments, museums, and other sites of art-historical interest. What Wikimedia

Commons provides thus overlaps to some extent with Artstor's remit as a virtualized slide library and with Smarthistory's additional service of virtual excursions.

Having decided upon these three sources as representative of three kinds of online platform catering to the requirements of art historians, I ran into an obstacle when it turned out that my institution does not have a subscription to Artstor and so I could not obtain access to that platform. A solution to this problem could have been to use private funds to buy an individual subscription. As this will not be a realistic option for most students or academics without extensive privilege, however, I decided instead to make use of a workaround by accessing this resource through the JSTOR platform, to which I do have institutional access, and to which Artstor is in any case in the process of migrating its content ('The new Artstor experience on JSTOR' n.d.). For the purposes of this study then, I decided that JSTOR would work as a surrogate for Artstor, since both platforms require subscriptions. Unlike subscriptions to Artstor, however, JSTOR access is available at low or no cost to independent researchers unaffiliated to an institution.

This lack of exclusivity does in turn have consequences for the way Artstor on JSTOR functions as a store. As its acronym indicates, when JSTOR was first launched in 1997 it was designed as an online platform for 'journal storage', which emerged more or less simultaneously with Adobe's PDF technology and the first graphical web browsers (Gitelman 2014: 73). It soon became an almost indispensable resource for academics, especially in the humanities, who need to master 'the literature' of their discipline not only as it appears in the most recently published research but also in its historical contexts. In recent years, however, it has expanded its remit beyond journal articles to encompass 'books, images, and primary sources' (JSTOR 2023). The digitized images stored by JSTOR are chiefly derived from the picture collections of university libraries and other teaching or research institutions. In addition, subscribers to the platform can now search content across both JSTOR and Artstor collections; however, they can only access files from those parts of Artstor's collections that have been designated as open access.

The impact that such restrictions have on the usefulness of any given online platform as a source of material for study and research became clear when the contents of all three 'stores' were sampled by means of an exploratory search. For this comparative exercise, I decided to search for one work of art across all three platforms. I chose the painting *Olympia* (1863, Paris: Musée d'Orsay) by Édouard Manet for three pragmatic reasons. First, it is a well-known work that is definitely in the public domain; second, it has been widely used as a textbook case in art history both before and after the discipline was 'digitized'; and third, I used to teach an undergraduate seminar on this painting, in the early 2000s, with the aid of just one slide projector and the resources of the departmental slide

library. This meant I had a reasonable idea of the kinds of images that were used to contextualize this painting in the pre-digitized era, and would thus be able to assess to what extent the digitized offerings replicated, differed, or expanded that iconographic context.

Again for reasons of straight comparison I settled on the search term combination 'manet olympia', where the addition of the artist's name would help identify files pertaining to the painting, as distinct from files representing any number of other things in the world (ranging from an ancient site in Greece via a make of typwriter to a stadium in Berlin) that bear the name Olympia. After entering these search terms in the query field of each platform, JSTOR returned 16 hits, Smarthistory 9 items, and Wikimedia Commons 19,250 results. There would have been a further 47 images available on JSTOR if my subscription had included Artstor; among those images unaccessible behind the paywall were the digitized reproductions of the original Manet painting. Instead of providing a digitized surrogate of this 'source' painting, JSTOR mainly offered reproductions of reproductions, in the form of photographed and/or digitized engravings of the painting. The results returned also included the digitized photograph reproduced in Figure 2.1, where a mounted reproduction of an engraving of *Olympia* can be identified among the pictures spread out on the undergraduates' table. Clicking on any of these images to view it further revealed what might be termed tangential search results, in the form of two strips of thumbnails running at the bottom of the screen, one pointing to 'related images' (mainly the same as on the search results page) and the other to 'related text', which in the context of JSTOR means scholarly journal articles on the topic of Manet's *Olympia* held in its online repository.

In keeping with the digital-textbook format of Smarthistory, its search results all pointed to texts where Manet's Olympia was mentioned, rather than to visual reproductions of it. The top hit was the platform's main article on *Olympia*, which contained four digital photographs of the painting, produced on site at the Musée d'Orsay by Steven Zucker and furnished with hyperlinks to the photographer's photostream on Flickr, where the photographs may be downloaded and used via Creative Commons licence. This article was further accompanied by reproductions of other pictures – including classical nudes and contemporary caricatures – that are traditionally discussed in connection with Manet's work, as well as a video in the form of a narrated slideshow incorporating the same illustrations.

On Wikimedia Commons, the first page of search results numbered about 140 slightly larger-than-thumbnail images, sorted according to the default relevance setting. Out of these, the top 23 images appeared from a cursory scan to be either reproductions of the entire painting or details from it. About 35 thumbnails referred to reproductions of engravings or drawings, including caricatures, of Manet's painting, while the remaining 80-odd images on the first results page

were either copies of varying quality, drawings or paintings vaguely referencing the work, or completely unrelated images of cars, typewriters, or ancient ruins that happen to contain the word 'Olympia' in their file names. (Incidentally, adding a filter to the search results on Wikimedia Commons, such as 'quality image' or 'valued image' under the Community Assessments menu, throws Manet's Olympia off the first results page entirely, with the top spot taken by a colour photo of a 1930s Olympia Simplex typewriter and a 1950s Opel Olympia car, respectively.) In addition to the default search result page of 'images', Wikmedia Commons also returns separate results for 'audio', 'video', 'other media', and 'categories and pages' that may be accessed by clicking on the relevant tabs. While my search returned no audio or video files pertaining to Manet's Olympia, the two latter tabs provided access to other media files, in the form of pdfs of books and other printed materials on Manet, and links to various categories and pages related to the painting or the artist in the greater Wikimedia Commons system, such as Musée d'Orsay gallery page and a 'file talk' comment from a contributor about the colour balance in an image file harvested from The Google Art Project (Coat of Many Colours 2014).

The above descriptions of search results, obtained from the three different platforms in response to the same search terms, reveal that the affordances of each platform privilege the four signficant sites in unequal measure. Depending on what you are trying to find out about a given topic, each of them will invite or discourage different lines of inquiry. In the case of Manet's *Olympia*, the open-access Artstor resources on JSTOR would be of little use for studying the visual characteristics of the painting itself, since it offers no surrogate views of the original artefact as it hangs on the wall in the Musée d'Orsay. It would, however, be useful for studying contemporary reproductions of the painting in the form of engravings, as well as for identifying previous research on the painting due to the incorporation of suggestions from the JSTOR journal repository. Smarthistory would be a better place to access high-quality reproductions of the painting in its current condition, including detailed views of visual elements that have received a substantial amount of attention by scholars. Due to its virtualized textbook-and-slide lecture format, Smarthistory also helps contextualize *Olympia* within the visual culture of its own time and place by providing examples of other artworks that belong to the reception history of the painting. Wikimedia Commons, by contrast, offers access both to high-resolution photographs of the painting similar to those provided by Smarthistory and to the kind of related material that is openly available on JSTOR. It has a greater number of both these kinds of surrogates than the other two platforms, but in a sense that is all it has. Unlike Smarthistory and the Artstor-JSTOR constellation (but like so many resources on the web that are co-opted for research and teaching purposes), Wikimedia Commons has been shaped by knowledge

communities far removed from the humanities in general, and from art history in particular. That is why, paradoxically, art historians searching for digital sources or surrogates stored in this media file repository must be prepared to exercise the traditional disciplinary skills of connoisseurship and 'a good eye' (Rose 2023: 118) to a much greater extent than those who limit their queries to the pre-curated collections of Artstor and Smarthistory.

Based on what the small experiment of searching for Manet's *Olympia* has revealed about the three platforms, we can use the framework of the four significant sites to summarize the affordances that each of them offers students and researchers in art history, and thus to determine what kind of research activities they might be best able to support. Taking the painting as it hangs in the Musée d'Orsay as the primary source in this instance, we can ask how the different platforms enable some forms of research to be undertaken about this painting, and others not. We can also ask to what extent each platform draws attention to a particular aspect of the research process that remains hidden or transparent in the others.

The difficulties I reported about gaining access to the full Artstor collection meant that the experience of researching Manet's *Olympia* through this platform first and foremost foregrounded questions of uneven access to stores, whether of surrogates or sources. It may function as a digital equivalent of an academic slide library for institutions that can afford the subscription, but for students, teachers, and researchers who are not affiliated to such an institution its content remains as inaccessible as it would have been if the slides were still housed on site at the University of California at San Diego (whose slides formed the core corpus of the first digitized collection).

Consulting Smarthistory for reproductions of *Olympia*, on the other hand, mobilized the site of the surrogate in more ways than expected. Far beyond the digital photographs of the painting, captured directly from the wall of the museum, the surrounding context of the entire platform is replete with surrogates. The text that appears on the page dedicated to Olympia may be a straight remediation (Bolter and Grusin 1999) of a similar entry in an illustrated art history textbook, however, the narrated video that appears at the top of the page is a veritable hat-trick of surrogates, replacing at one and the same time the textbook, the slide lecture, and the excursion.

Finally, looking for *Olympia* on Wikimedia Commons was perhaps the most typically post-digitized experience in the sense that it involved a simple search on a mainstream website on the assumption that such a painting would of course be available on the internet in good-quality digital reproduction. The overwhelming number of search results for my query, and the order in which they appeared on my screen in accordance with the default 'relevance' filter, highlighted the search as the site that first and foremost connects the other three by pointing the researcher

in the direction of both sources, surrogates, and their respective stores. As I have already hinted, the sheer eclecticism of search results – not just the fact that they included thousands of completely irrelevant items, but also that they included variations of Olympia surrogates of highly varying and distinctly murky provenance – also pointed up how arbitrary the process of post-digitized research can be.[1]

This brief exploration of three digital platforms through one combination of search terms can be read as a meta-representation of post-digitized scholarship, in that I am presenting my research of search results as the results of my research. It could however also be considered as a surrogate for an as-yet-unrealized research project, which would apply a range of methodologies to survey a greater number of platforms and thus uncover many more ways in which digitization undoubtedly affects the sites of art-historical scholarship. In the meantime, students and researchers may begin building up their own store of stories about how they do their work and make their findings. The gathering and structuring of such a corpus of art-historical paradata could in turn be usefully guided by the principles presented in the conclusion to this essay.

Applying the framework

Back in 1990, Kaplan observed that 'the less the seams of your findings show, the better your discoveries lend themselves to use by others' (Kaplan 1990: 103). Revealing those seams, she further suggested, risks compromising the credibility of the research, 'by showing on what thin strands of coincidence, accident, or on what unfair forms of friendship, ownership, geographical proximity, the discoveries were based' (Kaplan 1990: 4). Coincidence, accident, and unfair distribution of access continue to shape the discoveries we make, whether they are carried out online or off-line. Rather than pretend otherwise, we should acknowledge how they do so (as I have done in this essay) and develop methodological frameworks that allow us to account for their effects. In conclusion, therefore, I propose four principles for a critical methodology of post-digitized art history, articulated below as a set of questions based on the four significant sites of art-historical inquiry that I have outlined in this essay:

1. What are your sources and in which media were they originally produced? (e.g. unique oil painting; site-specific marble sculpture; popular lithographic print; backlit projection photograph; digitally-generated image, etc.)
2. What surrogates are you working from and how far removed are they from your sources? (e.g. a monochrome photographic print from a reference collection; a colour reproduction in a coffee-table book; a digital photograph of an artwork

that you have produced yourself; a digitized slide from a museum collection; a screenshot from a website of digitized photographic reproductions, etc.)

3. What kind of stores are your sources and surrogates located in, and how have you gained access to them? (e.g. artwork is in a specific museum but surrogate is from Wikimedia Commons; artwork is destroyed but surrogate has been consulted on Artstor; artwork is not on display but surrogate is available on the museum website; artwork is in private collection but surrogate is private photograph provided directly by owner, etc.)
4. Which search tools or techniques are you using to locate your sources and surrogates, and to what extent are they internal or external to the stores in which you have found those sources and surrogates? (e.g. keywords on Google Images; keywords in Warburg Iconographic Database; online collection browsing on Artstor; physical collection browsing on-site in a museum, etc.)

Ideally, all digitally aware art historians should be able to answer these questions in relation to their own work, and they should be transparent about the answers when publishing the results of their research. Just as importantly, however, researchers should be prepared to pose the same questions when reading, citing, and critiquing art-historical scholarship produced by others, whether under pre- or post-digitized conditions. In the case of earlier publications, this is likely to entail a closer reading of paratextual elements such as acknowledgements, prefaces, footnotes, captions, and picture credits, than has otherwise been customary in the discipline. As for research yet to come, the questions above can be adopted for use in the contexts of teaching, research training, and peer review. Applying this framework systematically across all three areas will help foster greater reflexivity about the conditions and processes of art-historical scholarship. It will also encourage more critical self-awareness about the role of these conditions and processes in determining what the field recognizes as research results.

NOTE

1. For another example of search result arbitrariness, see Anna Näslund's discussion of Flickr Commons in this volume.

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3

Global Digital Museum Narratives: Representation, Authorship, and Audiences

Maribel Hidalgo Urbaneja

Digital media and online channels have redefined the ways in which communications is defined and how stories are told among us. The unique circumstances of the COVID-19 pandemic, characterized by social distancing, have accelerated the adoption of various digital communications platforms and reinforced the internet's role connecting people globally. This is a phenomenon with a Global scope.

Successive lockdowns and additional social distancing strategies compelled museums to close their doors and move their activities to the online sphere. The opportunities to access online exhibitions and resources from every corner of the globe became more useful and relevant than ever before. Numerous articles in various types of media outlets offered curated lists of the best 'online exhibitions' to visit during the pandemic highlighting the popularity and paradigmatic-shifting nature of online exhibitions and online catalogues. Research has assessed the impact of the pandemic on museums practices providing evidence a significant shift towards online initiatives (Giannini and Bowen 2022; Hoffman 2020; Samaroudi et al. 2020). This research questions the readiness of museums as they confront the challenge of operating in the digital realm and the level of technical innovation in this area.

Another effect of the pandemic has been the resurgence of social and geopolitical inequalities among different ethnicities, cultures, and social classes, as well as between countries. The murder of George Floyd marked the beginning of a global wave of protests against systemic racism and breathed new life into the Black Lives Matter movement, not only in the United States but also worldwide. In this climate, museums from all over the world felt the need to respond to the situation and issued statements reinforcing their social stance in relation to threatened communities globally and their arts and cultures. Concurrently, both onsite and online decolonization initiatives have gained renewed urgency.

The level of preparedness of art museums and their online resources in the face of such a critical societal crisis is at stake. An asymmetrical social reality, seeking social justice, demands a strong and decisive response from institutions like art museums. These unique conditions bring several questions to the forefront: How can we study online resources in a manner that allows us to scrutinize their content regarding global arts[1] and assess their value in light of the current challenges and needs? Do online resources need to be reimagined and remodelled? If so, what types of changes would effectively 'decolonize' them? What is the scope and direction of these changes and modifications?

Art museums' online resources as narratives

The examination of museums as textual entities and the narratives they present to their audiences has garnered significant attention in museum studies and adjacent fields (Bal 1992, 1996, 2004; Francis 2015). Narratology, the theory that focuses on the study of narratives, defines narratives as structures composed of interconnected and indispensable components. These components are typically examined separately, even though they would not exist independently (Chatman 1978; Bal 2017). By disentangling this structure, we can isolate components for further scrutiny. A narrative primarily consists of two levels: the story and the discourse. On the one hand, the story would constitute the 'what' of the narrative (Chatman 1978; Genette 1972) encompassing events, actors, as well as the time and space in which the story unfolds. On the other hand, the discourse element represents the 'how' of the narrative (Chatman 1978). This distinction between story and discourse responds to a 'traditional distinction between content and style/form/expression, subject matter and treatment, or matter and manner' (Shen 2005).

Narratology also studies the interchange between the author of the narrative and the receiving party, defined as the reader or the audience depending on the context and the medium of the narrative. Approaching museums' online resources as narratives offers the opportunity to analyse them, taking into account their complex and multifaceted nature from a perspective that can help question their roles and functions. Issues related to the fair representation of global arts and cultures, notions of repair, as well as matters of inclusivity and openness in museums can be addressed through this lens. More specifically, a narrative approach assists in addressing questions regarding the character of the stories conveyed in online resources and the subjects that museums choose to feature or not feature in these narratives. In essence, it answers questions about the 'what' of the narrative.

Additionally, this approach leads to an understanding of the 'how' of the narrative: where do these stories originate, from what perspectives are they being told,

what is the role played by the museum in terms of establishing institutional authority and defining authorial intentionality. Lastly, narratology provides a means to examine the audience or 'readership' of museums' online resources.

The widespread interest in museum studies in studying the exclusionary, authoritative, non-neutral, and biased nature of museums and the narratives they present in exhibitions has given rise to a rich line of enquiry. The focus on the types of stories that are told or omitted, as well as the perspective from which they are told, lies at the heart of scholarly discussions. Critical museology (Shelton 2013) and postcritical museology (Dewdney et al. 2013) are driven by self-reflective and critical ethos, with the former positioned externally to the institution and the latter engaging in a dialogue with the institution and the audiences. The recent decolonial turn inspiring museums necessitates a critical stance to realign them with a decolonizing agenda.

Methodological approaches such as worlding propose the analytical and activating use of the concept as a tool (Worlding Public Cultures. The Arts and Social Innovation 2023) that grounds the global within local worlds offering new ways to decolonize the so-called 'universal' western narratives and canons deriving from western epistemologies (Cheah 2016; Heidegger 2002; Spivak 1985). Elevating the concept of worlding implies engagement with methodologies aligned with postcolonial or decolonial digital humanities practices and research in information and digital museums studies which provide the critical foundation necessary to assess and transform key aspects of art museums' digital resources. Practices that generate new forms of knowledge in the digital sphere or challenge existing ones are seen as a *worlding* exercise by postcolonial or decolonial digital humanities (Risam 2018). Augmenting narratology with intersectional theories and approaches can ultimately suggest pathways to challenge, reinvent, disrupt, remodel problematic practices in art museums' online resources.

A survey of digital narratives in art museums

The renewed attention that online engagement with exhibitions, publications, and other multimedia materials created by museums has received during the COVID-19 pandemic has led to research exploring the museums' presence on the web during this unusual period. A couple of significant reports authored by UNESCO in 2020 and 2021, titled *Museums around the World in the Face of COVID-19*, analyse the issue in detail. The 2020 report provides evidence of widespread and increased development of digital activities during the pandemic. Interestingly, the report highlights the prevalent use of already-existing digitized or digital materials, online exhibitions, and activities over newly created ones. This underscores the need

for an analysis that addresses not only online resources that have been produced during the COVID-19 pandemic but also those predating its occurrence.

The starting point of the research presented in this chapter was a survey of art museums online resources with an overarching and cohesive narrative as opposed to collections websites or databases. This survey concentrated on resources such as online exhibitions, online publications, exhibitions websites, microsites, and similar interactive resources. In total, this survey includes 195 online resources created between 2006 and 2021. The initial phase of the survey was completed before the COVID-19 pandemic, resulting in the documentation of 132 online resources, while the second phase, completed in 2021, accounted for 63 additional resources.

The objective of completing the survey was to be as comprehensive as possible, although limitations were encountered in terms of the reach of data collection. Even after defining the types of resources and the scope of data collection, locating them proved to be a challenging process. These limitations have also been acknowledged by authors working on the same topic (Hoffman 2020). Existing directories of online exhibitions such as the Virtual Library of Museums webpage (Bowen 2000) have existed since the early days of web development in museums. However, more recent examples continue to emerge, as seen in the environmental scan conducted by Quigley (2019). Despite their significant documentary value, these directories are compiled by us, researchers, or professional associations without the resources to consistently keep them up to date. Moreover, due to the lack of a clear definition of the different types of resources museums have on the web (Hidalgo Urbaneja 2020), each directory contains resources defined by different parameters and characteristics.

To compile both the initial and subsequent surveys of online resources, websites from major art museums and popular awards, including the Webby Awards and the Best of the Web Award from the Museums and the Web annual conferences, were systematically consulted. Manual Google searches using keywords such as 'online exhibitions', 'virtual exhibitions', 'online publications', and 'interactive' or 'online resources' were also performed. The new data collection began in the first months of 2020, coinciding with the onset of the COVID-19 pandemic. During this period, various digital media outlets, including cultural sections of newspapers, general magazines, and art magazines, featured the best online exhibitions that one could visit 'from home' (McGreevy 2020; Nurjuwita 2020; Yerebakan 2020; Dawson 2021). A review of these articles provided several notable examples. However, these 'best' exhibitions were generally those created by Google Arts and Culture. These exhibitions were excluded from the survey because they are not directly and entirely produced by museums, leading to a more complex dynamic in terms of authorship and ownership. Nevertheless, this dynamic should not be

overlooked, as it raises a number of issues that will be discussed in the following paragraphs of this chapter. As the survey was being updated, more comprehensive and accurate lists of online resources provided by associations of museum practitioners were found such as the Museum Computer Network guide to virtual museum resources (MCN n.d.). This reflects the widespread and increased interest in online exhibitions, publications, and other interactive resources.

The survey is accessible[2] and was collected in a Google Docs spreadsheet. The parameters of the online resources that have been analysed include country of creation, language used, year of creation, type of resource, institution responsible, implied audience, and whether it features global arts. These parameters were not chosen randomly; they assist in addressing questions related to the types of stories covered by the digital narratives, the perspective or focal point from which these digital narratives are presented, and the intended and potential audiences that museums have considered for their digital narratives. As the chapter unfolds, the insights from the data collected are analysed using a combination of theoretical foundations from narratology, critical museum studies literature, and postcolonial or decolonial digital humanities.

What stories?

The subject of the narrative, the story it conveys, emerges as one of the most critical aspects of this analysis. Understanding what is being told in online exhibitions and online publications provides an initial insight into the topics, artists, and objects that audiences encounter on the internet. As the online resources were collected and analysed, attention was given to whether or not they feature global arts in the narratives. In essence, having global arts as subjects implies that the cultures or the origin of the artists or objects featured in the online resources are from non-western territories and former colonies. The concept of global arts also encompasses art created by artists belonging to diasporic communities originating from non-western and formerly colonized territories. It is worth noting that identifying these cultures and origins in the resources raises concerns about identity and agency. The identity of the artists and cultures considered for this research was the one determined by museums. However, there is a possibility that artists may self-identify differently, and in acknowledging this, the biases that exist in data collection together with the need to address this issue in museums catalogues are acknowledged.

The findings after analysing the resources are not surprising. They underscore the predominance of the western canon in online resources. Most of the resources feature objects, art, and artists from Europe and North America and

who are easily identifiable. Out of the 195 resources, a total of 88 showcase objects and works of art from global majority cultures and territories and diaspora communities in western countries. Nevertheless, there is a slight increase in the number of resources dedicated to global arts when compared to the results from the initial survey, where only 44 out of 132 online resources covered this subject. Moreover, there is a notable increase in the number of online resources developed in non-western countries, specifically focused on their local arts manifestations. An interesting case can be observed with the Palacio de Bellas Artes in Mexico City. The institution has consistently created online exhibitions or exhibition microsites for each temporary exhibition that was on display – some of which have been removed from the internet but still can be accessed through the Internet Archive's Wayback Machine. Notably, the topics of these exhibitions have shifted towards indigenous or local artists, themes, and artistic movements in recent years.

In an effort to study the resources and the narratives they present in greater detail, the scope of the themes was observed. Online resources were categorized based on whether they feature the work of a single artist or a group of artists. The group exhibitions encompass either local or global artistic styles and periods. The category includes these two types of group exhibitions. For instance, some resources feature an artist monographic exhibition such as the website of the exhibition about the Colombian Artist Doris Salcedo at the Museum of Contemporary Art (MCA) Chicago. Others focus on group exhibition dedicated to a local style, like the exhibition website created by the Guggenheim for their temporary exhibition on the Japanese Avant-Garde group Gutai. Additionally, there are resources with a more encyclopaedic focus, as seen in some of the interactive resources the Metropolitan Museum of New York has developed in past years.

The results offer an interesting picture that reflects the state of global arts in museums. Among the 88 resources that were classified as those showcasing global arts, 24 were dedicated to a single artist, while 32 featured artistic groups, styles, or themes of local nature and circumscribed to a specific geographical territory. The remaining resources, totalling 30, delve into 'international' artistic styles or maintain an encyclopaedic focus (Figure 3.1). Online resources focusing on a single artist predominantly feature artists from the contemporary art scene, emphasizing the current inscription of global arts in the contemporary art canon. A more complex and occasionally problematic picture emerges when considering resources that display global objects and arts alongside creations from western countries. For instance, online resources such as MoMA's *Object:Photo* present a narrative that de-centres artistic hubs, while others reinforce notions about artistic influence and directionality, positioning the arts of Europe and North America as a universal canon.

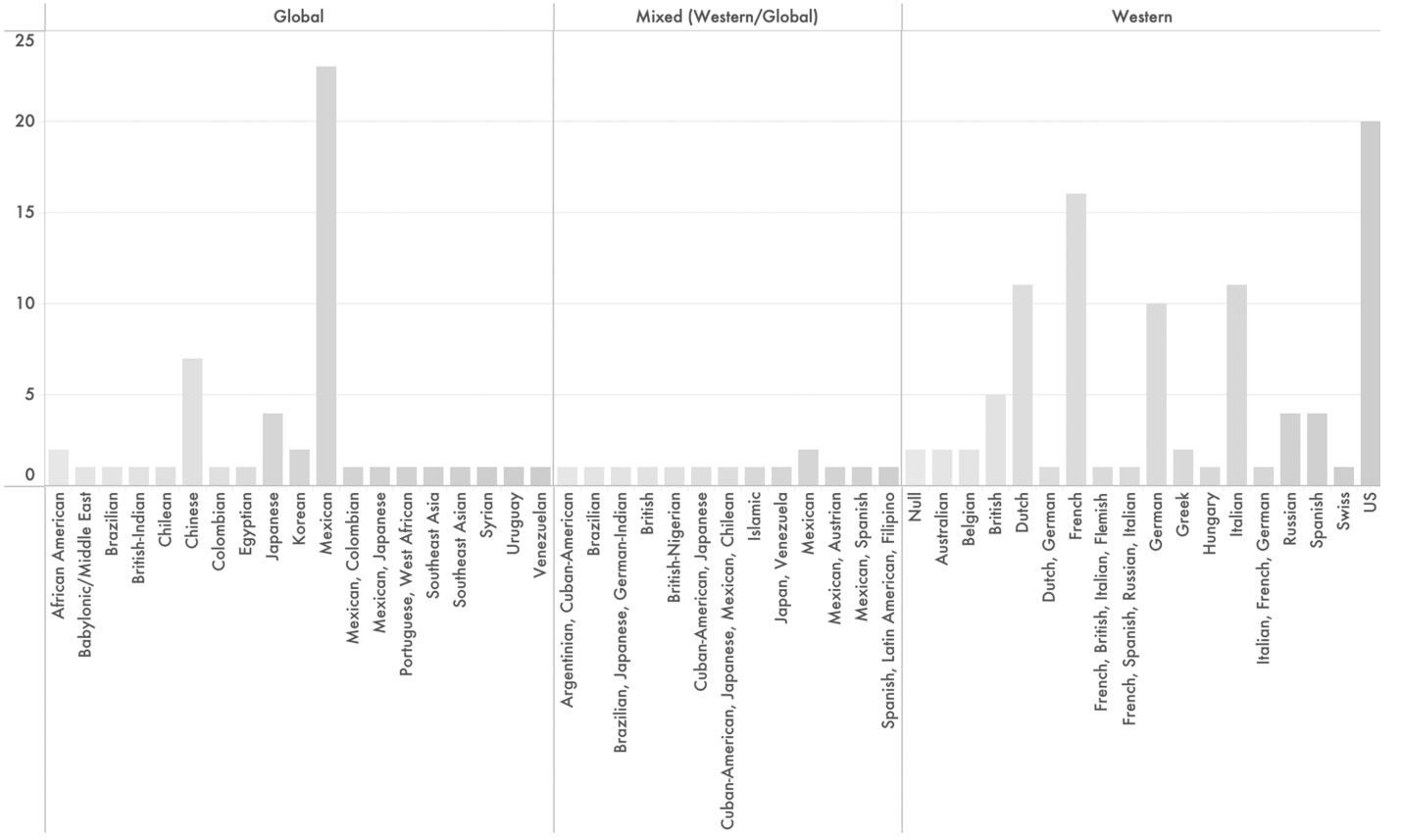

FIGURE 3.1: Bar chart that shows the distribution of themes in online resources. Author's copyright.

In analysing the stories in online resources, several key points come to the forefront. First and foremost, the expansion, albeit modest, in the number of online resources that museums have developed with a narrative centred on global arts shows that change may indeed be possible. This also signifies a more sensible and equitable approach towards non-western and non-canonical subjects. However, when delving into the online resources, moving beyond merely quantitative and thematic aspects of the data reveals the necessity for a deeper understanding of the narratives presented in the resources. Narratology can guide this analysis in a logical direction, emphasizing not only what is told in the narrative but also the manner in which it is conveyed, thereby advancing the discussion in this chapter.

How are stories told?

Increasing the presence of global art in the digital sphere and challenging the dominance of stories from western cultures in online exhibitions and publications are necessary and important steps. Gaps must be filled. Yet, the mere addition of more online resources presenting stories from traditionally underrepresented, neglected, and omitted artistic voices and creations is insufficient to repair deeply disrupted institutions rooted in a societal order defined by structural racism and inequality if these stories are told from a certain perspective and by specific narrators.

Museum studies texts on narratives characterize the museum as an institutional entity whose discourse influences the stories they present (Bal 1992). This discourse extends to the multiple elements that physically constitute a museum, from the building to the labels, and digitally, from the ontologies that model their databases to the software used in websites. Museums determine which stories are worth presenting to the audience. Traditionally, the discourse of art museums has been constructed by western dominant epistemologies that have shaped art historical canons, as well as more recent technologies adopted by them. A common area of discussion in literature is the fact that while the museum's aim is to present objective and accurate historical facts in their narratives, omissions, biases, and assumptions inevitably creep into these narratives (Bal 1992; Porter 1996; Lidchi 1997). To aid in understanding how museums function, narratology proposes a term: focalization. The term introduced by Genette (1980) is understood as a 'point of view' or 'perspectival filter' (Jahn 2007). It responds to the questions '"who sees?" or "whose perspective orients the text?"' (Aczel 2005). A selection and/or restriction of narrative information happens in relation to the experience and knowledge of the author or narrator (Niederhoff n.d.).

In 'Telling, Showing, Showing off', Mieke Bal adopts the term to explain the position of western museums as they represent non-western cultures in their galleries from a clearly western-centric perspective (1992). Bal reinforces the idea that focalization is intrinsic to narratives: 'Whenever events are presented, it is from within a certain vision', and she continues by pointing out that 'storytelling is inevitably slanted or subjective in nature. […] It is of course possible to attempt to give an objective picture of the facts' (1996). In the current moment, multiple but legitimate truths and realities are recognized. Accordingly, narratives should be 'likely to be less complete, more fragmentary, and to consist of the elements of many narratives that can be combined in a range of ways rather to be completed finished story' (Hooper-Greenhill 2000). However, in practice, reality often presents a less objective and more fragmentary presentation of narratives. The contentious statement that museums are not neutral (Fraser et al. 2020) is not only made by critical voices but also by museums in an attempt to reshape institutional authorship.

Museum studies literature has often reinforced the belief that the hypertext and the Web are democratic instruments, capable of challenging the 'unassailable voice' museums inherently possess (Walsh 1998). Contrary to techno-utopian views (Barbrook and Cameron 1996) that were especially common in the early years of the Web, the reality is that museums still tend to impose a slanted view on the narratives they present online. For example, the British Museum, in collaboration with Google, developed a notable immersive online exhibit titled the Museum of the Word. Despite its inclusion in an article listing the Top 10 exhibitions of 2020, the *Smithsonian Magazine* pointedly notes that 'Notably absent from the project is an acknowledgement of the London museum's colonialist history, which came under renewed scrutiny this summer amid global protests against systemic racism' (McGreevy 2020). This example illustrates how museums serve as focalizers that deliberatively exclude certain stories from the narratives they present about the objects in online resources.

Identifying elements to quantify focalization can be a complex task, which is best approached through a more qualitative and careful analysis of individual online resources, as seen in the above example. However, one aspect that is relatively easy to quantify is the location of the institution that has developed the online resource. It is almost certain that a museum from a given western country will function as a focalizer, and the stories will be told from a biased and non-objective perspective. The way in which stories are told has an impact on the audience's perception of history, cultures, and objects which are viewed through the lens of the author, in this case, the museum. Unsurprisingly, online resources of western origin outnumber the resources created in non-western countries. As the survey indicates, only 53 out of the 195 online resources are from non-western countries. Furthermore, even resources in western countries are predominantly from

FIGURE 3.2: Map that displays the geographical distribution of the institutions that publish online resources. Author's copyright.

major institutions within those countries, with a majority of them belonging to art museums in the United States (Figure 3.2).

These unbalanced results reflect systemic inequalities across institutions. Research has shown that access to technological means, including software, as well as skills and human resources, plays a significant role in the development of online resources and shapes the way in which narratives are presented (Hidalgo Urbaneja 2020). The affordability and user-friendliness of tools are key to their adoption by museums (Hoffman 2020). Creating online resources requires an enormous amount of labour in addition to economic resources and the right institutional infrastructure, which not all museums, even major ones, possess. While inequalities affect museums worldwide, museums from non-western countries are at clear disadvantage when it comes to creating online resources and sharing their narratives with audiences in the digital domain.

As museums from non-western countries have embraced the digital age, software, systems, and tools created in the West were nearly the only ones available to them. Shifting the focus to the Google Arts and Culture web platform, it is noticeable that a significant number of museums worldwide have partnered with them with the aim of showcasing their objects and galleries to a wider audience, not only

in western countries but also in non-western ones. In some cases, museums may have opted for joining the Google platform to overcome technical limitations and a lack of appropriate resources needed, for example, to create 360-degree views of their galleries or launch online exhibitions. While the initiative has received an overall positive reception, critical voices have raised concerns about the potential dangers of ceding data and the capacity of creating narratives to commercial entities. These entities 'attempt to reposition the power of art to asymmetrically extract cultural capital from non-profit and state institutions' (Pepi 2019). Behind these extractive practices lie issues concerning ownership of technological systems and narratives. The concept of 'digital colonialism' introduced by new media artist Morehshin Allahyari (2019) facilitates a critically engagement with ownership issues. Digital colonialism refers to the position of museums, heritage institutions, and corporations involved in the digitization, preservation, study, and display of objects from non-western countries. These organizations tend to define themselves as 'saviours' and 'protectors' of heritage, but in reality, they perpetuate traditional colonial roles and functions of the museum. Heritage is digitized, preserved, and shared with audiences online, but the ownership and copyright of the digital copies belong to institutions and organizations in western countries, not to the communities of origin of the objects who were not engaged in decision-making processes that lead to digitization (Boast and Enote 2013). This once again highlights the limitations of initiatives and online resources focused on uniquely increasing the representation of global arts and cultures while replicating existing power dynamics.

In addressing absences and omissions in terms of the technological frameworks used by museums, the postcolonial – or decolonial – approach in digital humanities defined and established by Roopika Risam seeks to provide solutions to this problem:

> Representation will never be a sufficient approach to addressing the colonial and neocolonial inscriptions in the digital cultural record. Digital humanities practitioners, therefore, must also interrogate colonialist and neocolonialist politics through project design to intervene in the epistemologies of digital knowledge production. Put together, the representational and epistemological dimensions of digital humanities scholarship hold the possibility for creating a postcolonial digital cultural record.
>
> (Risam 2019)

With the invitation to challenge and remodel the epistemologies of colonialist knowledge production that permeate institutions such as museums, Risam sets the stage for a complex and multilayered process that involves questioning not only the technologies and software that is used in online resources but also the more textual elements of narratives. This idea converses with the views of Digital Art History scholars, such as Pugh (2020), who agrees on the fact that epistemologies

generate standards 'that can impose or perpetuate cultural biases' that go beyond art historical canons and influence digitization processes, ontologies, archiving and cataloguing practices, metadata production, user experience design, software, and more. The biases present in the systems used by museums in online resources frame and shape the narratives that are presented to us in these resources.

Strategies that respond to the need to correct biased narratives and help communities regain ownership over their stories must offer more than additive or textual and linguistic intervention in online resources. Fields such as information studies, digital humanities, software studies, and human-computer interaction research have introduced frameworks that, if adopted by museums' online resources, would help transform the nature of their discourse. Ontologies (Bruseker and Guillem 2018; Hunt 2014), information systems (Boast et al. 2007), software (Ali 2014), and interfaces (Lazem et al. 2021) all are susceptible of decolonization, in other words, reinvention and transformation to accommodate the diverse ways of knowing and being that frame the modes of production global arts.

Who is the audience?

Narratives involve two parties, often described as 'a sender and a receiver' (Chatman 1978). This condition also applies to museums: 'what is a museum for if not for visitors?' (Bal 1996). In the context of this research, both the visitor or audience of museums and the user of an online resource are equal in form and function to the concept of the reader. Reader-response, a subfield of narratology, provides the foundation for a better understanding of the status, role, and behaviours of the reader. It invites us to interpret the audience of online resources through the lens of narratology.

The concept of the implied reader (Iser 1978) can be defined as the hypothetical or presupposed reader of a narrative, as assumed by the author. A narrative is always constructed by the author with a reader or an audience in mind, making the implied reader intrinsic to any narrative (Chatman 1978). Museum studies literature acknowledges the role of an implied visitor in the development of exhibitions. In fact, in museum exhibitions, 'the dramatic tension constructed by the content and design team is based on an "implied visitor" which has much in common with an "implied reader" in literary theory' (Austin 2012). Although authors studying digital storytelling in museums may not explicitly employ the narratological concept of *implied reader*, they use pragmatic methods to outline the implied readers or audience of the narrative that is being constructed and the implied reader is modelled upon real readers' information. An example of this approach is the CHESS project (Roussou et al. 2015) which uses 'personas', a well-known method of user experience research in digital media, for that purpose.

'Personas' could be defined as 'empirically grounded, detailed descriptions of imaginary people (constructed user models) that are represented as specific individual human beings' (Roussou et al. 2015).

Since online resources can potentially be accessed from every corner of the globe, provided there is internet access, museums must question how they can serve an online audience that is diverse in geographical locations, language, and demographics. In fact, one of the strongest arguments supporting the production of online exhibitions and other types of resources is that through them, museums can reach wider audiences and be visited from all over the world. The concept of implied reader can assist museums in asking this question and design resources for a diverse and global audience, which is a challenge in itself given the multitude of factors that should be taken into account.

Returning to the survey of online resources, the concept of the implied reader can help us understand the level of preparedness of museums in terms of reaching global audiences. One of the parameters used to analyse the results of the survey was the language or languages used in the resource, which implies that the reader of the resource has a certain linguistic background and skills. It is noticeable that a significant number of resources, 96 of the 195, are in a language other than English, but from these 96, only 42 are in English and another language (Figure 3.3). Upon further scrutiny of this second set

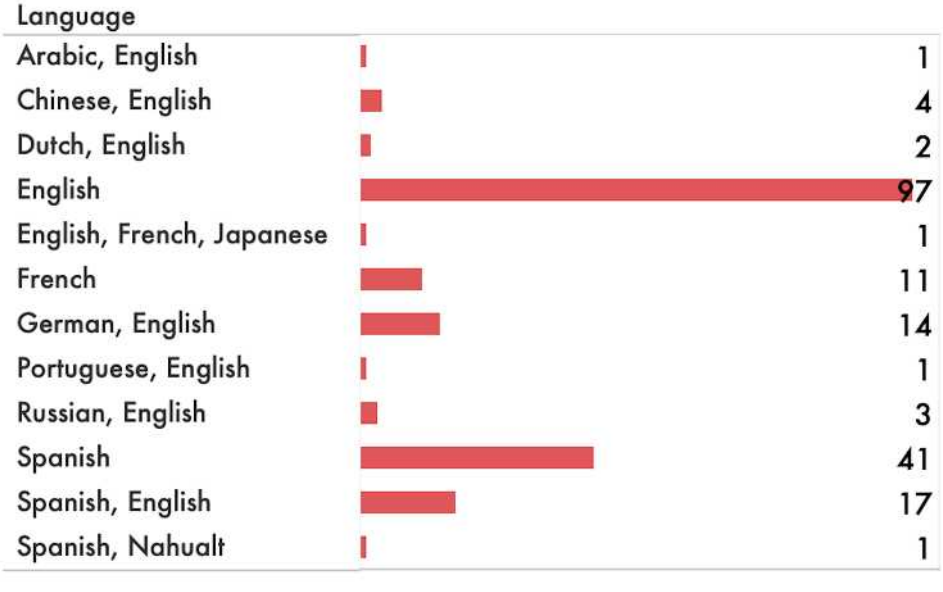

FIGURE 3.3: Bar chart that shows the most prevalent languages used in online resources. Author's copyright.

of data, it becomes apparent that the museums offering resources in both English and another language are not based in English-speaking countries; rather, it is the opposite. The status of lingua franca English has explained such a problematic dynamic. In an effort to become accessible to international audiences, these museums provide an English version of the online resource. However, for many communities learning foreign languages, even English is a privilege. Linguistic barriers exclude them from the possibility of accessing and enjoying these narratives. The universality of English and its linguistic dominance has been raised by digital humanities scholars (Fiormonte 2012; Risam 2019). The colonialist connotations of this dynamic in connection to English need to be addressed and contested; yet, this problem is not exclusive to English. Among the collected online resources, the website of the exhibitions from the Palacio de Bellas Artes in Mexico confronted the colonial dominance of Spanish to include a version of some of the exhibition websites in Nahuatl, the most prominent indigenous language in Mexico, as seen in its exhibition *Orozco. Artistas en dialogo. Thomas Newbolt y Roberto Parodi (2020)*. This simple act reclaims the space for a minoritized, excluded language and the community that uses it in both the institution and on the internet.

Beyond the issue of language, the digital divide that exists in terms of internet access becomes another excluding element. Once again, online resources have been designed for audiences with internet access, and the accessibility and openness of the internet are often taken for granted. Several authors have argued against the techno-utopian discourse around internet access and the illusion of democratic access that others (Weibel 2011) associated with it in the early stages of the internet.

The moment museums started to inhabit the digital sphere, scholarship has highlighted the democratizing and 'wall-breaking' role of digital media as it helps museums to have a more open and plural emancipatory role that digital technology could play for museums atoning for centuries of exclusion, colonialism, and omission (Pepi 2014).

The consequences in terms of audience engagement resulting from uneven internet access have become even more pronounced during the pandemic. This fact has been noted in several articles and reports focused on the study of museums online presence during the COVID-19 pandemic. One of the UNESCO reports (2021) points to the danger of exclusion and the idea of establishing second-class audiences. However, Rodriguez Lopez (2020) delves deeper and shows a more complex picture. He highlights the fact that audiences that have traditionally felt marginalized by museums due to their inaccessibility now find themselves in a similar situation online. Because they lack the required cultural capital to engage

with online resources, these resources effectively become 'art deserts' designed for a select number of individuals.

This reflection on the existing knowledge, background, or cultural capital of the audience and its role in engaging with narratives leads to the final point of this chapter. Reader-response theory examines how the reader's identity impacts their reading (Prince 2003). Holland's work on literary response employs psychology and psychoanalysis to demonstrate that 'readers respond to literature in terms of their own "lifestyle" (or "character" or "personality" or "identity")' (Holland 1975: 63). This reflection parallels the concept of entrance narrative in the domain of museum studies. According to Doering and Pekarik's (1996), every museum visitor has formed their own 'entrance narrative' before going through the museum doors. The entrance narrative can be defined as the knowledge and experiential background that influence their interpretation of displays and narratives offered by the museum. Similarly, Everett and Barrett (2009) investigate the way in which individual factors, including personal interests and educational background, shape the visitor's interaction with the museum. The reader's or visitor's experience of the visit, based on their identity, does not necessarily result in an affirmative or positive interpretive or meaning-making response. Disagreement and estrangement are potential reactions to the visit. Doering and Pekarik suggest that audiences visit museums with the expectation of finding validation based on their beliefs and prior knowledge. In museums, visitors seek intellectual and even emotional approval. If they feel contested by the institution, their experience could be negatively impacted. The effects that this sense of validation would have in visitors who do not share a sense of belonging with the institutions for various reasons connected with their beliefs, gender and ethnic identity, and demographics give museums a reason to address inclusivity both in gallery and online. Additional concerns may arise as the entrance narrative the audience brings with themselves encounters 'challenging heritage' that addresses delicate topics such as colonialism and racial violence. As Kist (2020) contends, museums face the challenge of enabling an understanding of current events and facilitating critical reflections online, especially in light of the social circumstances resulting from the pandemic.

To conclude

A critical study of art museums' online resources presents a mixed picture of the current situation. It highlights several pressing and unresolved problems. Some of these, such as the questionable authority and position of the museum in shaping narratives about global arts and the unequal access to the internet, are not new

and have resurfaced as a consequence of the COVID-19 pandemic. Yet, there is place for hope as a decolonial agenda seems to be gaining stronger traction in various digital practices. While the overall picture suggests the need for urgent and profound changes, discrete advancements are noticeable.

The methodological approach that constitutes narratology remains relevant to the types of questions and problems that museums face. Art museums are tasked with the challenging goal of addressing a troubled past and present through the stories of the objects they display in both their physical galleries and online platforms. The critique formulated by this research should motivate institutions to develop online exhibitions that tackle the unequal representation of historically neglected or omitted subjects and artists. However, profound revisions of the foundations that define art museum themselves in the digital sphere, including their classifications, cataloguing systems, ontologies, vocabularies, and more, are required as online resources increasingly accommodate narratives that favour plural ways of knowing and being. Lastly, audiences cannot be overlooked. Incorporating other voices and perspectives to the narratives museums should be done with the aim of connecting with everyone globally, especially individuals from backgrounds and geographies that have been traditionally excluded from museums and would certainly lack a sense of belonging with the institution.

NOTES

1. This chapter uses the term global art to refer to art produced in non-Western countries and colonized territories or created by people original from those territories. Although the term is used in the context of contemporary arts practice, here it is applied to art produced in previous historical periods rejecting terms such as world art which have colonial connotation (Belting, 2013).
2. https://m-hidalgo.com/online-publications-exhibitions-2020/ (accessed 18 January 2024).

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4

Picturing Platformization: Information Infrastructures in Picture Archives Online

Anna Näslund

The discourses on platformization – meaning 'the re-organisation of cultural practices and imaginations around platforms' (Poell et al. 2019) – in relation to picture archives are very diverse. The same holds for the connected and partly overlapping concept of datafication (Hansson et al. 2022), meaning in this context the transformation of picture collections into quantifiable data can be tracked, monitored, and analysed computationally. At one extreme, the process has been described as giving unprecedented access to the visual heritage (see e.g. 'Europeana Pro' n.d.; Poll 2010); at the other, it has been argued that it can de-contextualize and banalize photographs (see e.g. Birkin 2020; Capurro and Plets 2020). Whether one positions oneself at either extreme or somewhere in between, it is certain that the transition from analogue binders, boxes, and shelves to online platforms changes the way picture archives work. In this context, the dyad concepts of *digitization* and *digitalization* are relevant. Typically, the term 'digitization' has been used to refer to 'the purely technical aspects' of the transformation of analogue to digital, while the term 'digitalization' instead refers to the 'manifold sociotechnical phenomena and processes of adopting and using these technologies in broader context' (Frenzel et al. 2021). Even though the technological process and application are inseparable from the cultural, social, and institutional context where it is developed and used, and the separation of technical and the social or cultural is impossible, I will use the term 'digitization' in the following when referring to the act of transforming analogue pictures to digital representations. And I use the term 'digitalization' when talking about the more general effects and implications of these processes.

Much of the writing on the transformation of picture collections from analogue to digital in heritage institutions has focused on digitization in quantitative terms,

implicating the portion of analogue collections which have been made accessible digitally online. This is well monitored by national and governmental organizations as well as individual heritage institutions (see e.g. Digisam 2015; NEMO 2020; Nauta et al. 2017; Poll 2010; Tasovac et al. 2020). A similarly large body of works has focused on the misrepresentation and bias of pictorial content as regards gender, race, or class, and has drawn attention to effects and ethical concerns related to such aspects when picture collections are transferred from analogue to digital and made more easily accessible and searchable online (see e.g. Kizhner et al. 2021; Krabbe Meyer and Odumosu 2020; Turner 2020; Zhitomirsky-Geffet et al. 2023).

In contrast, this chapter discusses the platformization and datafication of picture collections from another perspective where the primary focus is neither the quantitative aspects of 'big data' nor the hitherto common bibliographic focus on visual content, but on the foundational systemic aspects of the transition from analogue to digital. My aim is to consider *how* or in *what ways* the transformation from analogue to digital changes the archive qualitatively and to scrutinize how digitization may alter the way we conceive of picture archives, particularly photographic archives, and of photographs as such.[1] In consequence, I focus on the information infrastructure of online platforms and only indirectly on its visual and textual content. With inspiration from Bowker and Star, I use the term 'information infrastructure' to signal that my focus is on the systemic, and how the information, both textual and visual, is organized, classified, and made accessible across analogue and digital platforms (Bowker and Star 1999). As pointed out by Bowker and Star (1999: 33–34):

> Infrastructures are never transparent to everyone, and their workability as they scale up becomes increasingly complex. Through due methodological attention to the architecture and use of these systems we can achieve a deeper understanding of how it is that individuals and communities meet infrastructure. […] recognizing the depths of interdependance of technical networks and standards, one the one hand, and the real work of politics and knowledge production on the other.

The cases from which the analysis is drawn come from the platform Flickr Commons. Flickr Commons is part of the Flickr online interface which is an American photo-sharing site launched in 2004. While initially begun as a collaboration with the Library of Congress, it has since then changed ownership several times.[2] Flickr Commons, a subdivision of Flickr for publicly held image collections, was launched in 2008. Of particular focus – and used as case studies – are the collections of two Nordic heritage institutions that hold extensive photographic collections: The Norwegian photomuseum Preus and The Swedish National Heritage

Board (henceforward SNHB). Preus is the national museum of photography in Norway and holds collections of Norwegian and 'international' photography. The collections are diverse and include a large number of art prints by internationally famous photographers such as Julia Margaret Cameron, Hill and Adamson, Lewis Hine, and Jacob Riis; large collections of Norwegian photographers from the nineteenth and twentieth centuries, as well as mass-produced carte-de-visite photographs from the nineteenth century.[3] SNHB is a Swedish government agency responsible for cultural heritage and historic environment issues. Their photo collection includes individual collections from various times as well as photographs taken over a period spanning more than a century in connection with the activities of the SNHB, including pictures of ancient monuments, runic inscriptions, old churches, urban and rural environments, archaeology, industries, and aerial photos.[4]

Thinking with images

This chapter is a response to Johanna Drucker's recent call for a humanistic approach to interface design (Drucker 2020). As an art historian by training, my default focus is on the visual aspects of presentations of picture collections online. Thus, I am interested not in how interfaces work or are used – a common perspective within computer science and library and information science studies – but in how they look. Moreover, my take in this study of online interfaces where photographs appear is systematic, in that I am interested in patterns, configurations, and categorizations; yet I study these from a visual angle. Using the vocabulary of Bowker and Star, I am in this chapter concerned with how a digital online platform like FlickrCommons works as a visual 'scaffolding' (2020: 47).

My method is likewise visual. As pointed out by Horst Bredekamp, 'the image is not a derivative or an illustration, but an active bearer of the thinking process' (2005: 24). This chapter is therefore organized around four images or visualizations of the information infrastructure of the online picture archive, as compared to its analogue counterpart. In other words, it focuses on the systemic patterns in digitalization and digital access through visualizations. Hence, I use images in their capacity as 'knowledge generators capable of creating new information through their use' (Drucker 2014). What follows is my interpretation of the effects of digitization processes and the resulting digital information infrastructures of entries in these databases. This means that I do not go into visible particularities of individual pictorial representations. The aim is to try to understand and illuminate the changing information infrastructure in the transition from analogue to digital. In particular, this means that I seek to clarify how pictures are organized, presented,

visualized, and thereby conceptualized in heritage institutions' online interfaces. Indirectly, this also points to the issue of what we mean by digital access, what we are gaining access to, or what the characteristics of these online archives are. In sum, this chapter presents a way of thinking qualitatively about the processes of digitization through visualizations, with a focus on the infrastructural changes that the platformization of picture archives entails, and its deeper implications for the understanding and interpretation of images as such, particularly photographic images.

The iceberg – Quantifying access

As pointed out by Nanne Bonde Thylstrup among others, digitization which at first might appear as a straightforward transfer of analogue data to digital data 'reveals, on closer examination, a complex process teeming with diverse political, legal and cultural investments and controversies' (Thylstrup 2018: 3). Capurro and Plets have, for example, shown how Europeana subsumes the individual institutions whose collections are made available on the site in the quest for the interoperability of making a platform that conforms to the European Union expression 'Unity in Diversity' (Capurro and Plets 2020). Still, digitization processes are often reported in terms of degree and quantitative statistics. Visually, this typically equates to the tip-of-the-iceberg model, where a small portion of the totality is digitized and thereby visible while the greater part of the material or data is hidden from view, and still held only in analogue form (Figure 4.1).

Naturally, this way of describing the processes of digitization as a subtotal of a larger totality focuses on the number of entries in a database, not their individual character or quality. This makes the process of digitization a matter of numbers, a matter of quantity. However, this way of describing digitization, whether textually or visually, has two implicit foundational ideas. The first is that something either *is* or *is not* digitized, for example. Something cannot be semi-digitized or partially digitized. However, the quality or amount of information may vary widely between different database entries in heritage institutions' online catalogues, which raises the question about what these numbers tell us. For example, do we mean that an artefact is digitized when only a limited written record exists, like a title, originator, or year of production in the online database, or do we mean that in order to be digitized, there has to be a photographic reproduction of the picture at hand?

Second, this model implicitly says that there is a fixed totality from which a percentage can be drawn. In reality, collections of pictures (and other cultural heritage material) are often not ordered fully and the total number of items

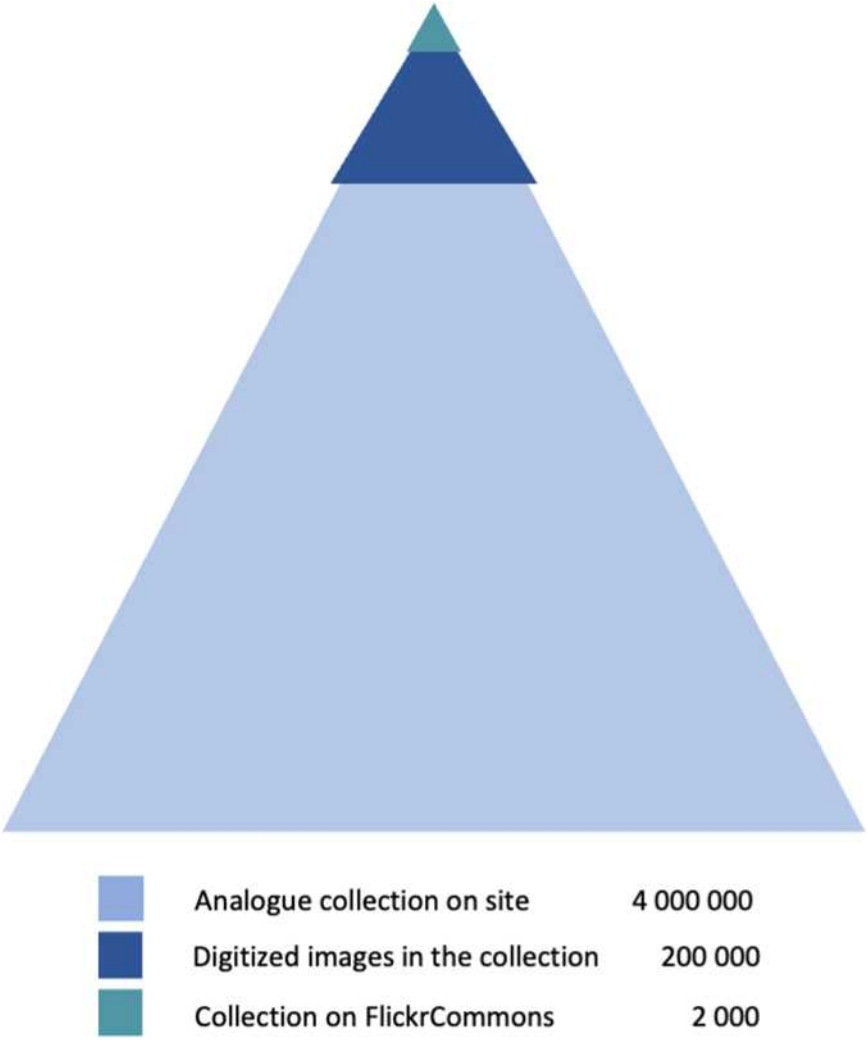

FIGURE 4.1: The tip-of-the-iceberg model showcasing the percentage of an analogue picture collection that is digitized. Figures from the Swedish National Heritage Board (SNHB): 5 per cent of the holdings are digitized and 0.05 per cent of the holdings are published on Flickr Commons.

given for a particular institution or collection is in many cases just a qualified guess (Poll 2010: 126). Pictorial material also comes in very different material shapes; illustrated books and photo albums, for example, are typically catalogued as one entity and do not account for the dozens or hundreds of pictures they contain.

A realistic estimate of how much of a collection is made accessible in a chosen platform is of course relevant but just as relevant is how (and why) those particular artefacts have been made accessible. Turning back to the tip-of-the-iceberg image, the *relations* between the tip and what is 'below ground' are just as crucial to map and understand. How do the items visible at the tip relate, correlate, or resonate with the totality? How have they been chosen? When have they been digitized and to what end? And with what quality, technique, and content in mind? The following three images or visualizations focus on such relations, between the digitized parts and the analogue whole. In sum, the tip-of-the-iceberg visualization model is simplified to understand the systemic changes inherent in the processes of digitization of picture collections.

The archival windows – Partial visibility

A recent estimate (2020) shows that about 20 per cent of the museum collections in Europe are available online. Similar numbers for the whole LAM sector (libraries, archives, and museums) in Europe are not yet available but statistics from 2017 indicate that around 20 per cent of all heritage collections are digitized (Digisam 2015; NEMO 2020: 3; Nauta et al. 2017; Tasovac et al. 2020: 4). Although online catalogues are presented as databases over the picture collections, these online repositories typically represent only a very tiny, curated, selection of the analogue collection. What is visible and searchable online is thus not representative or directly proportional to the whole collection.

The relation between the online database and the analogue collection can be likened to what one can apprehend from the outside, and through the windows, of the interior of a building. In this sense, the online archive can be described as equivalent to the foundational etymological meaning of the word 'archive'. The word archive stems from the Greek word *archeîon*, which literally means the house or building where important, official documents are stored.[5] The online interface can then be seen not so much as a window onto the world, but a window onto parts of a much larger built interior complex.

These windows are naturally not randomly placed on the archival building. It seems that what is considered 'rare' in contemporary culture or 'culturally distant' from the geographical and cultural place of the archiving institution is more likely to be showcased in the online collection rather reflecting its proportional occurrence in the collection itself. A simple yet revealing example from the Flickr Commons website is the occurrence of different photographic techniques that are searchable through the written metadata. While there are 804 hits on daguerreotypes, 1490 on tintypes and 1476 on ambrotypes, the website reveals

only 57 hits on silver gelatin, even though the vast majority of photographs from 1880 until the introduction of digital cameras with CCD-sensors around the year 2000 was the default photographic technique. As a consequence, the number of photographs made on silver gelatin base by far outnumber the items produced by the above-mentioned nineteenth-century photographic techniques which can be found on Flickr Commons site.[6]

As pointed out by Stylianou-Lambert, '[i]ronically, photographs owned by well-known artists are more likely to be catalogued, archived and preserved for future generations than many other types of everyday photography because of their assumed historical or artistic value' (Stylianou-Lambert 2019: 376). Thus, there is a strong self-reinforcing impetus in the circulation of visual heritage material in the sense that what is already activated and in circulation tends to re-circulate and re-activate recurrently. This pattern holds for anything that is visually different, unusual, or 'beautiful' and can be visualized, as shown in Figure 4.2.

Systemically, Flickr Commons consists of picture collections curated and chosen by professional curators and archivists in their respective collecting institutions. It is a professional choice. This is in contrast to the patterns of visibility for photographs on the social media platform Flickr where pictures with 'very high social feedback' are more visible than less popular photographs, but where there is, for example, no correlation between high visibility and aesthetic quality (Schifanella et al. 2015). Accordingly, the online image archive has more in common with the curated exhibition and is a less representative sample of the image collection as a totality. This is not only in the sense that it is a tiny selection of the total visible collection but also because the selection seems to have been made with the 'eye-catching', 'the rare', and the 'known or named' photographers in mind.

Turning this around, one could ponder if there are any recurring patterns when it comes to identifying what the blind spots are. What is typically hidden from sight in the online windows in relation to the total analogue collection? One could speculate – but not prove until one has the full statistics of both digital and analogue collections – that the downplayed images are less visible in such a system. This might include photographs made by less famous or even anonymous photographers (e.g. product photographs, fashion, adverts, authorities' documentation, scientific images) – photographs of what, from the geographical and periodical perspective of the collecting institution, are considered as 'non-sites' or non-spectacular landscapes and buildings, photographs of unidentified, unnamed, or 'ordinary' people. In western picture collections, this would typically include adults, white civilians, working-class to middle-class people, and would exclude ethnic, cultural, or social minorities. It goes without saying that these types of images form the bulk of the photographs accumulated in press archives, commercial picture agencies, and portrait ateliers, which are today held in historical and cultural historical museums and public archives.

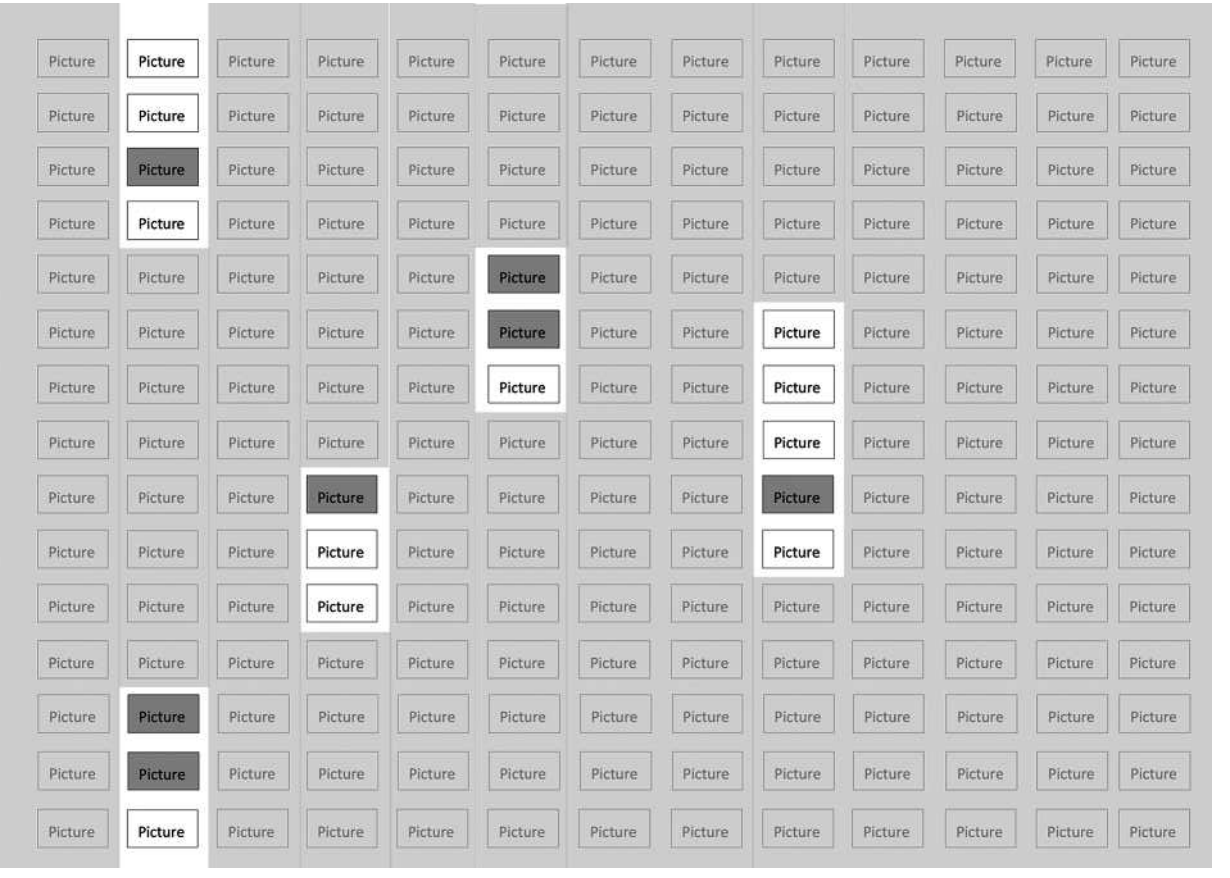

FIGURE 4.2: The window to the analogue picture collection unevenly displays the holding. Dark grey pictures equal daguerreotypes and white, the large majority silver gelatin photography.

Search paths – Beyond context

The search paths also differ between the analogue and digital archive. Generally, there are more search options in digital interfaces than in the analogue equivalents as any information inserted in a database can be a potential search entry. This has certain benefits as it makes access to cultural heritage material less dependent on the authorized interpretation and order created by archivists, and obscure, forgotten or minor items might be given as much space as treasures or canonical work. However, the keyword search which is the default access model in digital platforms (Whitelaw 2015) in a database system, focusing on item level, turns the search paths upside down in relation to the analogue archive. The online interface of Flickr Commons, for example, encourages a user to start with the individual picture or the collecting institution, whereas in the analogue archive, the main search entry would be the collecting institution or the sub-collections within a particular institution. This can be described as bibliometric leverage because 'traditional archives prioritize hierarchical descriptions' while 'libraries tend more towards representations wherein each item has an item-level metadata record' (Burke et al. 2020: 187–88). The single item-level digitization, which is the default on Flickr Commons, is completely compatible with items such as modern artworks and books but less compatible with objects like illustrations in books and magazines, photo albums, comics, and so on, where the immediate visual and textual context of the image is crucial for the understanding. Thus, the item-level organization aligns well with the bibliographic tradition which focuses on the visual content of an individual picture, what it is a 'picture of', while other types of pictures are less well aligned to this way of thinking about what images are (Dahlgren and Hansson 2021).

In sum, the text search is more efficient when you are looking for content and images at the item level but less efficient if you are looking for a particular type of visual context or a particular historical event. However, it is not efficient when looking for so-called 'non-visual information', that is information which 'cannot directly be derived from the content of the visual resource' such as originator, production year, historical, or material contexts (Hollink et al. 2004: 3–5). This is even less doable when conducted at a more abstract level, that is not searching for pictures by named individuals but for the work of, for example, female artists. That photographs often appear in cohorts is one aspect that also appears to be lost in the item-level thinking with a focus on image content. Revealing examples, for instance, include stereoscopic photographs and photo albums which are very common types of historical material in museums, archives, and library collections. Yet, the entirety of the albums or the card on which two slightly different but connected photographs (what in Figure 4.3 would equal the boxes/folders level) would in many cases be invisible.

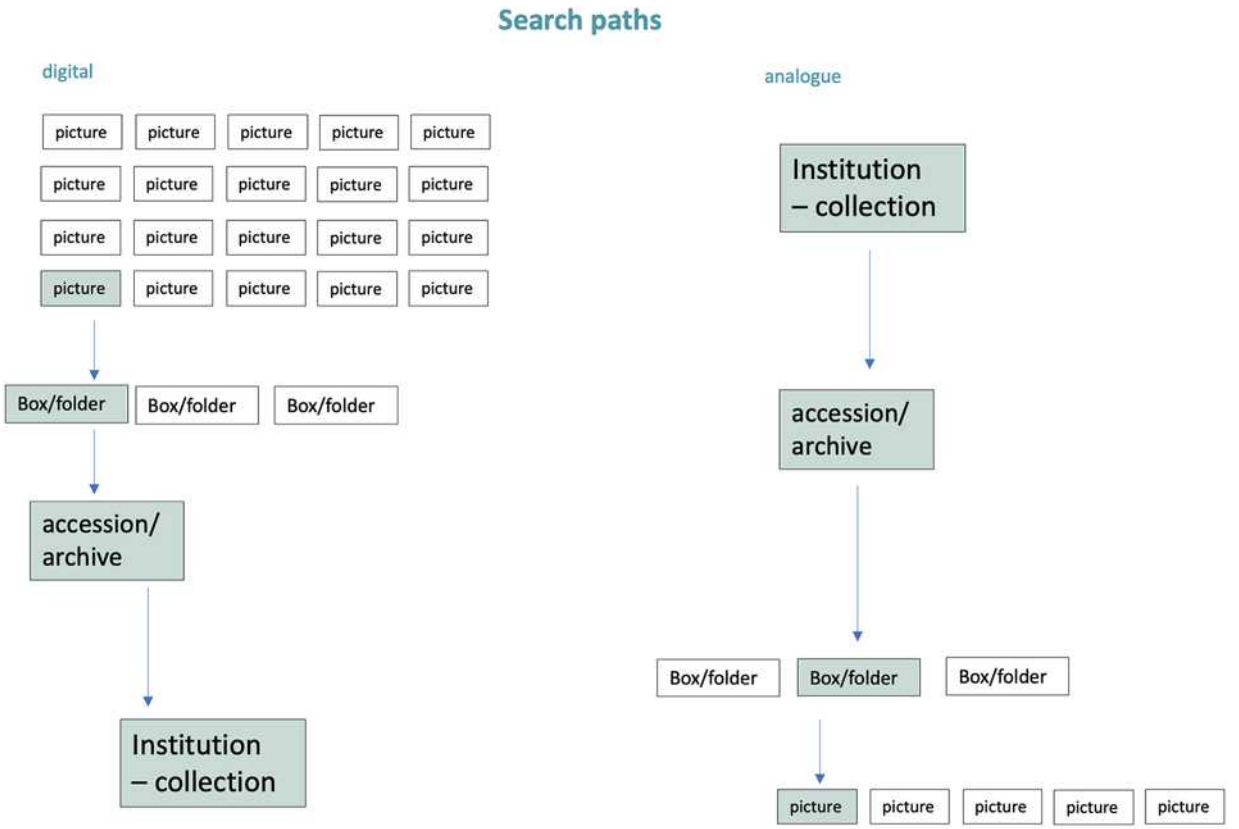

FIGURE 4.3: Search paths in the analogue and digital picture archive.

The flattened archive – The stand-alone image

While photographs in museum exhibitions and history writing are often presented as 'solo works', series of images are the standard in the archive. Such series are typically derived either from an individual photographer's production or from the collection of an individual or organization (Edwards and Morton 2015; Ekeberg and Lund 2008). Thus, the default way photographs exist in the analogue archive is literally in the context of other photographs. At first sight, the same holds for digital online picture archives like Flickr Commons as the images are organized in albums and streams. However, the implication of notions like 'collection', 'series', and 'context' is quite different in this online infrastructure.

What happens in the online platform is that a collection of things transforms into entries in a database. This seems obvious but it has a number of indirect implications. The need for interoperability, for example, not only requires coherent vocabularies when it comes to metadata but also necessitates visual effects. In the online collection database, all pictures are of the same size and the actual size of an individual picture is not evident. Their materiality is thereby downplayed, not only in the sense that content is privileged over material and technique in the sorting or searching options but also that the pictures literally look like equal containers of different visual content.

In the physical, analogue picture archive, the immediate context of a picture is either text document or other pictures. Pictures are, for example, ordered and linked to each other based on the photographer who has produced them (typically art collections, personal archives), organized by the period when they were produced or published (typically a newspaper archive or an institutional archive) or ordered according to content (typically in cultural historical museum or stock photo agencies), and this linking is spatial and singular. On Flickr Commons, each participating heritage institution can organize the published pictures in albums. On this site, the Preus museum has, for example, 39 albums. The majority are labelled according to the originator's or photographer's name. The focus on oeuvres, collections of certain photographers' work, is directed towards the catalogue raisonné. The second most common are albums based on different image content or dating. They include, for example, a collection of pictures of cigarette cases, another of spirit photographs, and a third called '100 year old private photos show two cool women playing with gender roles', which includes pictures by the Norwegian photographers Marie Høeg and Bolette Berg. There are also albums based on image technique, such as daguerreotypes, which show how different materials are typically stored in the analogue archive or museum storage. SNHB, in turn, has 30 albums on Flickr Commons. The majority are

labelled according to the photographers' names. The second most common are albums based on depicted geographical locations. For a few albums, image technique is the organizational factor, like autochromes (of Villa Bonnier), stereographs, postcards, and drawings. Finally, there are also a few albums that are based on image content only such as 'Runic inscriptions', 'Cities', and 'Old churches'.

Although the Flickr Commons interface is organized into sub-collections, called albums, it is possible to search and find material across the boundaries of these groupings. A digital database like Flickr Commons may simultaneously have multiple active links to other images and these are textually based, according to their metadata or their so-called 'tags'. There are systemic patterns in these different ways of linking images to each other. The metadata on Flickr Commons focuses on three aspects: the collecting institution, the originator, and the image content. This means that the online photo archive does not provide more information or more links but rather establishes and favours those types of links based on metadata. It enables some links but disables others. On a platform like FlickrCommons, with its implicit focus on image content, it may therefore be hard, or even impossible, to make structured searches across a large collection based on the gender of the artist or the place of registration, the historical production context, or intended use (genre). In fact, what happens when you search for a particular image content, by typing keywords like 'dress' or 'shoe', is a search return that includes very varied types of pictures, from fashion photographs that have been published in adverts or magazine editorials, documentary photographs depicting dress habits in historic periods, to pure registration photographs of dresses and shoes in a particular museum collection.

However, a keyword search on Flickr delivers a content-based cohort of images. Yet, pictures are rarely organized according to their visual content in the respective analogue archive or museum collection. Fonds or the year of production are most likely the sorting principle.

A search for the word 'Sami' on Flickr Commons, for example, returns pictures from very diverse collections and different time periods, and image techniques. This may show anything from a Sami singer in the Eurovision Song Contest of 1980 through to innumerable documentary photographs from the nineteenth-century to eighteenth-century etchings.[7] The analogue archive, on the other hand, is organized in a manner that is based on the date of accession to the collection. The pictures are typically ordered according to provenance or historical context – or so-called 'legacy data'. Time is a basic organizational feature of the analogue archive as well as genre.

Neither the techniques used nor the material size of the pictures are typically a sorting principle on Flickr Commons. Yet, it is vital to know the relative size of a picture to understand its historical meaning and use. Likewise, it is crucial to know whether a depiction is created with a camera or pencil, whether it is a photograph or a drawing or painting.

The analogue archive can be visualized like a hierarchical tree structure with units or sub-archives within the collection, which consists of binders or boxers which, in turn, contain single pictures. What is seeable online, however, can be likened to a light board rather than boxes on shelves. The relation between what is kept in the analogue archive and what is visible online on a site like Flickr Commons can thereby be described as a flattening of the archive. So, what we see online is a pattern of equally large and formatted pictures and the way photographs may be searched on this visual platform, as equal single items, is an effect of this flattening. Again, this aligns better with the library collection where the provenance of each item is not seen as relevant since a library typically 'holds what amounts to the same thing', copies of identical mass-produced items (Seeman and Dean 2019: 5) (Figure 4.4).

Typically, hidden in online interfaces like Flickr Commons are institutional contexts that explain why a picture has ended up in a particular institution and what the entirety of the collection looks like. Another hidden aspect is the fonds and historical context indicating why a particular picture has been produced, how it has been used, and by whom. A third hidden element includes the material aspects or contexts which describe the relative size of the picture, the technique used to produce it, and its immediate, material context in the archive. Finally, but not least, the digitization context is maybe the most under-communicated information of all. Para-texts describe why, for example, all the images in one collection/folder/binder have been digitized but none in another, and some but not all in a third are not included in Flickr Commons. Neither is there any information about who has chosen what to, or not to, digitize and the date when the material was digitized. The methods, rationales, and practices employed during the process of digitization are likewise not communicated. As we have described in a previous study, the process of digitization is certainly historically changing and depends on a variety of cultural, organizational, and monetary factors.

As Bonnie Mak proposes, we need to study the archaeology of digitization as, consequently, we 'should understand the digitally encoded entity as a cultural object, produced by human labor, and necessarily shaped by – and consequently embodying – historical circumstance. With this perspective digitizations emerge as material artefacts, ideal for the study of the past and present' (2014: 1521).

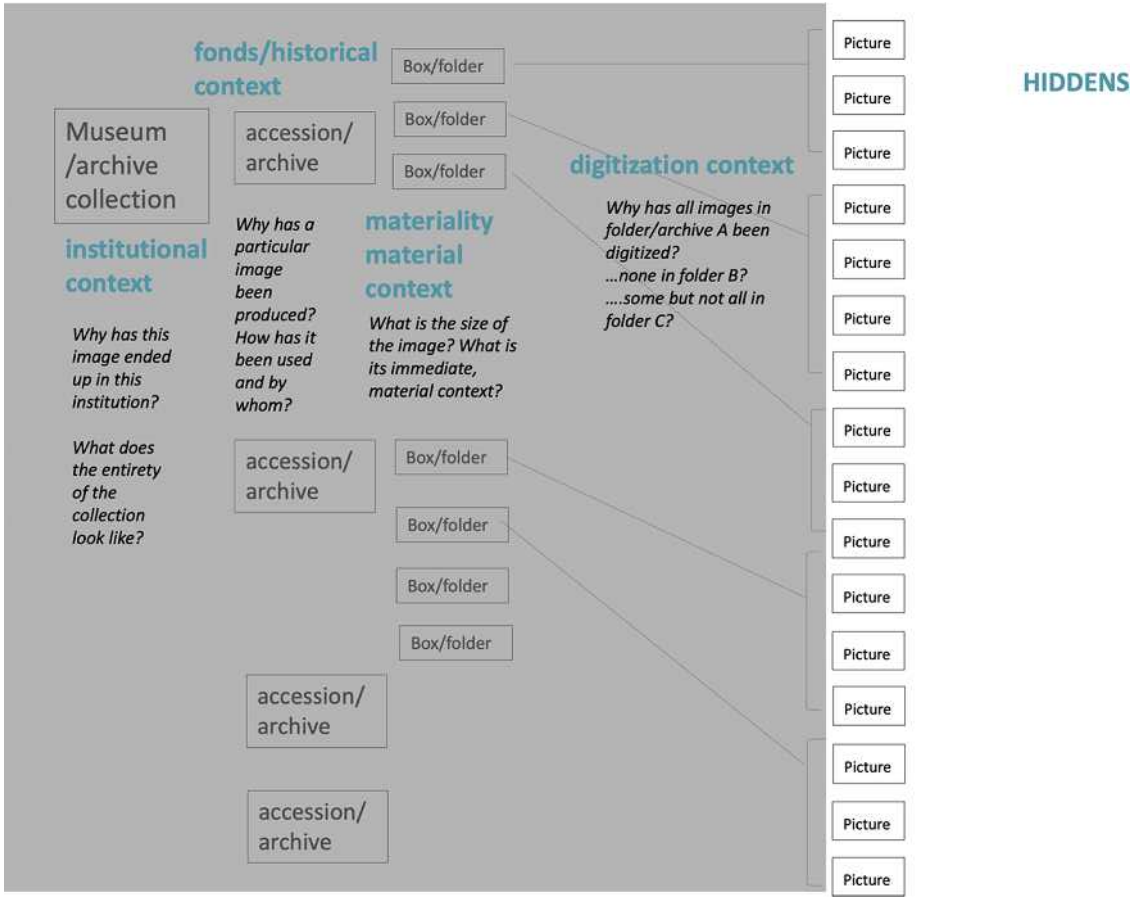

FIGURE 4.4: The flattened archive. Visible and hidden (greyed) information in the online picture archive.

Conclusion: The image as database

The transition from analogue to digital not only changes the basic information infrastructure of the picture archive but also changes the understanding of what a photograph is, what a picture is. As pointed out by several scholars before me, the focus on the single image and downplay of historical context changes how we understand the context of photographs but also how we conceive of the single photographic image (Birkin 2020; Kahn 2020).

Adding to Poll's argument (Poll 2010), I reiterate that the systematic structure for how picture collections are made available digitally online on Flickr Commons and other sites has two characteristics that are linked to the field of library and information management. Libraries have been both ahead and expansive when it comes to digitization compared to museums and archives. The focus on individual pictures and the tags, metadata, and hyperlinks online emphasizes collecting institution and image content. At the same time, certain types of information are systematically downplayed. In the physical, analogue archive, time is always a key organizational aspect as every document, series, or sub-archive has an accession number indicating when it entered the collection. Wolfgang Ernst and Jussi Parikka (Ernst and Parikka 2013) have suggested that the digital archive is characterized by multi-temporality but the effect I would say is rather non-temporal. Online the historicity of images is downplayed. They appear in a constant present: historical style but without historicity.

As pointed out by Seeman and Dean, this

> underlines a slight distinction in that library and digital object description is made to be atomized, re-mixed, and matched in whatever order the user finds useful (and this is an impossibility to comprehensively predict), while archival metadata may enable the same re-mixing but wants the context and structure to 'stick' with the metadata and its associated object.
>
> (Seeman and Dean 2019: 8)

Thus, in the core systematic features of online photo collections, which focus on the individual picture, the item level matches the basic systemic thinking of library collections better than the correspondent for archives and museum collection. Therefore, it is completely logical, as in the case with Flickr Commons, that Library of Congress was the first institution to utilize and publish their collection on the platform.

This might be opened up to a larger debate because libraries have not only been early adopters in digitization practices and efforts. I argue that the systemic thinking of the library dominates online databases. The bibliographic take on pictures dominates online repositories and other databases that do not primarily display textual material. The bibliometric tradition which has dominated library work

with pictures since the nineteenth century (Kamin 2017) typically renders a strong focus on image content rather than on different types of contextual information. The archive contextual information is at the core and includes juridical-administrative, administrative, provenance, procedural, documentary, and technological context.[8] The same kind of contextual information is at the core in museum collections; yet, they also have a strong focus on the materiality of items in the collection. This focus on the visual content of pictures has, in turn, implications. Thus, online logic transforms photographic images primarily into repositories of content.

This is an example of the 'commodification' of photographic images (Birkin 2020, 2021), or even a commodification of fragments of photographic images. In this way, parts of photographs become the end products. The image is a composite of fragments of information that can be mined. In fact, this is exactly what much of the machine reading models for images are focused on: that is to extract the smallest possible meaningful unit. In effect, it is 'image of' a face and a dress, rather than a portrait or a mugshot. The primary function or meaning of the photographic image is then as an accumulation of visual content and pictures that can be mined in the same way that texts are text mined for details or fragments. Such visual raw material can range from representations of certain objects or creatures to particular textures or hues.

As a consequence, the image surface as a unified whole is thus not the only way of understanding photographic images. A photograph can be digitized in a technical sense to appear online but it can also be conceptually digital just as an image rather equals a list of visual details, fragments, a list of things, an archive of visual content in itself […] as databases in themselves (Figure 4.5).

FIGURE 4.5: The picture as repository for visual raw material.

NOTES

1. The research presented in this chapter was supported by the Swedish Research Council under grant number 2018-06057.
2. https://en.wikipedia.org/wiki/Flickr (accessed 9 January 2024).
3. https://www.flickr.com/people/preusmuseum/ (accessed 9 January 2024).
4. https://www.flickr.com/people/swedish_heritage_board/ (accessed 9 January 2024).
5. *Etymologisk ordbok* (Malmö: Gleerups, 1993), 31.
6. https://en.wikipedia.org/wiki/Gelatin_silver_process (accessed 9 January 2024).
7. https://www.flickr.com/search/?w=commons&q=sami (accessed 9 January 2024).
8. http://www.interpares.org/ip_director_welcome.cfm (accessed 9 January 2024); Seeman and Dean, 2019, p. 3.

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5

RE:Inventing the Museum: Co-Creation in Digital Space

Leah Lovett and Valerio Signorelli

Introduction

The emergence of digital collections as cultural and discursive objects aimed at cultural preservation in the early 1990s brought to the fore questions concerning the accessibility of museums and their collections. Whether regarded positively, as a means of engaging more and diverse audiences, or critically, as risking the integrity and security of cultural institutions, putting digital objects online has generally been assumed to make museum collections more available to people beyond the museum walls. The non-profit initiative Google Arts & Culture has been a main driver of this trend since 2011, promising 'to preserve and bring the world's art and culture online so it's accessible to anyone, anywhere' (Google 2022a). From the initial 17 partner museums in 2011, based mainly in the United States and Europe, the project has enabled and supported access to more than 2000 museums, associations, collections, and archives covering all five continents, though by no means evenly distributed (Google 2022a). Among the *ad hoc* features developed for the Google Arts & Culture platform, several make use of existing Google technologies such as Picasa and Google Street View. Of these, the Google Street View virtual museum tour experiences have increased rapidly from nine to 250 experiences, with more than 100 having been added since 2020. This timing is significant, as the mass closure of cultural spaces within the United Kingdom and internationally as a measure to prevent the spread of COVID-19 brought questions regarding digital accessibility to the forefront, presenting an unforeseen opportunity to test the aims of existing digital collections and to reimagine the relationship between digital technologies, museum collections, and virtual museums (for a focused discussion of virtual museum tours, see Wasielewski 2022).

This chapter begins by engaging with existing literature from across the arts, curatorial and museum studies, and media studies to map out claims for digital collections and virtual museums as means of increasing accessibility through enabling audience outreach and opportunities for interactivity. Aware of the lack of an established agreement on their definitions (Schweibenz 2019: 12), the term 'digital collections' is understood in this context to give priority to the capture, digitization, and cataloguing of individual museum objects to enable user searching. Alternatively, 'virtual museums' give greater emphasis to the curatorial and spatial arrangement of collections to convey the museum experience. Though taking a historical view, our focus is on augmenting existing curatorial practices aimed at inclusion through exploring how, and to what extent, digital spaces enable cultural participation in practice.

In critically questioning how far expectations for the digital accessibility of museums have been realized, we discuss the Google Street View model of the virtual museum developed through Google Arts & Culture, as a digital replica or 'twin' of the bricks and mortar museum. As a means of mapping and linking together panoramic images, Google Street View provides a highly visible and replicable approach to enable remote access to museum spaces. There are, however, certain limitations with this model, not least, the difficulty of viewing many of the exhibition objects and artworks on virtual display, except where they have been specifically highlighted or linked with external digital archives. In adhering to the limits of the architectural space and camera set-up, we suggest the Street View model neglects the agency and experience of the virtual museum visitor, who must navigate the exhibition picture by picture, in short jumps. Moreover, the knowledge, resources, and access required to obtain the panoramic images that constitute this type of virtual museum make the Google Street View model better suited for the capture of permanent than temporary displays. While it remains useful in offering an immersive experience of museum spaces, the limitations of this model call into question any presumptions of digital accessibility, prompting us to ask what different approaches there might be to realize the potential for meaningful interactions and encounters with digital collections through virtual museums.

The alternative model we are proposing here centres the sustained participation and collaboration of museum visitors and creative practitioners in the development of virtual museums. Our main case study is RE:Invent Digital Pilot (Lovett and Signorelli 2020), a series of three virtual and interactive studios realized as a digital co-creation between young people, artists, researchers, and museum producers with the Young V&A (formerly the V&A Museum of Childhood). Co-creation in this context recognizes that the museum experience is constituted *between* institutions and museumgoers, rather than through the transmission of

knowledge from the institution to the viewer. By actively involving audiences in the selection, creation, display, and interpretation of exhibits, we show how digital co-creation seeks to mobilize technology to renegotiate the relationship between institutions, artists, and audiences. In this ambition, we suggest digital co-creation can be a method that 'allows *the process*, not just the product, to be conveyed', according to 'the collective imagination of many' (Negroponte 1995: 224).

Virtual museums and the collective imagination

Though initially motivated by the preservation and management of art and cultural artefacts, the digitization of museum collections over the past 30 years prompted debates around issues of access to cultural institutions and digital accessibility from the outset (Cameron 2003; Davis 1994; Geismar 2018). Since the first experiments with digital-imaging technologies in the early 1990s, scholars from across technology, media studies, museum, and culture studies have recognized opportunities for expanding and diversifying museum audiences through digital outreach, education, and participation. At the same time, the dispersal and susceptibility of digital media to alteration have led to concerns about the integrity of digital collections and the potential loss of institutional control. Reading across these accounts raises key questions for the present discussion about the meaning of access, and how – and under what conditions – virtual museums might be understood to increase accessibility.

Early scholarship and press around digital virtual museums, primarily multimedia CD-ROMs and museum websites, emphasized the potential for digital-imaging technologies to increase data flows and communication with geographically distributed audiences (Miller et al. 1992; Bowen, Bennett, and Johnson 1998; Bowen et al. 2005; Schweibenz 2019). Media reports declared the expectation of increasing museum audiences through digital outreach (Muchnic 1994; Information Today 1993), and announced the liberation of culture, via the computer screen, from 'the distant tower of the museum, […] [into] our own homes, schools, offices, and local libraries' (Griffin 1997: 67). Nor was the transmission of data necessarily assumed to be one way, as digital technologies created novel channels for reciprocal information flows with the potential to transform museum cultures. This led some commentators to recommend a cautious approach to digital collections and their seepage out of the museum. On the launch of LUNA, an information and standards organization for digital imaging in the visual arts established by the Getty Trust and Kodak, Muchnic (1994) noted the reluctance of museums to embrace digital reproduction technologies

for fear of forfeiting, 'both a lucrative licensing system and the artworks' integrity'. Schwartz (1997) asks, 'How many people will want to stand in line in a museum to look at a monitor offering information that they can access at home, with no one breathing down their necks?' Davis (1994), meanwhile, viewed the digital as 'problematic' for museums, on the basis that, 'digital evidence can flow out of the museum record-keeping system into the educational system, the entertainment system, or the economic system, resulting in a multitiered digital museum'. Negroponte (1995) went further, anticipating the meeting ground of computing and culture would bring about irreversible 'mutation and change' to culture through enabling collective participation in the 'digital manipulation' of digital art and artefacts. Far from viewing this change as problematic, however, he imagined art becoming 'more participatory and alive' through contact with the digital.

Whether perceived as a risk or opportunity, the emergent discourse therefore conceived of digital technologies as uniquely capable of disrupting any singular cultural or institutional authority. However, despite a tendency to conceptualize the digital in terms of a rupture with previous material cultures, the digital as material belongs to a long history of cultural production and practices of collection: 'imagining the digital/analogue as a divide (rather than a continuum) is not a particularly productive way of understanding the particular materiality, and historicity, of digital practices and objects in museums' (Geismar 2018: xviii). The potential for digital technologies to enable participation in cultural production was imaginable and realizable only insofar as it interacted with a wider shift towards increasing and diversifying museum access – not only to the collections themselves but also to the conditions and cultures of their display. The range of responses to the earliest virtual museums rehearsed a conversation playing out in the museum and heritage sector concerning the role of museums in asserting and maintaining Eurocentric hierarchies of power, and moves to challenge 'top-down' regimes of curatorship focused on the unidirectional transmission of knowledge from the museum to the visitor (Anderson 2012). In advancing an understanding of museums as sites of cultural production, tasked with codifying and enacting a shared set of civic values, art historians and museum scholars were beginning to call their assumed authority into dispute (Duncan 1995). Informed by post-structuralist and postcolonial theories, attention shifted to the multiple, contested narratives at play within and beyond cultural institutions, and the diverse ways audiences might relate to those narrative conflicts. The turn towards site-specificity and new modes of public art addressed to social issues in arts practices further contributed to bring the sites of engagement with culture, including museums, into view (Rendell 2010). Repositioning audiences as participants and co-producers of art and culture, socially engaged artists were reimagining the creative process as

a catalyst for transforming social and spatial relations (Lacy 1995; Kwon 2002; Bishop 2012). With artists making interventions into the social fabric, curators took on a new role as custodians of communities as much as of objects, and museums in turn underwent a transformation, 'from being *about* something, to being *for* somebody' (Weill 1999).

The image of widespread collaboration in the iterative production of art through the digital put forward by Negroponte (1995) resonated with these attempts to rethink the function and responsibilities of cultural practices and institutions in relation to the cultures, communities, and social hierarchies enacted through their displays. Technically, however, his vision of geographically distributed, digital co-creation became practically possible with the emergence of Web 2.0 in the early 2000s, recognized in retrospect as the participative evolution of the web (O'Reilly 2005). Where Web 1.0 has been characterized by its innovator, Tim Berners-Lee, as '*read-only*' (Choudhury 2014), the Web 2.0 user is invited (and sometimes obligated) to actively contribute to its expansion through sharing bits and bytes of life experiences and personal data via social networks, video and photo sharing platforms, blogging, microblogging, and wiki. Museums were quick to recognize how the technologies, software systems, and protocols enabling this evolution might be applied to their engagement activities. The participatory web introduces new opportunities for visitors to actively engage and share their voices in the museum (Simon 2007; Pulh and Mencarelli 2015). Nevertheless, Pulh and Mercalli (2015: 48) also acknowledge the limitations of these approaches and the issues arising from the ill-considered use of Web 2.0 technologies: 'if these tools are able to develop the audience competences and to make museums less stuffy, their implementation may also induce tensions by challenging their authority and legitimacy and by disenchanting their visit experience'. Their discussion suggests that digital tools are not intrinsically capable of connecting institutions with audiences nor of delivering coherent museum experiences to the user without careful direction.

Google Street View, a model of the virtual museum

In exploring the current and continuously evolving landscape of virtual museums and the extent to which they have been made to realize the pervasive imaginary of digital participation in cultural institutions, our discussion turns now to the model developed under the Google Arts & Culture platform using the Google Street View technology. Beyond offering a highly replicable, well-established, and therefore recognizable example for discussion here, the Google Street View model of the virtual museum is especially interesting because of its proximity to

Negroponte's innovative research into spatial visualization at the MIT Architecture Machine Group during the 1970s, and currently folded into the MIT Media Lab. Released on Google Maps in 2007, Google Street View emerged out of an internal research collaboration with Stanford University that set out in 2001 to enable the photographic capture, processing, and dissemination of panoramic imagery of San Francisco, and in few years grew to a global scale (Olanoff 2013). The process the researchers and engineers arrived at effectively refines a method pioneered by Lippman and Negroponte three decades earlier in deploying data-collection vehicles to capture street-level views of the built environment, linked to a digital map, and controlled by an intuitive user interface. Between 1977 and 1980, with funding from the US military, Lippman and Negroponte developed a three-dimensional, touchscreen interactive rendering of Aspen, Colorado, made up of images captured by affixing multiple stop-motion cameras to the top of a vehicle.

Conveying this approach to the formative context of Web 2.0, the Google research team developed a replicable method for the mass capture of photographic data and integrated cartographic techniques to connect people with places, if not with each other. While the everyday scenes Google Street View offers up are populated, the incidental subjects are motionless, captured *in media* res, with their faces blurred for privacy since 2008. The Google Street View interface prioritizes the experience of the individual user, enabling them to digitally teleport into a landscape constituted of static moments that may be navigated in jump cuts, according to the documenting camera's location. The opportunities for interaction in this stitched-together digital environment are limited to stilted movement along roads with vehicular access, and visual observation from the fixed perspective of the documenting camera (enhanced to an extent with the use of zoom and pan). There can be significant variation in image quality and light levels across an urban area, and some sightlines to the street may be obscured, for example, by passing high-sided vehicles. Google Street View images moreover vary in resolution depending on which year the survey took place. However, even the lowest resolution images are sufficiently detailed to provide a visual reference of urban surroundings, as well as increasing the functionality of Google Maps, for instance, by contributing data to enhance the accuracy of routing and distances.

Though initially focused on street spatial visualization and presented in the context of a digital navigation tool, the Google Street View technology was subsequently expanded through the development of portable camera equipment to enable the capture of pedestrianized spaces, including tourist attractions, university campuses, and even the Great Barrier Reef, the Brazilian Amazon, and the International Space Station (Google 2022b). The first virtual museums were added in 2011 under the remit of the Google Arts & Culture platform, giving internet users panoramic views into cultural institutions including the Hermitage Museum

(Russia), the Metropolitan Museum of Art and Design (USA), the Uffizi (Italy), and Tate Britain (UK). While therefore realizing an imaginary expressed in early accounts of virtual museums – 'more accessible than travelling to the Louvre' (Negroponte 1995) – applying technologies designed for the capture and rendering of outdoor environments to the representation of museum interiors exposed the limitations of the model as a museum outreach and engagement tool. Notably, the fisheye lens of the panoramic camera produces distortions that are less apparent with distance, and more visible with objects appearing in the foreground of the shot. In the context of the street, these close objects are likely to be transient, incidental, or additional detail – a passing cyclist, for instance, or a bollard. In the context of a virtual museum, however, where display objects are the signal focus, such distortions actively frustrate the visitor experience. The Google Street View technology prevents close viewing of museum objects in other ways too, for example, due to the discontinuous sightlines – as determined by the camera's position – as well as the relatively low resolution of panoramic photography. Optimized to convey an impression of the street without excessive data usage, the Google Street View model is less well-suited to the representation of exhibition spaces, especially where there is detailed work or curatorial text to read. While these limitations may be addressed through the online publication of exhibition materials and links to digital archives, these features are supplemental to the core Google Street View-based experiences available via the Google Arts & Culture platform. While there are more interactive experiences emerging within the wider Google Arts & Culture project space, these alternatives are more experimental and site specific by design, and consequently tend to have narrower scope and institutional reach.

The Google Street View model of the virtual museum therefore perpetuates limited opportunities for meaningful engagement – including close observation – beyond the most cursory glimpse of the gallery spaces. The resulting experience is produced as a form of *déjà-vu*, giving an impression of a cultural encounter, and perhaps recognition of the depicted space, but which remains tantalizingly out of reach to the online visitor due to the constraints of the digital platform:

> I was a little clumsy with the technology, certainly, but it's also clumsy technology – not designed for looking closely so much as panoramically. Street View technology aims for a sort of overall sense of awe – the effect of a re-created space, rather than its details.
>
> (Haigney 2020)

Nor is the Google Street View model especially suited to participatory curatorial projects and attempts since the 1990s to make museums more accountable and porous to the communities they represent – both in relation to the displays

themselves and, in the UK context, as an effect of public funding structures. Increased availability does not necessarily equate to increased accessibility, and this is not exclusively a digital issue. As Negroponte (1995) suggests, digital collections do present opportunities for interaction and transformation that might be impractical otherwise for reasons of conservation. However, the emphasis on the individual user of Google Street View and the closed, unalterable mode of representation hardly invites the interaction that another model of the virtual museum might be imagined to enable.

The gaps that appear in the attempt to transpose a digital platform developed for the visualization and mapping of outdoor spaces into the museum context call for digital tools but also processes to support the specific needs, intentions, and activities of cultural institutions in context. Developed with a view to improving street navigation, Google Street View was never intended as a tool for extending cultural engagement with digital collections, and its pervasive use for the dissemination of virtual museums gives rise to questions about how digital tools might be used differently to activate the viewer as a participant and creative contributor. What activities might the digital facilitate, beyond a disjointed walk-through of existing exhibition spaces, to augment, extend, and transform the institutional offer? The second part of this chapter sets out an alternative approach to building a virtual museum in collaboration with Young V&A, artists, and young people (aged 11–14) using a method of digital co-creation in the context of the first UK lockdown (March 2020). In discussing the discoveries but also the challenges of this case study, not least the resources (time, expertise, material) required to develop a virtual museum within the context and limitation of the ongoing pandemic, we ask what qualities of engagement do existing platforms enable, and how might arts-led engagement methods be deployed to make virtual museums more flexible and open to participation?

Lockdown and museum response

Notwithstanding significant strides in the development of digital and online museum displays since the early 1990s discussed above, the UK cultural sector was underprepared for exclusively digital and remote delivery when Prime Minister Boris Johnson addressed the nation on 23 March 2020. While every industry and aspect of life was impacted by the government directive for 'non-essential' workers to stay at home, those cultural forms and institutions organized around and contingent on the co-present audience had to rapidly reconsider whether and how to deliver on their public remit (Noehrer et al. 2021). In many cases, it was necessary for producers to cancel or postpone programmed work, resulting in

income losses for organizations and practitioners. Indeed, the collaborative project discussed below followed the cancellation of a weekend festival organized by the former V&A Museum of Childhood to mark the start of a two-year redevelopment, with the museum planned to reopen as the Young V&A in 2023.

The sudden and increased need to be online for work, education, and social and cultural engagement made significant disparities in online access and issues of data poverty across the United Kingdom more visible, with 8 per cent of UK adults internet non-users, rising to 46 per cent of adults over 75 years of age according to recent Census data (ONS 2020). Yet, the forced closure of museum buildings gave renewed focus to the imaginary of the virtual museum as a means of making digital exhibitions and cultural experiences accessible, with Google Trends recording a worldwide peak for the search term in March 2020, and a flurry of popular articles directing readers to the 'ten best virtual museum and gallery tours' to be enjoyed 'from the comfort of your own home' appearing in March and April 2020 (Romano 2022; Wilson 2020). As cultural producers and artists – including those who may not have engaged with digital media in a particularly intentional way prior to the pandemic – began to explore how to adapt their practices to and through the digital, so digital platforms became increasingly vital sites of creative production and exchange, with hashtags like #MuseumFromHome from Museum of Modern Art trending on X (formerly Twitter) and initiatives such as the Artists' Support Pledge on Instagram.

For those cultural institutions with financial and technical resources, confinement therefore became a catalyst to strengthen their online offer, or in some instances create a digital presence. In a study by NEMO (2021), social media activities were found to be the most popular, widespread, and cost-effective activities to define or reinforce online presence, with almost 60% of the responding museums reporting an increase in social media engagement (NEMO 2021: 5). Many institutions recycled existing digital media, indicating a lack of new content (Morse et al. 2022). Where new content was made available, the most popular formats included video content (42%) and virtual tours (28%), suggesting a preference within the museum sector for experiences adhering closely to the physical museum displays, with limited scope for visitor interaction and input, consistent with the Google Street View model. Asked what content was most sought-after by site visitors, however, interviewees indicated an emerging need for more dynamic, engaging, pedagogical approaches: 'the highest demand was for educational and inspiring content, mostly driven by parents home-schooling their children and teachers (re-)using content designed for pedagogical use' (Noehrer et al. 2021). This finding is reinforced by Morse et al. (2022), who note that, 'the most successful digital engagement came from those activities that promoted a sense of community or an invitation for self-expression by visitors'. Rather than attempting to

replicate the physical display, this move towards the use of digital technologies to invite creative expression shows how virtual museums can provide distinctive experiences to extend and shape the relationship between visitors, digital collections, and the institution.

The discrepancy between the availability of and demand for participatory digital experiences gestures to a gap in digital platforms, technical skills, knowledge, and resources to meet the intersecting needs of museums, creative practitioners, and young people in the rapidly shifting context of the COVID-19 pandemic. As has been noted, museum professionals may be unaware of the capabilities of novel digital technologies due to limited capacities to engage with the latest research, especially since curating and digital communication have traditionally been regarded as distinct activities within organizational structures (Morse et al. 2022). At the same time, museums have often provided researchers opportunities for the practical application and communication of experimental technologies.

In March 2020, we had been preparing to participate in the Young V&A festival with a proposal for a digital time capsule to capture and convey visitor responses to selected display objects. This project represented an extension of research by our group, Connected Environments, into digital co-creation methods, inviting audience participation in a digital process to generate meaning and connection through the act of making together, as well as through interaction with co-created digital outputs. Notwithstanding this experience of developing novel digital experiences with and for collaborators, however, our activities were oriented towards in-person delivery until 2020. The move to remote working limited opportunities for traditional outreach and public engagement with research, giving rise to questions that resonate with Negroponte's (1995) image of distributed collaborators, around how best to invite and sustain remote participation in co-creation projects across the digital divide. In this way, the emerging context of the first lockdown revealed the need for knowledge exchange activities to support digital experimentation and the development of platforms aimed at cultural creative engagement and participation.

RE:Invent Digital Pilot: A case study

RE:Invent Digital Pilot brought together young people of 11–14 years, as the 'reach' audience previously underserved by Young V&A, together with freelance artists, museum producers, and researchers to explore novel forms of online engagement and co-create a digital space to inform the learning programme of the reimagined museum over the longer term. In the immediate aftermath

of the lockdown order and cancelled cultural programmes, our primary aim was to enable activities planned for the Young V&A festival to go ahead in an adapted format to address the urgent needs of the museum's young audiences and freelance artist collaborators. Secondary to this, we were curious about the potential for brand-new digital technologies to connect people across geographically distributed locations and enable creative participation with potentially limited technical knowledge and resources. The project was funded by UCL Engagement through a small Community Engagement Seed Fund of £4000, with further in-kind support from The Bartlett Centre for Advanced Spatial Analysis and the Young V&A. The reallocation of funding, initially intended to cover our costs as researchers delivering public engagement activities for the festival over a weekend, to enable a digital co-creation project over eight months was possible thanks to the flexibility of both our funder and the Young V&A as our partner.

Our main collaborator, Helena Rice (creative producer, Young V&A), used the limited budget available to (re-)commission three artists who, like us, were involved in the plan for the cancelled festival: artist and designer, Kristi Minchin; performer, athlete, author, and hula hoop artist, Marawa Ibrahim; and multi-instrumentalist, composer, sound artist, and author, Dan Mayfield of School of Noise. While therefore engaged with digital media to varying degrees, these artists were selected for RE:Invent Digital Pilot because their practices are broadly aligned with the thematic organization of the new museum, with galleries inviting audiences to Imagine, Play, and Design. As well as the artists, and in keeping with the ambition of the museum redevelopment to encourage creative play, ten young people (aged 11–14) were recruited as Young Ambassadors to participate in the project via partnerships with two Tower Hamlets-based youth organizations, Spotlight (2022) and Leaders in Community (2022). The youth workers assumed responsibility for ensuring parental consent, basic digital access (hardware and data), project communications, and safeguarding of the young participants. The young people had a key role in informing the scope of the digital commissions, collaborating with the artists to create them, and ensuring that whatever we made would be relevant to them. As researchers, our role was to share our research expertise and build, test, and update the digital platform for the duration of the project.

The co-creation process

The constraints were clear: the workshop sessions would need to take place outside of home-learning hours and they would need to be held online; we

would all be remote from one another. In addition, we had to assume that no specific resources in any one household other than the devices used to connect and participate to the workshop, in most cases a smartphone. On a practical level, the delivery included nine online sessions: an introductory meeting with all the participants of the project; six creative workshops, two facilitated by each of the three commissioned artists; a session for testing of the developed digital platform; and feedback sessions and conclusion of the project. All of these sessions took place via Zoom over an eight-month period, from April to November 2020. Zoom was chosen as the preferred video platform of our partner youth organizations, and therefore familiar to the young people participating in the project. Besides these meetings, there was regular email communication between researchers, producers, and artists to share updates to their commissions.

From the outset, the group shared a desire to explore the affordances of digital space, that is, the opportunity to work remotely to shape a place together, as distributed and connected collaborators. After the preliminary online and offline conversations between all the participants, we began to imagine the digital space we were co-creating in terms of three studios, and loosely corresponding to the new galleries of the museum, to be realized as three distinct but linked commissions with the three selected artists. The studios did not mimic any representation of the existing museum space, and they purposely challenged the intended uses and limits of our chosen tools and technologies.

The web technology

A guiding consideration in determining what technologies and approaches to use for this project was the uneven access to devices, platforms, and internet speed capability of the participants, both young people and artists. We decided to focus our attention on web-based technologies, specifically AFrame (2022) and Howler.js (2022), which are inherently cross-platform and device agnostic, flexible enough to accommodate the multimodal outcomes of the online sessions, and to cope with the time and funding allocated thanks to their permissive licences. Another advantage to using web-based platforms was our familiarity with these solutions through previous research practice, including in-person digital co-creation projects. In addition, the web-based approach enabled iteration in the co-creation process. The source code of the web application was hosted on a publicly accessible repository by GitHub (2022), a free-to-use code hosting platform for version control, collaboration, and web hosting. Any change or adjustment discussed together with artists and young people could be tested in real time and, using

'version control', it was possible to restore previous versions of the web application if needed.

For the three commissioned artists, RE:Invent Digital Pilot represented a new experience in adapting their practices and delivering commissioned projects entirely online. To help with this transition, the research team provided an overview and some practical examples through a series of immersive digital prototypes to demonstrate what might be possible with the chosen technologies during the initial project meetings. This exercise helped the team to identify overlapping areas of interest in research and practice without being prescriptive.

Each of the three studios progressed independently along the eight months of the project, reflecting the different practices of the commissioned artists, as well as the ideas and digital outputs that developed through their workshops with the young people. In inviting substantive input and material contributions from the young people as part of the creative process, the resulting experiences acted as a portal between the digital means of production and the participant homes, as spaces of confinement.

The movement studio

As the artist leads on the development of the movement studio, Marawa Ibrahim opened her workshops with breathing exercises and the 'Radio Exercise 1', a Korean national gymnastic routine, which the group was gently encouraged to perform on camera, in Zoom, together. Where individuals preferred to keep cameras turned off, this was accepted without question. The group went on to discuss how lockdown had made us feel in our head, chest, and legs, and to explore movements and exercises that might help to relieve any unwanted feelings. The participants were then asked to decide on images to represent their bodily feelings – 'If your legs felt like spaghetti, what movements might help them feel more grounded?' – and to record, in a short audio file, the instructions for the agreed exercises: 'from standing, touch your toes three times.'

The final studio took the form of a free-floating outline of a figure divided into three parts – head, chest, and legs – in the manner of a Surrealist exquisite corpse (Figure 5.1). The digital visitor could interact to change the images shown in each section of the figure through the use of gestures to swipe left and right. Double tapping on each image would trigger the linked audio file to play, sharing the exercises devised with the young people to be performed, as in the Radio Exercise 1.

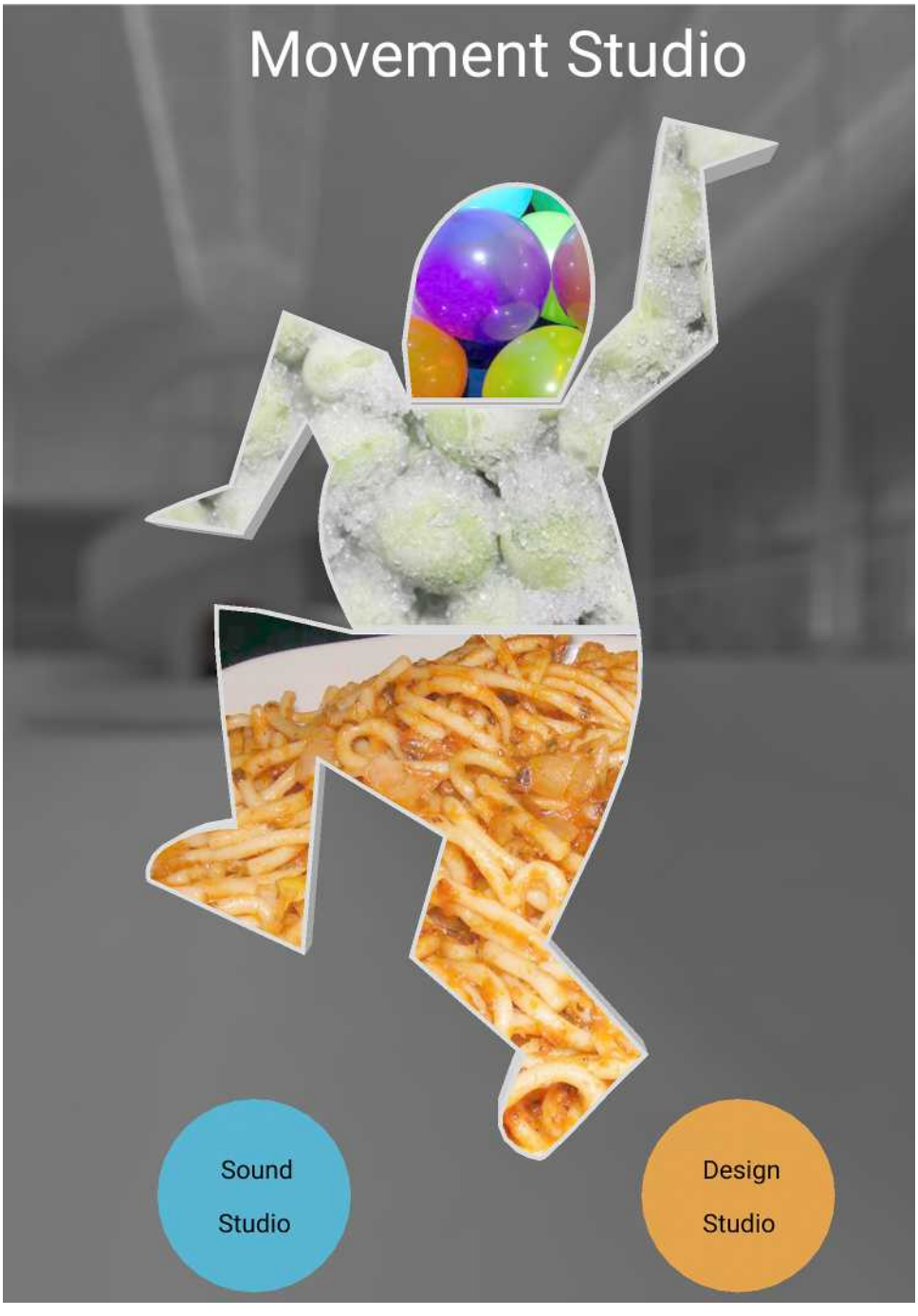

FIGURE 5.1: A figure with a head of balloons, frozen peas torso, and spaghetti legs conveys some of the felt experiences in the lockdown of participants in Marawa Ibrahim's movement workshops.

The design studio

Kristi Minchin is an artist who creates sculptures with colourful elements inspired by everyday objects that audiences are actively invited to touch, play with, and reassemble. In translating her practice to the design studio, she was keen to explore the possibilities of Blender for creating three-dimensional digital sculptures (Figure 5.2). The constituent, everyday objects for the digital sculptures were decided with the young people through online workshops.

Kristi opened her workshop by asking participants to draw, with pen on paper, any object they could see in another person's space on Zoom, before showing and attempting to guess what everyone else had drawn. Another exercise invited participants to gather whatever objects were to hand and assemble them as a sculpture (Figure 5.3).

The second workshop extended the exploration of household objects through drawing and collage to produce a collection of shapes and textures as the source material and inspiration for a series of three-dimensional digital objects created by Kristi in Blender. In its final iteration, the design studio featured a pipe above an empty plinth, as an open invitation to digital visitors to create their own virtual sculptures by dragging, pushing, spinning, and assembling the digital objects developed through the workshop process. The digital objects were randomly generated

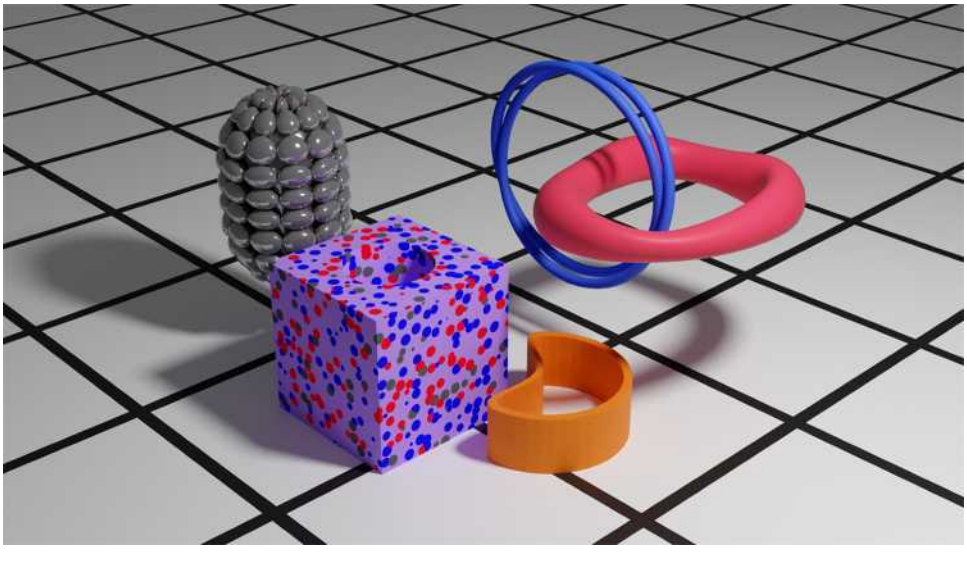

FIGURE 5.2: A sample of the three-dimensional objects inspired by participant drawings and created for the design studio. Modelling and rendering by Kristi Minchin.

FIGURE 5.3: A participant reflects on the summer from the confines of their room in an online workshop activity led by Kristi Minchin.

in the zero-gravity space by double-tapping on the pipe, and manipulated through swiping, dragging, and pinching gestures. In this way, the two-dimensional surface of the screen became the interface for interaction with three-dimensional digital space. Once assembled on the plinth, the sculpture could be exported and shared as a screenshot for exhibition on the web application.

The sound studio

Dan Mayfield, the founder of School of Noise, directed the development of the sound studio. During his initial online session, Dan introduced the group to Foley. As experts in recreating everyday sounds for film, television, and radio broadcast, foley artists use diverse objects to closely mimic the perceptual expectation of particular sounds. Dan challenged the group to guess what sounds were being depicted and to identify the objects used to produce them.

The young people were then asked to find and record the sound of an object that had been significant to them over the lockdown, or that was able to produce intriguing sounds. The final audio clips were edited by Dan to produce two versions of each sound, with differing durations, and linked to a digital asset selected from a free repository to represent their source.

The sound studio, meanwhile, took the form of a virtual hopscotch, reimagined as a sampler machine, with a beat moving through the squares in a loop. Dragging the three-dimensional objects onto the hopscotch squares added the connected sounds to the sequence, to be played on the beat. Placing two or more objects on the same square caused different sounds to be played simultaneously (Figure 5.4).

RE:Invent digital pilot web application

The three studios were combined into a single digital experience via a welcome screen and linked together using buttons that enabled the digital visitor to move across each of the spaces. Instructions on the use of each studio were provided in a drop-down menu.

Once the beta version of RE:Invent Digital Pilot had been completed, the young participants were tasked with presenting and sharing the link to the studios with their friends, and eliciting any feedback to support the future iteration of the web application. A final online workshop enabled them to share their findings and to reflect, together with the youth workers, commissioned artists, and researchers, on the co-creation process.

Reflections and learning

The RE:Invent Digital Pilot was limited both in scope and scale as a localized intervention, delivery in close collaboration with one museum, the Young V&A, that nevertheless successfully delivered a web-based interactive series of studios with original commissioned digital artworks co-created by artists, youth organizations, producers, and researchers. Our intention was never to compete with a platform like Google Arts & Culture, nor with the Google Street View tours, as a model of the virtual museum developed over years with vast resources, both financial and technical. Rather, considering the limitations of the virtual tour model, our objective was to explore whether an alternative process and provisional platform might be developed, using the tools and skills readily available to us, to centre the active engagement of partners, participants, and digital visitors in extending the museum offer during the lockdown. Within the scope of a pilot project,

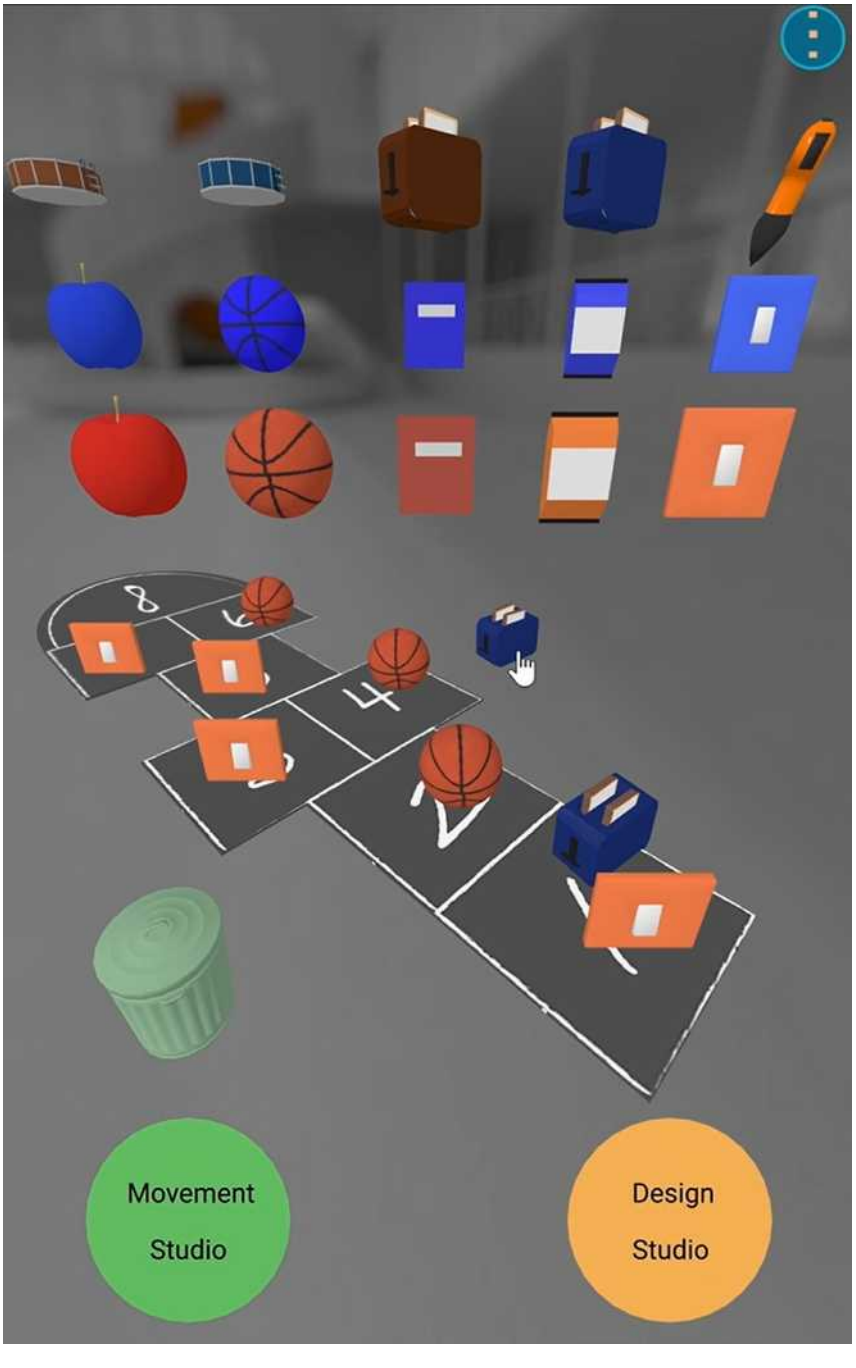

FIGURE 5.4: The virtual hopscotch used as a sampler machine to generate audio loops in the sound studio created by Dan Mayfield with Foley sounds recorded by participants.

RE:Invent Digital did provide opportunities for dialogue and meaningful input from partners and participants. Our findings suggest the museum professionals, artists, youth workers, and researchers who collaborated on RE:Invent Digital Pilot gained key insights into how remote co-production workshops might take place, the challenges of sustaining engagement when working exclusively online, as well as practical experience in structuring the project and individual sessions to improve access.

Specifically, we found that the artists felt they had developed new skills and ways of working through the digital co-creation process to support their practice moving forward:

> We've had to think so much about how to translate our practices. For me, moving into a digital space wasn't something I have done before. I have made loads of new skills I can use in other projects. Not just a new programme, but the whole thing.
>
> (Kristi Minchin)

The commissioned artists also reflected on the significance of this opportunity during a period where other work was disappearing:

> It was amazing to still be part of something when all around you everything seemed to fall apart – all the cancellations. All the work was going, and … no work was coming in, so to have this project happening, getting to chat with creative people, felt like a space of ideas flowing.
>
> (Dan Mayfield)

The timing of this project during the first lockdown furthermore contributed to a sense for our collaborators of being at the forefront of emerging technologies to develop new ways of working that might inform future digital practice:

> We've got this head start on every other festival that cancelled in terms of finding a way to do the new digital version. Like the blue-print of how these things can work, and how we can apply our skills and share them differently online. It's the beginning.
>
> (Marawa Ibrahim)

In the emerging context of the pandemic, RE:Invent Digital Pilot presented an opportunity to test the possibilities and parameters in running collaborative creative projects online, and called for a responsive and adaptable approach to address issues of engagement and access as they emerged. The process of digital co-creation that we developed together centred the creative participation of the Young Ambas-

sadors as key stakeholders in the development of the virtual museum pilot and, by extension, the re-invention of the museum site. The young people contributed substantively to the conception of the digital space as a whole, as well as to the development of each of the three digital commissions. Invited to reflect on their experiences of participating in the project, they highlighted the value of collaborating with creative practitioners and learning from their processes and practices: 'I learnt how to be creative using everyday things'; 'I learnt how to make ideas into a reality'; 'I learnt how to find weird sounds from everyday things'.

The role of Young Ambassador that emerged through this project was also significant in establishing an ongoing relationship between the museum producers and their reach (11–14 years) audience with a view to supporting the transformation of the Young V&A and its programmes. We discovered this role was also valued by the young people as means of formalizing their relationship with the museum and acknowledging their contributions to the RE:Invent Digital Pilot project: 'I can say in the future that I was a Young Ambassador with the V&A' (young participant). The commitment of all project partners to develop meaningful and lasting relationships with the museum visitors as key participants and stakeholders in the digital co-creation process marks the signal contribution of our approach to building virtual museums, as a main point of departure from the Google Street View model.

That said, the constrained scope and resources available for this pilot resulted in limited numbers of project participants. Asked what might have been done differently, the young people expressed their wish for, 'more people [to be] involved. There were too few'. While ten young people participated for the duration of the project, it was not unusual to have two or three participants in any one session. Small group numbers did allow for more directed engagement during the online workshops. However, the need to rapidly pivot to realize the project as a remote collaboration, the uncertainty of partners and participants adapting to the unprecedented and emerging context of lockdown, and the difficulties of sustaining engagement via Zoom all contributed to limit take up. It was also often difficult to gauge engagement during the Zoom calls as participants habitually used the mute button, and encouraging verbal expression was sometimes a challenge. Our experience with online communication platforms was still limited at the time of the project, and with the benefit of hindsight, more strategic use of features such as breakout rooms might have helped in structuring the online experience, for example, by allowing the young people to engage with one another with fewer adults in the space.

Due to the nature of the process and time constraints, some planned activities had to be scaled down or repurposed. For example, an initial proposal to make each of the three studios generative and to display the creations of the participants

was never fully realized during the pilot. The one exception was the Design Studio, which invited digital visitors to capture screenshots of their sculptural assemblages. An alpha test also incorporated the option to share sculptures back to the application for publication, but this was not released to the final version due to time constraints. We are continuing to explore the potential for virtual museums to be reimagined as meeting spaces for collective participation and co-creation, including opportunities for displaying the contributions of digital visitors.

The young people also identified some technical limitations in their feedback, including a requirement for 'smoother technology', the suggestion to 'optimize for PC too', and through questions around opportunities for providing additional features and updates on a regular basis. These comments perhaps reflect expectations shaped by familiarity with digital applications at a later stage of development; however, they also speak to the participants' investment in the web application as a co-created output.

The responsive and agile approach from all partners, and the ability to perceive alternative possibilities, enabled a major pivot in activity and outcomes. However, as a method of working, we found the digital co-creation process to be resource heavy, requiring a considerable investment of time, creative experience, engagement and youth work expertise, and technical skills. The experience of delivering workshops entirely online was observed to be 'exhausting on a whole different level compared to face-to-face engagement' (Helena Rice). Nor is the resulting web application immediately replicable to different contexts, having been created specifically to address the needs and interests of the commissioned artists, Young V&A, and their reach audience. This raises important questions for ongoing practice around sustainability and how best to facilitate and resource participatory digital activities. While it may offer less specificity, the Google Street View model supported by Google Arts & Culture does provide a tested and highly replicable approach to the digital dissemination of virtual museums. As such, the use of virtual tours remains a viable and effective choice to allow remote visitors access to museum spaces, which despite limitations may be enhanced by higher resolutions and shorter capture time. Our hope, however, is for existing models of the virtual museum to be augmented not only through such technical solutions but also by embracing digital co-creation activities to empower visitors and support museums to deliver more inclusive programmes, and increase their resilience to unexpected events leading to closure.

Ultimately, we found digital co-creation did enable a community to cohere in lockdown, albeit on a small scale, through building trust and enabling meaningful communication and the exchange of ideas between partners and participants. Notwithstanding the modest scope and aims of the project, it enabled new partnerships to develop between the Young V&A, the commissioned artists,

Spotlight and Leaders in Community, as well as strengthening and deepening an existing partnership between UCL and the Young V&A. The experience of delivering this pilot contributed to shape subsequent digital co-creation projects by the Connected Environments team and prompted ongoing research into the uses of digital co-creation methods and spaces.

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6

Deep Art History: Inferences between Google Arts & Culture and Art Museums

Lotte Philipsen

New digital methods change the discipline of art history. These years, in particular, so-called 'artificial intelligence' (AI) – technologies that involve convolutional neural networks, deep learning models, and automated image analysis and image generation – influence art history. This chapter is motivated by an urge to investigate more thoroughly how well-established art museums use AI methods compared to the methods used by the popular online platform Google Art & Culture. In part, this urge stems from a nagging feeling that the application of highly advanced technological methods sometimes, paradoxically, represents a somewhat old-fashioned approach that seems simplified and methodologically opaque at the same time – as if post-structural image theory developed in the so-called 'New Art History' (roughly late 1960s to mid-1990s) is forgotten or ignored in some contemporary 'digital art history' practices at museums. Whereas general work has already been done that convincingly supports this hypothesis (Bishop 2018; Näslund Dahlgren and Wasielewski 2021; Wasielewski 2023), this chapter specifically re-activates theoretical insights by art historian Norman Bryson (Bryson 1981, 1983, 1988) in order to critically examine some of the most significant ways AI is currently at work in (selected) art museums.

Traditionally, art history belongs strictly to the humanities and computer science (evolving from mathematics) belongs to the natural and technical sciences. New fields like Software Studies (e.g. Manovich 2013), Critical Data Studies (e.g. Chun 2013; Noble 2018), and Science and Technology Studies (e.g. Bratton 2015; Zuboff 2019) are, however, positioned somewhat between the humanities and the natural sciences and work more interdisciplinary. In general, the overall aim of such fields is to study computer technology from a humanistic point of view

in order to analyse what new technological development does to people – how various algorithmic designs actually affects the lives of different groups of real people and feeds into societal structures on a broader level. Critical voices, including artists, from these interdisciplinary fields have pointed out severe problems related to automated image recognition tools such as racial biases in mainstream tools from Google and Twitter. This chapter is strongly inspired by the critical work carried out in these fields but focuses particularly on the cross-pollination between Google Arts & Culture and art museums (namely the national galleries in Denmark and Norway).

The following begins by very briefly accounting for differences and relations between the fields of Traditional Art History, New Art History, and Digital Art History to set the overall scene for the subsequent analysis and discussions. After this, the chapter elaborates on the relation between artworks and image files in computer vision as an important prerequisite for the subsequent analytical work: first, the text describes how Google's *Vision AI* looks at works of art, followed by an analysis of the implicit art theoretical approach of Google Arts & Culture. Next, the text turns to art museums and critically analyse how the national galleries in Denmark and Norway have worked with AI when organizing their collections for the public. The conclusion discusses some of the art theoretical implications of these new practices.

Art history: How and when?

The following briefly, and in rough and somewhat condensed manner, accounts for the characteristics of and differences between Traditional Art History, New Art History, and Digital Art History.

Just like World War I was referred to as 'The Great War' before World War II came along and renamed the event, 'old' art history was only identified as a certain set of art historical approaches when the term 'New Art History' came into the picture. Traditional art analyses were governed by a focus on either *formalism* (colour scheme, composition, style, etc. as practiced by Heinrich Wölfflin [1950] and Alois Riegl [1992]), or correct *identification* of objects/persons in the motif (iconography, as practiced by Erwin Panofsky [1972]), or symbolic *interpretations* of the specific motifs' broader context (iconology, *Geistesgeschichte*, as practiced by Max Dvorak [1924] and also Panofsky), or a combination of the above. In this 'old' art historical paradigm, the work of art exists in itself. Once it has been created by the artist, the work of art is complete and stays the same, while the job of art historians is to analyse it in manners that come as close as possible to the truth. As stated by Rees and Borzello in their description of Mark Roskill's 1974

book *What Is Art History?*: 'According to Roskill, art history is about style, attributions, dating, authenticity, rarity, reconstruction, the detection of forgery, the rediscovery of forgotten artists and the meanings of pictures' (Rees and Borzello 1988: 2). For the sake of clear terminological navigation, I will refer to these art historical practices as Traditional Art History in the following.

Art History as an academic discipline undertook a change from the late 1960s onwards. Traditional approaches were challenged by Marxist thinking and post-structuralist theory, and in order to distinguish the new methodological awareness and distance it from Traditional Art History, the term 'New Art History' was coined (Rees and Borzello 1988). New Art History considers the work of art to be a dynamic phenomenon, heavily influenced by its changing contextual framework. For example, a painting is not always a work of art but can instead be considered an image (Belting 1994; Mitchell 1994), a sign (Bryson 1983; Bal and Bryson 1991), an institutional practice (Danto 1964; Dickie 2001), or a construction of power relations (Nochlin 1971, 1983) – to name just some other possibilities. One overall characteristic of New Art History is a strong attention to the fact that Art History as such does not exist as a given, chronological narrative but that it is constantly (re)constructed by different academic communities that, by the use of different methods, create different art histories (Elkins 2002, 2007). In short, the difference between Traditional Art History and New Art History is that in the former, the art historian '*explained and classified*, but he did not question. The new art historians *question*, giving not only art but the society which enshrines it a long hard look' (as stated by Rees and Borzello 1988: 4, emphasis added). Norman Bryson was a key figure in New Art History, and his ideas will be reactivated later.

From a strictly chronological point of view, Digital Art History is newer than New Art History. Digital methods have been used in art history since the mid-1980s (Heusinger 1989; Zweig 2015), but Digital Art History as a distinct subfield of art historical practice has emerged during the last decade (Drucker 2013; Klinke 2020; Brey 2021). Digital Art History focuses on applying advanced digital methods to art historical research, and the subfield is primarily oriented towards practical use and discussions of AI tools that enable the detection of visual patterns across large image collections (for example see Moretti and Impett 2017) or network analysis of metadata (e.g. which artists were active in which cities and when). Among Digital Art History's academic manifestations are Routledge's massive companion to *Digital Humanities and Art History* (Brown 2020) and *The International Journal for Digital Art History* inaugurated in 2015 by art historian Harald Klinke among others. The underlying logic of Digital Art History may be carved out by consulting Klinke (2020) who describes Digital Art History as an extension of the classical art historical approaches that he detects in Wölfflin,

Riegl, Panofsky, Warburg, and Malraux – approaches that are described above as Traditional Art History. With references to Chris Anderson and Lev Manovich, Klinke sees great potentials in the fact that:

> The computer [… can …] compare everything to everything else. […] It will come closer to the original idea of the 'museum without walls' – this time with digital means. Its possibilities make it easier to tell other art histories, take new views, and to include the 'long tail' of objects in the narrative. This opens up to yet uncharted territories and maybe, thus, a 'democratization' of art history (i.e. the total inclusion of every visual artifact).
>
> (Klinke 2020: 38)

Despite the fact that this quote is stated under a subheading that reads 'Transition to a New Art History', Klinke neither touches upon New Art History from the 1980s to 1990s (described above), nor take its critique of Traditional Art History's methodological approaches into account.

In addition to the three art historical spheres (traditional, new, digital), the following will touch upon how Google analyses images and art. As a private big tech company, Google is not normally associated with art historical research in academia. However, Google's image platforms often combine approaches from Traditional and Digital Art History, thereby – due to the omnipresence of Google – implicitly promoting methods that have little room for the critical approach represented by New Art History. Before analysing how that happens, it is important to look at, in the following, what kind of material art museums as well as computer vision systems engage with.

A work of art – or not

Art historians very often study something other than works of art themselves. They study artists or historical narratives (this has often been the case in Traditional Art History, see Preziosi 1989) and/or they study representations of works of art, in the form of visual reproductions (first prints and drawings and later photographs, see Crimp 1980; Nelson 2000). Photographic reproductions, in particular, have played an enormous role in the discipline of art history: obviously, they have provided for extended visual accessibility of site-specific originals (Benjamin 2001), but in addition they have paved the way for genuine methodological experiments, for example double slide projections allowed for comparative analysis, flipped projections for studying formal properties, and larger collections of photographs for studying tendencies across time and place (Nelson 2000). The crucial point,

however, is to be aware *that* reproductions differ from what they (seemingly) represent, and what implications this has for the research and the possible claims resulting from the research. It is particularly important to pay attention to this in the field of Digital Art History, which engages only with digital representations of art – not with the work of art itself.

The fact that numerous museum collections of fine art have been digitized does not mean that the *works of art* have been digitized. Recollecting Walter Benjamin (2001), it merely means that *photographic reproductions* of the works now take the form of digital image files, and that these files are labelled with the digital metadata that curators in that specific museum decided were of relevance. A digitized museum collection does not include a single work of art. Instead, it consists of a large number of data files that each represent a photograph that represents a work of art (I deliberately use the term 'represent' and not 'mediate' – the difference between the two is accounted for by Lars Elleström 2010).

The all-important technical prerequisite for Digital Art History is computer vision and specifically image recognition tools. The overall principle behind building an image recognition tool is to train a computer model to match a specific visual, pixel-based input with a specific textual concept, for example, 'hat', and this training consists in feeding the model with a dataset of numerous different image files of hats (small hats, big hats, hats in different colours and shapes, etc.) that are all labelled 'hat' in advance (often by humans). By analysing the different images, the model gradually learns that the concept 'hat' can have very different visual properties, but that some features seem to be recurrent. In advanced deep learning image models with multiple neural network layers, what features the model learns to be 'hat-features' are embedded in the neural layers and therefore inaccessible to us. Ideally, after its training, the model will be able to analyse new, unknown, and unlabelled image files and determine whether, and exactly where, that image contains 'hat' (for technical elaboration, see Kelleher 2019).

The construction of the dataset used for training is of paramount importance. Some well-known training pitfalls are that the dataset is too small; that image files do not correspond visually to social understandings of real phenomena; that the dataset stems from a certain (limited) visual culture or that the labels are culturally idiosyncratic (Manovich 2017). The seminal, all-important dataset ImageNet has been criticized for containing exactly such structural biases (Crawford and Paglen 2019; Malevé 2021).

One problem when applying image recognition to art historical research is that models are often considered to be more universal than they are. When using a digitized collection as a training set, the model learns to identify visual features in the reproductions and link these features with the metadata provided by the

specific institution. While some cross-institutional initiatives have emerged to enable comparisons across collection, this is still to a large degree very difficult due to initial differences in the institutions' individual digitization process (Brey 2021). Accordingly, training a model with the dataset from one art collection is no guarantee that it will work as intended when it analyses works of art from other collections – even though finetuning the model, through deep transfer learning, attempts to take the specificities of the new collection into account (Gonthier et al. 2021; Iman et al. 2023). An example of deep transfer learning is that even though ImageNet and other dominant tools are not trained with works of art, but instead primarily with photos harvested from the internet and social media, the tools are still used as a base when building model aimed at analysing art. The following takes a deeper look at how that plays out in Google's *Vision AI*.

Google looks at art

Vision AI is an AI vision tool that allows customers to use image recognition on large data sets. Google advertises that, with a subscription, you can: 'Assign labels to images and quickly classify them into millions of predefined categories. Detect objects, read printed and handwritten text, and build valuable metadata into your image catalog' (Google 2023b). As a mainstream AI vision service, *Vision AI* is one among many – other examples are *Rekognition* (Amazon), *Azure* (Microsoft), and *OpenCV* (OpenCV 2023).

Mainstream computer vision tools are not very good at describing the motifs of fine art paintings. If you drag and drop a digital image of Jan van Eyck's painting *Virgin and Child with Canon van der Paele* (Figure 6.1) into the demo of Google's *Vision AI*, an art historian would not find the result very impressive.

The tool, which in reality consists of several different computer models, detects only three 'faces' in the painting, thus neglecting baby Jesus and the kneeling Canon van der Paele dressed in white (this is ironic, since he was the only real person alive when the image was painted). It does, however, detect four 'persons' – now identifying baby Jesus and the Canon as persons but neglecting virgin Mary. The tool also detects the 'picture frame' around the painting, and a 'hat' above St. Donation's face (to the left), but at the same time deems it 'unlikely' that his face has 'headwear', thus contradicting itself. Saint George (to the far right), in spite of his shiny helmet, is 'very unlikely' to have headwear according to Google's *Vision AI*. A more thorough test of the ability of mainstream machine vision tools' ability to look at art and identify what they see was carried out by Bruno Moreschi and Gabriel Pereira when, as an act of artistic institutional critique, they ran image files of reproductions of the entire collection from the Van Abbemuseum through six

FIGURE 6.1: Jan van Eyck, *The Virgin and Child with Canon van der Paele*, 1434–36. Oil on wood, 124.5 × 160 cm. Groeningemuseum, Bruges, Belgium. Creative Commons.

predominant machine vision models, with similar absurd – yet revealing – results (Pereira and Moreschi 2021).

Art historians (who may not be the main target group for such mainstream tools) are likely to be partly impressed by the tool's ability to automatically detect some specifics of the image, partly stunned at its stupidity (e.g. in not being able to connect 'persons' and 'faces'). Google stresses the ability of *Vision AI* to 'detect objects and faces' (Google 2023b) but compared to a traditional art historian equipped with a magnifying glass it does not detect much (see Carter 1954 for an account of the tiny objects and figures reflected in Saint George's armour). While the test does not convincingly demonstrate *Vision AI*'s ability to detect objects and faces, it does in fact demonstrates the most important principle behind every AI vision tool: The computer model can only perform the tasks it has been trained for. Does this mean that if only we were able to finetune the training and create the perfect AI model, always capable of making bulletproof decisions about the

content in a motif across all kinds of image files, that such a solid computer vision tool would be an improvement to art historical research?

The answer to this question would be 'yes', according to the logics of Digital Art History (as described above), but if we consult image theoretical insights from New Art History, the answer is not so straight forward. In fact, we would quickly come to the conclusion that the very idea of 'object detection' in images is misguided, because it confuses *recognition* with *perception*. In the 1980s, the ('new') art historian Norman Bryson offered a thorough critique of Traditional Art History for making exactly this confusion when it analyses paintings (Bryson 1983, 1988). According to Bryson, when a viewer looks at a painting and identifies objects or motifs in that painting it is not a matter of pure perception (1983: 61), or of discovering visual objects that already reside in the painting, because there is no such thing as 'natural' resemblance between the painterly sign and a (pre-existing) objective reality. Socially constructed, and socially located, codes of recognition always stand between the two. A similar argument was made in 1986 by art historian W.T.J. Mitchell, who offers the example of a picture of an eagle,

> which may be a signature of a warrior, an emblem of a tribe, a symbol of courage, or – just a picture of an eagle. The meaning of the picture does not declare itself by a simple and direct reference to the object it depicts. […] In order to know how to read it, we must know how it speaks.
>
> (Mitchell 1986: 28)

Hence, the idea of optimizing mechanisms of visual detection of motifs in painting through better perception, by looking more accurately, does not make sense as long as it rests on the belief that correct, objective identification is ultimately possible.

Since recognition 'always involves *more than one observer*' (Bryson 1983: 51, original emphasis), it is not a matter of just looking even harder – or getting an even bigger magnifying glass – but of engaging in sign-meaning negotiations with others. Given the fact that New Art History's visual theory already in the 1980s convincingly demonstrated that visual identification rests on social and cultural codes of *recognition* and not on scientifically correct *perception*, it is a strange paradox that new technological AI tools seem to disregard what is today considered basic image theory. Providers of mainstream computer vision tools do not dwell on the social constructions of visual recognition when they promote their services – instead they address potential users/costumers by promises of objective technology: 'Automatically *identify* more than 10,000 objects and concepts in your images' (Microsoft 2023), '*Detect* and *classify* multiple objects' (Google 2023b), '*Determine* the similarity of a face', and '*Extract* skewed and distorted text from

images' (Amazon 2023), (all emphases added). Another example, Google Arts & Culture, allows us to elaborate on the methodological implications.

Google curates art

In its *Arts & Culture* project, Google cooperates with more than 1000 cultural institutions from more than 68 countries to make millions of artworks and cultural artefacts digitally available from one single website, to everyone with an internet connection (Google 2023a). A quick visit to Google Arts & Culture demonstrates how image recognition work in practice in relation to art. Here, a search for 'Starry Night' returns 161 items, many of which depicts not only a night sky with visible stars (e.g. NASA photographs and paintings by Vincent van Gogh) but also an evening dress, which bears no visible resemblance with the former but is entitled *Starry Night*, a book page, and a small 'Sculptural ceramic ceremonial vessel that represents a priest' (see Figure 6.2). Looking at the three latter objects, it is very likely that they are recognized as 'Starry Night' for different reasons, and this provides us with a glimpse into the working methods of Google's system, which – and this is a point in itself – is only a qualified guess.

FIGURE 6.2: Screenshot from Google Arts & Culture showing three of the 161 search results for 'Starry Night'. From left to right: 'Sculptural ceramic ceremonial vessel that represents a priest' (created 1 AD – 800 AD in Trujillo, La Libertad, Peru. 10 × 19 × 19 cm. Museo Larco, Lima); book page from a book by Carla Lonzi (no information on title or year, La Galleria Nazionale, Rome); 'Starry Night' Evening dress with pair of evening sandals (designed by Joseph Whitehead, 1947, Museum of the City of New York).

One of the van Gogh paintings (Google 2023d) is most likely doubly recognized as 'Starry Night' in the sense that not only do parts of the file's *visual pixel properties* bear similarity to visual properties of the system's training set that were labelled 'starry night' or combinations of 'stars', 'night', 'dark sky' or alike, but, in addition, 'starry night' is present in the file's *meta-data* (the title of the work). The latter is also true in the case of the evening dress (Google 2023e), so that it is included in the search results even if there seems to be no visual reason for it. The book page (Google 2023f) is a yellowed, slightly stained photocopy, but zooming in it is possible to read the text (it seems to be about the Norwegian painter Edward Munch) including the sentence 'Sensations of dream and imagination awake again in his deep-toned nightly visions from Ekely with their rich, sonorous blue ("Landscape with a Starry Sky" 1923–24)'. While neither purely visual properties, nor meta-data contain 'Starry Night'-ness, this specific book page is detected by a *visual text-recognition* function in the system, meaning that the visual properties of the file are recognized as text in general, which activates a specific function that has been trained specifically to read text and numbers regardless of their typeface-setting, or whether written in books or on billboards in a cityscape. Finally, the ceremonial vessel (Google 2023c) does not seem, at first glance, to meet any of the above 'Starry Night'-ness criteria (visual, meta-data, text-in-image). Though it is a sculptural object, it is not possible to virtually move around it or twist and turn it to see it from different angles than the one depicted in the photo. All you can do is zoom in and out, and that leaves me to guess that maybe it is deemed 'Starry Night'-relevant by the system due to purely visual features after all, because the decorative white dots on the dark ceramic, photographed against a dark grey background probably bear visual similarities to labelled images in the training set like the van Gogh painting.

To a large extent, Google Arts & Culture aligns with the ambitions of Digital Art History – recollecting Harald Klinke: 'The computer [… can …] compare everything to everything else. […] It will come closer to the original idea of the "museum without walls" – this time with digital means' (Klinke 2020: 38). Viewed from this perspective, the application of advanced image recognition tools to art collections (or more precisely: to big-data-collections-of-digital-image-files-representing-photographic-material-representing-works-of-art) resonates well with Aby Warburg's *Mnemosyne Atlas* (Johnson 2012; Moretti and Impett 2017), and it takes Walter Benjamin's notion of the 'exhibition value' (Benjamin 2001) to a whole new level where you do not even have to worry about which museum's website to visit or which artist to search for because everything is available from one single platform with one single *private* operator functioning as a powerful gateway to what we intuitively may think of as public cultural and artistic heritage.

Every time the user (not the 'museum visitor' or the 'citizen') makes a search – which prompts the system to trawl various different institutions across the globe considering all kinds of artistic, archival, and cultural artefact on its way – Google launches a cluster of different methods that simultaneously apply visual analysis, meta-data detection, and text-recognition approaches in its investigation of the material it encounters. However, since the user is not necessarily familiar with these technical methods and can never know with certainty which parameter in a given artefact prompted which method to include the artefact in the final search result, the system adopts what Norman Bryson (inspired by Husserl) referred to as a 'natural attitude' in his writings in the 1980s.

The term is used by Bryson to describe the neglect of culturally constructed codes in the processes of creating meaning by means of images in Traditional Art History. According to Bryson, even though visual communication and aesthetic preferences in fine art are just as situated in specific social, cultural, and historical settings as any other kind of communication, the cultural codes are naturalized. Bryson exemplifies this by demonstrating how European and Chinese landscape paintings, even if they look very different, are both recognised as equally real within their painterly traditions.

Applying Bryson's distinction between perception and recognition to Google Arts & Culture, we may argue that the system really does recognize phenomena (e.g. 'Starry night'-ness), but the social codes it makes use of are deeply embedded in the systems algorithmic codes insofar as they stem from the training. These socio-technical codes, which are partly matters of humanly 'trained judgement', are hidden from the site's everyday users, while the system's official and visible selection practices masquerade as perception or pure 'mechanical objectivity' (terms adapted from Daston and Galison 2007). In short, Google Arts & Culture takes on a 'natural attitude' today that is similar to that of Traditional Art History, which was heavily criticized in the 1980s.

With Google Arts & Culture, you do not select which works of art to see yourself. Google selects for you – not only by changing sculptures to 2D images, allowing extreme close-up of brushstrokes, or other general gestures of reduction/amplification related to image reproduction techniques that predetermine the viewer's physical optics of the work. Here, the Google system seems to determine with which cognitive or aesthetic attitude you meet the work, and all you can do is to try to keep up and guess which methodological approach you are supposed to subscribe to, or, in other words: which subject position is designed for you to comply with in each specific case.

One could argue that Google Arts & Culture only does what museums or galleries already do in their physical exhibitions: select which works should be on display and how they should be exhibited – thus constructing specific contexts

depending on, for instance, what other works are displayed nearby and how wall texts frame the works. A significant difference, however, is that exhibitions and curating practices in individual institutions are disposed to reviews and critique. Critics and the public (via SoMe) are able to specifically address concrete institutions or named curators/directors in their discussions of curatorial choices and institutional mechanisms. The search function at Google Arts & Culture is not prone to similar critical discussion because it is an automated system that masquerades as a neutral mechanism devoid of human interference.

One could also argue that even if Google Arts & Culture closely resembles the ideals of Digital Art History, there is still an important discursive difference in the sense that the latter is solidly embedded in proper research institutions (the university and the museum), whereas the former is 'only' a popular mainstream platform by a big tech company – an example par excellence of the 'culture industry' that was heavy criticized by Max Horkheimer and Theodor W. Adorno (2002). The line between these two domains is, however, not always clear as we can see by turning to examples from national art galleries.

Art museums and computer vision

The Danish National Gallery ('Statens Museum for Kunst', SMK) has a strong commitment to open its collection digitally to the public – officially under the heading 'SMK Open'. In 2012, the museum licensed all their photos of artworks that are fully copyrighted by the museum as Creative Commons Public Domain, thus allowing their website visitors to download high-resolution digital photographs, free of charge and free to share, mix, and use in whatever way they wish (Sanderhoff and Edson 2014). Already in 2011, the museum was invited to contribute to Google Arts & Culture (then 'Google Art Project') but declined because Google wanted to reserve the rights to use the museum's photos without allowing others to download or use the images outside Google's walled garden. As explained by Merethe Sanderhoff from SMK, it was in-admissible for the museum 'as a public, tax-funded institution, to transfer the rights of use of our high-resolution images to a private enterprise' (Sanderhoff and Edson 2014: 70). Hence, today only 263 works of art from SMK's vast collection are present in Google Arts & Culture, and even if they cannot be downloaded from the Google site, they are freely available from SMK's own site. As Sanderhoff states (referring to Tim Sherratt):

> [T]here is power embedded and invested in every data file, in every single record and omission, in all curating and updating; in everything that we, who work in the cultural sector, do in our day-to-day practice. Providing open access to digitised

> materials is one way of letting power seep out and trickle down, becoming shared with the general public. […] Let us open up our collections so they can truly reach out and expand peoples' understanding of the world that we all share, and care about.
>
> (Sanderhoff and Edson 2014: 113)

Fast forward to 2019 when SMK Open launched new search features on their website based on AI. As stated by the museum 'SMK has categorised every single work in the online collection. […] all of which have been analysed, tagged and systematised. Carrying out this huge task was made possible by the use of artificial intelligence' (SMK 2019). As an ideological compromise for handing over this workload to deep learning technology, the museum must be willing to conceptually alter their collection and consider it to consist not of works of art with tradition, ideology, and meaning, but of context-free data elements. As Jonas Heide Smith, developer at the project, stated in 2017: 'We need to forget the properties of our materials that are irrelevant to organization without, of course, destroying these properties' (Smith 2017). At this point, it seems relevant to re-visit Norman Bryson's (1983) critique of Roland Barthes, because the approach put forward by Smith resembles the approach that Bryson criticizes. Bryson wrote:

> Barthes' failure, in *Système de la Mode*, to consult either fashion designers or fashion wearers, as a check to his analysis, vitiates and discredits all the generalisations he proposes, in that 'dream of scientificity'; though the bracketing out of competence as a criterion can be taken as symptomatic of the structuralist strategy, and of its grand imperative: *eliminate practice*. Yet even more dangerous, to the cause of clarity, is the formalist disposition to treat *structure* as though it were *information*, and to regard what may be only a feature permitting communication as communication already. […] He deals with data, not material practice.
>
> (Bryson 1983: 72–73, original emphasis)

Bryson implicitly calls for what is known as 'domain experts' in the field of computer science: people who know the objects and real-life, social whereabouts of a specific domain for which computer scientists design technical solutions.

SMK's goal is to let users choose their own structure of the museum collection, when they access it online – a structure based on the user's 'own definition of relevance' (Smith 2017). What this really mean, however, is that the museum carefully predefines what counts as relevant search options and organization principles and then allows the user to choose from those pre-existing possibilities. The museum does so by, in its technical infrastructure, establishing 'connections between our elements [works of art] by introducing what we call associators. Associators are labels used to form relationships, in other words they are "metadata"' (Smith

2017). Therefore, the results of any user's attempt to search or organize the collection depend on the pre-existing metadata, even if that metadata is provided by previous users.

The actual associators are highly relevant because they literally constitute the discursive field of what it is possible to do with the collection online – associators technically govern the scope of what results users can get from their individual search or attempt to organize results. Put differently, associators set the limits for what human users can imagine about the works of art and their interrelations when investigating them online. Smith identifies at least four types of associators:

- *Organic*. Keywords contributed by someone, whether museum staff or uses. [*sic*]
- *Machine-based*. Keywords contributed by computer analysis of image content (for instance)
- *Found*. Properties of the file itself such as camera metadata, document length, color distribution of an image.
- *Implied*. Relations gleaned from user behaviour. For instance, a relationship can be established between two objects that are often seen by the same user.

(Smith 2017)

The use of different types of associators means that image files in the database are connected according to different logics, creating a methodological criss-cross of relations. When searching for artworks in the SMK collection, the user can search by colour (hence 'found' associator, concretely: 256 colour options to choose between from a palette in the interface), by free text ('organic' and/or 'machine-based' associators), and/or filter according to a number of categories. The four overall filter categories, 'Work', 'Subject', 'Artist/Maker', and 'Role', include numerous subcategories, e.g. 'Work' includes six subcategories, 'work type', 'date', 'material', 'medium', 'techniques', and 'acquisition date', all of which include additional subcategories – 'material' alone has 227 subcategories (see SMK 2023b). Thus, on an overall level, the user can combine these search tools into a methodological cluster bomb of her own.

But in addition, the site's refined system of filter categories in itself – and by itself! – mixes different methodological approaches in manners that are not easy to discern (Figure 6.3).

When clicking on a thumbnails image on the website, e.g. *The Holy Family* by an unknown artist (Figure 6.3), the viewer is offered a selection of 'Related artworks' – in this case sixteen works, of which twelve are related due to 'same artist' (here 'unknown') and four are related because they are 'similar' to *The Holy Family*. This is interesting for two reasons: first, it seems unlikely that SMK's vast

FIGURE 6.3: Unknown, *The Holy Family*, 1515–1615. Oil on wood, 86.5 × 85.5 cm. SMK, Copenhagen, Denmark. Creative commons.

collection does not include more works by 'unknown' artists, and second it is not clear what 'similar' means.

A search for 'unknown' in the 'artist' category returns 11,566 results and a free text search for 'the holy family' returns 54 results. So, what makes the 16 related works more related to *The Holy Family* than others? What properties, categorization, or type of associators are at work in the system behind the scenes? Due to the lack of methodological transparency, visitors are left in a position that very closely resembles the one offered to users of Google Arts & Culture: they can only

guess. Or they can stop guessing and asking questions and instead be subject to the naturalized relations between certain works of art, and not others, offered by the SMK Open.

SMK provides information about its use of 'Categorisation by artificial intelligence' – and makes a general disclaimer:

> The works in SMK's collection have never been tagged with keywords created by art historians or other professionals. […] By training machines to generate keywords, we make it possible to search for commonly known motifs and terms. […] It is important to emphasize that when using artificial intelligence, it is impossible to avoid bias in the search options and results. Like human beings, machines aren't neutral. The machines have been *trained on specific datasets*, for instance vocabularies from other museum collections, and therefore they are only able to find motifs and words that they have encountered before. We are constantly working to train our search engine to become more nuanced.
>
> (SMK 2023a, emphasis added)

But nowhere is the website visitor provided with information on *what datasets* the model was trained on or how. The museum informs that 'we use Microsoft Vision Services to perform object recognition on the collection' (SMK 2023a), but that does not reveal much, since even intense exploration on Microsoft's website (Microsoft 2023) only leads to variations of services, business plans, and developers' options. In short, it is all about how to use and apply the Microsoft models, whereas there is no information on the datasets and training used to build the models. This is perhaps understandable insofar as Microsoft is a private business with no interest in disclosing all details behind their product. It should come as no surprise to visitors of the Microsoft website that the subject position it addresses is that of the consumer. But what about the subject position of the visitor to the SMK website?

If the national art museum's ideal is to open the collection to the general, tax-paying public (the owners) in order to let power 'seep out and drip down' and 'expand peoples' knowledge of the world' (having the subject position of the 'citizen' implicitly in mind), why keep the most powerful mechanism of how AI organizes the world (in this case: the collection) hidden? Why not provide full insights into what datasets were used in training the specific model at work in SMK Open? The probable answer is that due to pragmatic reasons the museum has chosen to make use of Microsoft's services instead of building their own model from scratch, but the trade-off is that what was intended, and certainly seems, as an act of openness, in some respects constitutes a closed black box, which forces the website visitor into a subject position of the curious entertainment enjoyer rather than the enlightened, critical citizen.

Another example is the Norwegian National Museum whose 'Principal component' project (2015–17) aimed at building a new interface for searching the database of the museum's collection (Nasjonalmuseet 2017). The museum used the ImageNet database as the foundation for their model. In the Norwegian case, the model's ImageNet base was additionally trained on the WikiArt database to teach the computer model which art movement an image belongs to (Westvang 2016). WikiArt (2023) is a website that provides a popular mainstream art historical overview categorized according to 183 different art movements (e.g. 'Mannerism', 'Junk Art', 'Tang Dynasty'). In WikiArt, each image belongs to one or more of these categories. In practice, this additional WikiArt training on top of the ImageNet base means that when the Norwegian model encounters a new image file from the museum's collection, it compares that image to its knowledge (gained in the training) of which visual features correspond to which art movements and is then able to tell which art movements this newly encountered image is similar to. However, these underlying art movement categories from WikiArt are now hidden in the neural network of the model and no longer visible to human users – as oppose to on the WikiArt website's interface.

To what extent the Norwegian National Museum still makes use of the project's final model in the search function on their current website is not clear but methodological opacity is certainly at work: apart from numerous filters, e.g. 'Motif' and 'Motif-type', visitors can search by free text. Typing 'blue' in the free text field returns 81 objects, some of which have titles that include 'blue' – like *Blue Sea* or *Blue Interior* – while others do not, e.g. *A Japanese Lantern* (see Figure 6.4).

Hence, at first sight it seems as if numerous methods are at work at once, mixing meta-text search with a search for visual properties like we saw with Google Arts & Culture – especially because all results contain a substantial ratio of blue colour, even if the term is not included in the title. But closer inspection shows that only a meta-text search was launched, and that the word 'blue' is in fact present somewhere in the meta-text of all works. For instance, the short description accompanying *A Japanese Lantern* includes the phrase 'it is summer, and the night sky is *blue* and the trees are verdant' (Nasjonalmuseet 2023c, emphasis added). So far, no mysteries: the free text search crawls meta-text.

The 'motif' category, however, prompts questions. *Blue Sea* is 'Landscape' in its motif type and 'Maritime' in its motif (Nasjonalmuseet 2023b) – suggesting that the latter is a sub-category of the former – but *Blue Interior* is assigned to no motif type, yet still has the motif 'interior' (Nasjonalmuseet 2023a), which contradicts the category/sub-category hypothesis. Finally, *A Japanese Lantern* has neither motif-type nor motif (Nasjonalmuseet 2023c). The site does not provide information on the logical difference between the categories of 'motif' and 'motif-type', so once again visitors are left in the dark about what kind of epistemological dialogue

FIGURE 6.4: Collage with three paintings from the National Museum, Oslo, Norway.[1] From left to right: Ernst Josephson, *Blue Sea*, 1893. Oil on wood, 20 × 25.5 cm.; Harriet Backer, *Blue Interior*, 1883. Oil on canvas, 84 × 66 cm.; Oda Krohg, *A Japanese Lantern*, 1886. Pastel on canvas, 100.7 × 67.5 cm.

they are part of when interacting with the website, because the individual work of art is squeezed into an utterly opaque complex of data classification.

This problem is very similar to a problem with Traditional Art History, pointed out in 1988 by Charles Harrison:

> Works of art are not natural. The tendency of art history has been to represent them in terms of established *categories and concepts*, as tokens of those cultural values they are supposed to express. The methodological critique of art history is thus necessarily a matter of inquiry into these categories and concepts and into the *mechanisms of their entrenchment*; a critique not of the objects themselves, but of the terms in which they have been represented.
>
> (Harrison 1988: 76–77, emphasis added)

Conclusion

The examples analysed above demonstrate that at SMK and the National Museum, visitors' online encounters with the collections are conditioned by an enigmatic methodological complex. At the National Museum, filter categories seem to follow a strange Borgesian logic, but apparently they have refrained from implementing the computer vision model developed earlier at the project stage. This is not the case at SMK's website where AI technologies are at work in several different ways: first, the museum developed their system from Microsoft's pre-trained model, and second, a deep learning model is directly involved in the way the site automat-

ically suggests 'similar' related artworks. Finally, the 'similar' related artworks are (probably) the result of launching different models using different methods simultaneously (meta-text/colour/object detection?). Visitors are not informed about what methods are at work behind the scenes, which is why the previous claim can never be more than a suggestion based on intense exploration of the site's functions. The fact that we do not know why these artworks are selected as 'similar' means that we cannot engage in discussions or critique of why the site chooses as it does. On the one hand, the museum site acts like an old-fashioned, all-authoritarian art historian expert, capable of instantly suggesting similar works out of pure instinct without degrading to elaborate on their choice, while on the other hand it acts as purely technical mechanism, devoid of human involvement.

In the decades following New Art History, most art museums – at least junior staff members – started to consider what art theoretical approaches were implicitly at work in their exhibition and communication practices. As a result, many museums found it important to engage their visitors in not just *what* was on display but *how* exhibitions work as powerful articulations and ideological constructs rather than neutral presentations. In many cases, visitors were invited to co-create exhibitions and encouraged to curate their own digital exhibitions on the museums' relatively new websites. The aim was to empower visitors and allow them to critically discuss what stories were told, challenge established patterns of representation, and take mental ownership of public art collections. Today the possibility to like images and to curate and share you own exhibition is standard on museum websites (both SMK and the National Museum have such features on their sites).

Whereas New Art History sparked a focus in museums on involving the public in critical engagement with how art is meaningful, Digital Art History, as adapted on museum websites, relieves the public of critical engagement by handing over work to AI. Just like Google Art & Culture the museum sites' Digital Art History initiatives are impressive and they encourage exploration, but they do not attempt to engage the public in these new *methods* of exploration. Despite the fact that most museums are highly dedicated to engaging with the public and involving them in discussions, the websites employ AI in manners that, unintentionally, does the opposite and implicitly deprive visitors of the discursive and methodological engagement that is truly empowering in terms of nourishing critical citizenship. Paradoxically, there seems to be a lack of deep learning in art museums.

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NOTE

1. All from https://www.nasjonalmuseet.no/en/collection/ (accessed 7 October 2023), all Creative Commons.

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7

Zombie Canon: Art Datasets, Generative AI, and the Reanimation of the Western Canon of Art

Amanda Wasielewski

Digital cataloguing and the creation of digital reproductions of art objects are not recent phenomena (Terras 2011; Zweig 2015). However, most early digitization efforts in museums and art institutions were geared towards creating teaching and learning materials for specialist students, scholars, and museum professionals. This meant that the audience and intended use of such collections was initially limited. The advent of the internet changed how institutions thought about accessibility to their digital collections. As the popularity of the world wide web grew in the mid-1990s, digital collections of art became increasingly accessible to the general public.

Art collections on CD-ROM were the most immediate precursors to public-facing web-based art collections. In 1991, for example, the National Gallery in London commissioned a multimedia learning tool for the public that contained a selection of images and information from the collection. A version of this tool was then released in 1993 as a CD-ROM called *Microsoft Gallery of Art* (Forsythe 1994). In the early days of the world wide web, amateurs were quick to create online collections of art images on dedicated websites and wikis. Although resolution was less than optimal, instant access was still a novel enough idea to make these efforts worthwhile. Sites like WebLouvre, started in 1994 and still online today (renamed WebMuseum),[1] and the Web Gallery of Art,[2] started in 1996 and also still online, were built and maintained by idealistic individuals rather than art institutions. Museums were quick to follow, however, and many of them put portions of their collection online in the mid-to-late 1990s. At that time, both amateur and museum-based art collections were made up primarily of canonical, western artworks, particularly paintings.

Online art collections continued to grow in sophistication over the next decade. By the 2010s, the tech industry – and thus the main entry points to content and user

activity online – was consolidating around a few corporate giants heavily invested in harnessing and understanding user-generated content on their platforms. This growing deluge of user-uploaded text and images needed to be parsed and understood automatically, which in turn could fuel targeted advertising. Digitization efforts from art institutions, now with the help of corporate technical sponsorship from the likes of Google, suddenly served a purpose beyond scholarship, education, and leisure (Google, n.d.). Google seemed to understand that cultural data was a rich untapped resource for both developing and deploying cutting-edge image analysis techniques using machine learning.

Given that art images are regularly used in computer vision research and creative or generative AI applications, the underlying rationale and curatorial construction of such collections demand scrutiny. Each art dataset presents a particular point of view that both defines and delimits what art is, and this point of view often happens to closely align with the traditional western canon of art. In this chapter, I begin by defining art data in the context of machine learning and then analyse the history and make-up of one popular online art image collection-turned-dataset, WikiArt. In light of my analysis of this art dataset, which can be browsed in full, I then turn to a discussion of an implied dataset that cannot be so easily browsed, namely the art data used to train the popular text-to-image generator DALL-E 2, which was released to the public by parent company OpenAI in 2022. Using targeted prompts intended to map the limits of its stylistic 'understanding', I reflect on the possible biases or omissions that may be present in training datasets of art images. I ultimately argue that art datasets reanimate the western concept of style by instrumentalizing it in such a manner.

This zombie canon of art is then deployed in the world in ways that may go unnoticed, infecting not only how we see art but also how it is defined and reproduced. Art historians have been deeply concerned with the process of decolonizing the field in recent years and this can only be seen as a step back. While the AI tools themselves are not without issue, the main problem of western canonical bias lies in the data that is used to train such systems. I thus conclude by asking: can art datasets be decolonized?

Understanding art data

As recently as a decade ago, computer vision researchers spent significant time and resources creating their own custom image datasets for machine learning. An image dataset is a special type of digital image collection designed primarily for processing by computational systems rather than browsing, searching, and viewing by humans. Image datasets thus organize and format image data and metadata in

specific ways suited to computer vision tasks. Although they can be made up of diverse or targeted types of images (e.g. human faces, technical drawings, animals, aerial views, cars, or artworks), most of these images tend to be photographs. Other common imaging techniques found in large image datasets tend to come from the field of medicine: X-rays, MRIs, etc. In the case of art image datasets, researchers found that openly accessible and ready-built online collections like Web Gallery of Art were easy to scrape data from and use in their research. Many of these early amateur art collections, therefore, served as the basis for custom-built datasets of art used in computer vision research. Long after their utility as educational resources waned in favour of more official online collections, they lived on in machine learning experiments.

Today, researchers have access to massive and diverse image datasets that are already annotated with descriptive metadata, object segmentation, keypoint annotation, and other information that help a computer 'see' and identify the content and style of the images. This explosion in image data primed for computer vision research has grown alongside the turn towards deep learning, which uses artificial neural networks to automatically extract features of images for analysis. Both computer vision tasks and massive image datasets have thus reached a scale of complexity that make them difficult for human observers to understand. In recent years, computer scientists have increasingly been concerned with 'explainable' artificial intelligence, meaning that they see the need to devise new tools to understand complex machine learning processes rather than just blindly accepting their output (Barredo Arrieta et al. 2020). But what about explainable image datasets?

At present, datasets can be almost as inscrutable as the processes that use them. While it is possible to download the most commonly used massive image datasets (if one has enough storage space), manually browsing or understanding these images and their metadata in any kind of comprehensive way is impossible due to the sheer scale of the data. Sorting tools are therefore required. Large datasets like Google Open Images[3] or COCO[4] (common objects in context) have web-based browsing functions that allow for exploration of the dataset in a limited manner. However, the exact contents of an image dataset are not always comprehensible even with these tools. Just as tiny organisms like bacteria are impossible to see without the aid of a microscope, big data is too *large* to see and without the help of sorting, browsing, and viewing software. Lev Manovich argues, 'Turning everything into data, and using algorithms to analyze it changes what it means to know something. It creates new strategies that together make up *software epistemology*' (Manovich 2013: 337–38, original emphasis). In other words, how we understand data is marked by the tools we use to view or understand it. Not only is an object fundamentally transformed by digitization, but so are the ways of knowing – the knowledge forms – associated with it.

Automation takes control out of the hands of humans in exchange for greater efficiency and output volume. In relinquishing control over all manner of tasks to machines, society has been fundamentally reconfigured (Giedion 1948). At first, automation was confined to mechanical tasks, but we have increasingly found ways to automate tasks that traditionally required brains rather than brawn. The rise of deep learning has been an important leap forward in this area. In simple terms, deep learning models transform input data through multiple (i.e. deep) layers of artificial neurons. For image analysis, this means that the process of teaching a computer to 'see' or identify parts of a digital image is streamlined. We no longer need to tell the system exactly what to look at; it figures out how to see the image on its own, given the training data fed to it.

Data creation/collection has also become increasingly automated. Many of the massive contemporary image datasets are conglomerates of pre-existing data and/or data that has been scraped and harvested from online sources rather than individually curated or collected by humans. This means that the datasets used in machine learning applications have grown larger and larger in a very short period of time but also less transparent.[5] Automation is now essential in creating very large image datasets.

These general trends in image dataset creation have also been true for datasets that specifically aim to compile images of artworks and information regarding those works. In 2014, for example, researchers created an art dataset called Painting-91, which was composed of only 4,266 images from 91 artists (Khan et al. 2014). A year later, the research group of Ahmed Elgammal at Rutgers University published some of their first findings in a series of papers that make use of a much larger dataset of artworks based on the WikiArt online art collection. At that time, the dataset contained 81,449 images from 1,119 artists. WikiArt currently contains over 250,000 works from 3000 artists (WikiArt n.d.). Unlike many other datasets used for machine learning, the images/metadata found in the WikiArt dataset are readily available for inspection through a web platform.[6] This is, in fact, its original (and intended) presentation format. WikiArt.org is an open platform designed to collect digitized images and information about art using a wiki-style content management system. Elgammal's group was thus able to benefit from a pre-existing collection of artworks, which was not initially designed for machine learning but provided structured information that could be easily repurposed.

WikiArt's 'neat little boxes'

WikiArt remains one of the most popular artwork datasets in computer vision research, and it has historically been used in experiments designed to understand, categorize, and replicate image style (Saleh and Elgammal 2016; Tan et al.

2016; Mao, Cheung, and She 2017; Elgammal et al. 2018; Strezoski and Worring 2018; Cetinic, Lipic, and Grgic 2019; Sandoval, Pirogova, and Lech 2019; Zhong, Huang, and Xiao 2020). Given that this dataset is regularly used in machine learning research, it is feasible that this exact data or data very much like it, scraped from the internet, is currently in use in the training sets for proprietary text-to-image generators such as DALL-E.[7] While the image datasets used to train Stable Diffusion, which is called LAION, is readily accessible online, the training data for DALL-E is not (Schuhmann 2021). Given the lack of transparency of many of these tools and their training sets, it is difficult to know for certain whether WikiArt is part of the dataset. I will return to the use of text-to-image generators and other generative AI techniques shortly, but first I address the idea of the universal art dataset, using WikiArt as an example. Given that WikiArt's data is readily accessible on a wiki site, it provides a unique opportunity to analyse its categorization and contents.

Universalism proceeds from the assumption that a particular world view applies to everyone, everywhere in an equally significant manner. For art history, this has meant that the canon of western art is positioned as universally relevant or valuable to people everywhere, not just westerners. In essence, western art was assumed to represent the apex of human artistic achievement. The reach and brutality of European colonialism followed by American imperialism were not only the consequence of political and economic power but also cultural dominance and indoctrination. Given this, it is perhaps unsurprising that the height of colonialism in the nineteenth century coincided with the birth of the scholarly discipline of art history. Early art historians were obsessed with devising taxonomies and universalist systems to understand art,[8] which positioned Europeans as the successors to ancient Greek culture and knowledge (and largely omitted ties between Greece and other Mediterranean cultures in North African and the Middle East). By tracing this artistic lineage, they – consciously or not – sought to demonstrate the cultural superiority of western art. The aftereffects of western cultural indoctrination continue to be felt in the valorization of European art above work from other parts of the world.

Like most art datasets currently in circulation, WikiArt is largely constructed around the traditional canon of western art. The non-western art that is present in the dataset is often conceptualized within the western-centric notion of periods and style. For example, the art of Ancient Egypt is included in the trajectory of western art, positioned as the first in a series of time-specific style category. After this, a number of non-western style categories are listed in a somewhat ahistorical fashion, separated from the western trajectory of art. Among them is a religious heading ('Islamic art'), country headings (China, Korea, Japan), and a catch-all category 'Native Art' which has (at the time of writing) a subheading

for the lone African category, 'Yoruba', alongside generic categories 'Native art' and 'Folk art' (Artworks by style – WikiArt.org n.d.). In other words, the styles of western art are clearly periodized in chronological order, whereas non-western art is grouped together in a haphazard way, according to culture broadly imagined. Given that the idea of style – as deployed in this context – is a western invention, it may not even make sense to even think about art outside the western in this way (Wasielewski 2023).

WikiArt's mission statement very clearly states the site has universalist goals: 'With your active involvement, we are planning to cover the entire art history of the Earth, from cave artworks to modern private collections' (WikiArt n.d.). Essentially, this means that non-western and indigenous art must be squeezed into the boxes set out by Europeans in describing their own cultural products: individual artistic genius, stylistic evolution, subscription to certain set genres, periodization in a progressive manner, etc. During colonialism, the supposed objectivity of western post-enlightenment ideals was often exposed as nothing other than righteous fictions. Gyan Prakash contends, 'The writ of rationality and order was always overwritten by its denial in the colonies, the pieties of progress always violated irreverently in practice, the assertion of the universality of western ideals always qualified drastically' (Prakash 1995: 3). This means that, though scholars or art datasets may lay claim to universalism in the sense of inclusivity, they often unwittingly colonize other cultural products in order to arrange them in ways that make sense only in relation to western thought. As Prakash points out, the supposed culture values of the West were often shown to be relative in colonial contexts.

WikiArt's use as a universal art dataset may therefore perpetuate western bias in the study of art history by computational means. Looking more closely at WikiArt, one can see that European and North American art is presented as historically situated, individualized, and progressive. Non-western art, on the other hand, is primitivized, marginalized, and largely decontextualized. In other words, artworks outside the western canon are under-represented in datasets like WikiArt and, when they are represented, they are subject to a colonizing gaze (Prakash 1995; Fanon 2021). The site states that WikiArt 'is based on wiki principle [*sic*]: free adding and editing the content by anyone who wants to participate. The quality and reliability of information is ensured by consistent moderation of all updates' (WikiArt n.d.). Like other popular wikis, chief among them Wikipedia, the information on the site seems to be factually accurate for the most part, but this superficial 'correctness' hides underlying issues.

WikiArt was originally called WikiPaintings, which at least partially explains the dominance of painting over any other media in the collection. The domain names for the site(s) were first registered in 2004 and 2006 according to WHOIS,

but the wiki itself likely appeared some time in 2011, according to crawl data archived on the Wayback Machine (wikiart.org whois lookup – who.is, n.d.; wikipaintings.com whois lookup – who.is n.d.; Wayback Machine n.d.). Since that time, the contents and metadata of WikiArt have been created by volunteers from the general public who are able to add, edit, and moderate the site's contents. This database of artworks was started by and continues to be run by Ukrainians, but the website does not currently publicize the specific people or organization(s) responsible for maintaining it. After doing some digging in the archived versions of the site saved on the Wayback Machine, however, I discovered a couple of names that are associated with the site: the Ukrainian developer Sergey Osypchuk and someone named Kseniya (no surname listed). Both of these people briefly blogged for the site starting in 2011 and the handful of entries they posted reveal some details of the project at that time.

In a post from 29 March 2012, Kseniya responded to an 'anonymous' commentator who was displeased with the site's use of style and genre categories (WikiPaintings blog 2012). The user's message, reproduced in the blog entry, reads in part:

> Using the same historicist approach that dictates a certain path of art movements through time is allowing for the continued misinformation of the general public […] An encyclopedia of painting is possible, but grouping these artists across time under art 'movements' is ignoring their own, individual, nuanced trajectories full of unexpected twists and turns. Please do not disseminate concepts that are still in discussion. The idea of art movements as a linear history of art itself is already questioned and discredited by most serious scholars. Please do not force artists and their works into neat little boxes. Categorize only what is objective and certain: dates, names, techniques. But please, please do not force a conceptual framework onto art! Please don't help maintain misconceptions about art! Please don't objectify art – it is much much more. […] Help art break free from the confines of imposed categories!

The anonymous person writing this impassioned message appears to be an informed student of art history, though not a scholar or an active participant in art knowledge production. The sentiment expressed here, albeit in a somewhat confused manner, references the shift in art history scholarship that began in the 1970s and 1980s from modernist discourses, which formulated the history of art in a progressive trajectory expressed as stylistic change over time, to a notion of art history that accounts for the subjective ordering of the discipline itself and the wider plurality of art-making and visual culture outside the narrow confines of the western art historical canon (Alpers 1977; Belting 1987; Bryson 1988; 'Visual Culture Questionnaire' 1996; Nelson 1997; Grant and Price 2020).

It is interesting that the writer of this critique repeatedly characterizes artwork categorization other than the name of the artist, date, and materials as 'misinformation' rather than, simply, competing or historically situated conceptual frameworks. After all, information presented in the form of a tabular database is literally pigeonholed into neat little boxes. Here, categories of art can only exist in on/off states – the work is or it isn't some style or some movement. There is no in-between. Anything lacking nuance is seen, from this perspective, as misinformation or falsehood.

In response to this plea for WikiPaintings to dispense with traditional categories of style and genre, Kseniya (speaking for the owners of the site) writes:

> do you really think it's possible, or productive, to talk about art history without these notions? Can you study art avoiding terms like *Renaissance*, *School of Paris*, and *portrait*? Don't you think that limiting a vocabulary to 'objective' categories like dates, names, and techniques is even more 'forcing a framework' in the sense of eliminating possible interpretation? […] Putting art into 'neat little boxes' of styles, and claiming that Monet's Impressionism is literally the same as Levitan's Impressionism is just as stupid as avoiding all style classification at all, and stating that those two artists have nothing in common and differs one from another as much, as Rembrandt differs from Malevich. […] We don't see how it's possible to provide basic knowledge without 'labels'. Would you use them as information or disinformation depends solely on your intellectual potential. We just provide you with tools. Use them creatively!

In its rawness, the exchange provides evidence that at least one early user questioned the organizational structure of WikiPaintings, which in turn pushed the creators of the site to reflect on their role as curators of an art database. They reveal that they see the WikiArt project as an ideologically neutral tool to disseminate art data rather than providing any particular (read: western) point of view.

Looking at the categorization on WikiArt and its use in machine learning experiments, however, issues arise. One overarching problem is that style categories are inconsistent, even when confined to western art. Machine learning experiments that use these categories often do not account for the nuances and inconsistencies between style terms. There are historical reasons why each style term has come to denote a particular group of artworks and the meaning of these terms evolves over time. However, the nuance and difference between style terms are lost when they are merely treated as containers for visually similar objects, i.e. when style terms are assumed to be uniform and logical in the way they are defined and applied. Attempts to categorize artworks automatically by style may, therefore, unintentionally compare apples to oranges.

For example, machine learning researchers working with art images often use categories like Baroque and Renaissance alongside Impressionism and Post-Impressionism. A large epochal category like Renaissance, which spans several centuries and many diverse geographical regions, is conceptually quite different from a modern category like Impressionism, which spanned approximately twenty years and was highly localized and circumscribed by a small group of tight-knit artists. A category like Post-Impressionism, on the other hand, is contingent on context and assumed intention rather than a particular visual style. The term was coined by art critic Roger Fry in 1910 and is vaguely defined as a reaction against the Impressionists who came before them (Orton and Pollock 1996: 53–54). Given this, it is difficult to argue that Post-Impressionism is a unified or cohesive category. Likewise, Baroque is a term contingent on the valorization of the Renaissance. Before the advent of modern art history scholarship, it was mostly used as a negative descriptor for artwork that was overly complex or irregular compared to the perceived logic and orderliness of Renaissance art. The term was rehabilitated by art historian Heinrich Wölfflin in his book *Renaissance und Barock* (1888), after which it has become a somewhat more neutral term for the art and architecture in the centuries following the Renaissance in Europe (Wölfflin 1979: 15).

As these examples show, the nuance of categorization is important. There are many other examples of categories found on WikiArt that, like Post-Impressionism, are contingent on context and have meaning beyond visual appearance. For example, the WikiArt category 'Naive-Primitivism' is particularly fraught. This category does not indicate a particular style so much as acts as a catch-all for various artists and artworks that do not follow the western artistic conventions handed down from the Renaissance to academic art of the nineteenth century. In other words, this category includes artists who had no formal art education alongside those who did but chose to rebel against that education in favor of imitating or taking inspiration from the work of peoples and cultures known as 'primitives' in the nineteenth and early twentieth century, i.e. colonized peoples/non-western peoples, traditional regional cultures in Europe, children, the mentally ill, and untaught artists/craftspeople. These two terms 'naïve' and 'primitive' are situated in a past historical moment and are considered highly derogatory today. The evolution of this usage and the need to qualify the use of such as this are lost when they become part of style categories that are assumed to be neutral or objective. Stripped of the historical meaning and context for why such terms have been used (and may still continue to be cited) in the field of art history, the machine learning experiments that use them become not only non-sensical but also insensitive.

Building on these observations, the next section outlines the tests I performed on the DALL-E text-to-image generator using a few of the contentious style terms found in WikiArt. The objective was to see what DALL-E would make of these

difficult-to-define categories. I also explore some non-western art categories and terms *not* found on WikiArt to try to feel for the outer limits or edges of art knowledge that may not have been part of DALL-E's artistic style training.

Style and DALL-E tests: Method and rationale

Out of the myriad text-to-image generators currently available to the public, I chose to use Open AI's DALL-E as a test platform. I had two quite simple reasons for this choice: its current popularity and its proprietary nature (and thus relative opacity). The main objective of these tests was to understand the limits of the term recognition and thus the limits of identifiable style categories in the data used to train the system. I do not claim that these findings are exhaustive. Although I regenerated and re-prompted several times for each of the sample prompts I used, outlined below, they are not comprehensive in their iterations and I do not make a claim as to the statistical relevance of the samplings. Rather, these manual tests are a means by which to try to understand what, at first glance, DALL-E does not seem to 'understand' given a limited selection of highly nuanced or non-western style language.[9]

The first set of prompts I used were designed to test whether there is any evidence that two of the more amorphous/problematic western-centric style categories found in the WikiArt dataset discussed above – namely Post-Impressionism and Naïve-Primitivism – seem to be part of the training data for DALL-E based on recognizable features of the output images. Given that diffusion models do not copy, collage, or otherwise provide straightforward composites of the existing images in the training data, I would not expect any elements directly from these style categories.

I also tested a few terms for subject matter. In generating post-impressionist style images, I indicated the subject of 'apples', thinking of Paul Cézanne's famous still-life paintings of apples (Figure 7.1). Additionally, I created prompts for the subject of 'bathers', a term that has a specific meaning in the context of fine art (i.e. it signals a (neo)classical style composition of idealized nude figures). I did this in order to determine whether this more specific implication of the term 'bathers' would be understood and reproduced via DALL-E. For the naïve-primitivist category, I was more interested in seeing what styles would be generated and so left the subject matter quite vague as 'two people'. I also used the term 'two figures' to make the prompt conform to the language of art historical descriptions in order to see if there was any difference in the images generated. The use of 'people' or 'figure' did not seem to significantly affect the generated images. I tested the following prompts:

FIGURE 7.1: Clockwise from top left: Paul Cézanne, *Apples*, 1878–79, oil on canvas, 22.9 × 33 cm, Metropolitan Museum of Art, public domain, Wikimedia Commons; Stirrup Spout Bottle with Figure, Moche, second–fifth century CE, ceramic, slip, pigment, 23.2. × 14.6 cm, Metropolitan Museum of Art, public domain, Wikimedia Commons; Altar to the Hand (Ikegobo), Edo peoples, late eighteenth century, bronze, 21 × 25.7 cm, Metropolitan Museum of Art. Public domain. Wikimedia Commons; Guo Xi, *Early Spring*, 1072. Ink and light colours on silk. 158.3 × 108.1 cm, National Palace Museum, Taipai. Public domain. Wikimedia Commons.

1. 'A post-impressionist painting of apples'[10]
2. 'A post-impressionist painting of bathers'
3. 'A naïve-primitivism painting of two people'

4. ‘A naïve painting of two people’
5. ‘A naïve painting of two figures’
6. ‘A primitivist painting of two people’
7. ‘A primitivist painting of two figures.’

After exploring these western categories, I turned to prompts for artworks and artefacts from cultures outside of western Europe. I chose three different types of object/artwork that have quite recognizable forms/styles: the stirrup spout vessels of the Moche culture (dated from circa 100–800 AD in present-day Peru) (Figure 7.1), shan shui paintings (brush and ink landscape painting that had its height during the tenth and eleventh centuries in China) (Figure 7.1), and ikegobo (cylindrical bronze altars created in Benin in the eighteenth and nineteenth centuries) (Figure 7.1). Of these, Moche and ikegobo are terms/objects not found on the WikiArt website, whereas shan shui paintings are present there. In general, Chinese painting styles are well-represented in machine learning datasets and experiments compared to other non-western styles. This may be due to the fact that there is a lot of machine learning research being done in China today, meaning that traditional Chinese painting styles, techniques, and motifs are readily familiar to many of the scientists doing this kind of research (see e.g. Jiang et al. 2006; Sun et al. 2015; Sheng and Li 2019; Liong et al. 2020; Yang, Ye, and Guo 2021).

For each of these prompts, I began by simply inputting the form/style words most closely associated with the type. For ‘shan shui’ and ‘ikegobo’, I could use the established orthography of the native words used for these classes of objects. For the Moche objects, I attempted different commonly used English terms along with the name of the culture, the most technical of which is ‘stirrup spout vessel’. After testing only the terms themselves, I tried them in combination with anachronistic or out of context subject matter that would not exist in an existing object. DALL-E does not allow the use of living public figures at the time of writing so I used historical figures or generic terms to test the output.

The prompts were as follows:

1. ‘Moche jug’
2. ‘Stirrup spout vessel’
3. ‘Moche pottery depicting Queen Victoria’
4. ‘Shan shui painting’
5. ‘Shan shui painting of the Grand Tetons’
6. ‘Ikegobo’
7. ‘Ikegobo depicting the Queen of England and her children.’

Style and DALL-E tests: Results and discussion

Prompts 1 and 2 generate images of 'post-impressionist' paintings depicting apples and bathers. Many of the images generated from prompt 1 are similar to Cézanne's paintings of apples (Figure 7.1) in that they have visible brushstrokes and a flattened perspective. None of the images generated could be characterized as Cézanne-like in their entirety but the influence is nevertheless visible. On the other hand, DALL-E does not seem to interpret the term 'bathers' in the art historical sense. The output for prompt 2 generally produces what appear to be contemporary beach scenes from more recent times rather than classical nudes.[11] This is unsurprising given that a simple prompt of 'bathers' (without the post-impressionist styling) produces such scenes. Unlike the slightly more cohesive style of images generated by the first prompt, the styles given by this second prompt demonstrate greater diversity from the category of Post-Impressionism and are reminiscent of artists such as Vincent van Gogh, Paul Signac, and Pierre Bonnard. The output images also show a wider variety of color palettes – bold and contrasting as well as softer pastels – but they share a focus on visible brushwork. It seems that when there is not a strong post-impressionist motif such as 'apples' already extant, the style output is more diverse, sampling some of the diversity of visual styles under the rubric of Post-Impressionism.

Prompts 3, 6, and 7 address variations on prompting DALL-E for the 'Naïve-Primitivism' category. The majority of the output for 'Naïve-Primitivism' (Figure 7.2 top) and 'Primitivism' (Figure 7.2 middle) generates images depicting figures with shades of black, brown, or red skin tones in flattened, angular, simplified, and/or geometric shapes and patterns. There is very little visual evidence to support training data from the European artists who drew from non-western sources, such as the cubists, or self-taught or non-academically trained artists, such as those found in this category on WikiArt. The images presented, by virtue of the imagery called up through the use of these terms, are stereotypically non-western.

Prompts 4 and 5, on the other hand, use just the term 'naïve' and generate images that do, in fact, deviate from these non-western stereotypes. Prompt 4, which calls for the subject matter to be 'people', generates images that look more like children's drawings rather than the stereotypical non-western motifs mentioned above (Figure 7.2 bottom left). Interestingly, prompt 5 generates images with more stereotypically non-western visuals, which must be due to the use of the word 'figures' rather than 'people' (Figure 7.2 bottom right). Additionally, some of the 'figures' depicted look more alien or animal-like than those in the images where the prompts used the word 'people'. While the difference between using 'people' or 'figures' in the other prompts is less apparent, using these different words seems to change the type of image generated for prompts 4 and 5.

FIGURE 7.2: AI-generated images created with the prompts: ‘A naïve-primitivism painting of two people’ (top two images); ‘A primitivist painting of two people’ (middle two images); ‘A primitivist painting of two people’ (bottom left image); and ‘A primitivist painting of two figures’ (bottom right image). DALL-E 2, December 2022.

For this series of prompts dealing with the terms 'naïve' and/or 'primitivism', therefore, it seems that certain words carry different weights depending on their combination. The word 'primitivism' seems to be quite strong, for instance, and outweighs the differences between 'people' and 'figures'. Mostly non-white-skinned figures are generated by the prompts that contain the word 'primitivism'. Using western-style terms with 'people', on the other hand, produces images of a diverse array of people. For example, a test of the prompt 'An impressionist painting of two people' returns four images that depict people from more diverse ethnic and racial backgrounds (Figure 7.3). Existing impressionist paintings primarily

FIGURE 7.3: AI-generated images created with the prompt 'An impressionist painting of two people'. DALL-E 2, December 2022.

depict white people, so this is a noteworthy deviation from the training material in the absence of more specific language to guide the image generation. It seems that there has been an attempt by Open AI to, perhaps retroactively, build diversity into DALL-E's output when generic terms such as 'people' are used in combination with style terminology that is not as overtly racialized as a term like 'primitivism'. Given the early criticism of DALL-E's output images for their depictions of race and gender, it is likely that OpenAI has tweaked the system somewhat since its launch to try to correct the more egregious biases (Johnson n.d.: 2; Rose 2022).

Moving on to the second series of tests, prompts 8–10 were designed to generate images of a standardized and highly recognizable form of pottery from the Moche culture. In my tests, DALL-E failed to produce anything resembling this style, indicating that Moche artwork is not part of its training data. Prompt 8 merely asks for a Moche jug and the results show amphorae, a type of ancient Mediterranean pottery (primarily associated with ancient Greece) with two handles and a long, tapered body (Figure 7.4). While the motif and figuration would not be described as indicative of ancient Greek decoration on such artefacts, it is not a close match to Moche motifs either but can perhaps be characterized as generically South or Central American. On some level, then, DALL-E must recognize the term Moche and tie it to the broad geographical region it originates in. The overwhelming prevalence of amphorae in the generated images, however, indicates a strong western bias for vessel types. Prompt 9 used more specific terminology, 'stirrup spout vessel' (the established term for this type of ceramic object) without the descriptor 'Moche'. The resultant forms were even more western-centric without Moche as a clue to the region. The images generated in the test appear to be vessels made of metal, some with horseback riding stirrup-like handles (Figure 7.4), which are unlike the characteristic Moche spout. Even when inserting the term Moche into the prompt ('Moche stirrup spout vessel'), DALL-E was unable to generate anything resembling the desired form. Lastly, prompt 10 attempts to mix this style with a nonsensical subject matter – Moche pottery depicting Queen Victoria. Once again, the majority of the forms generated by DALL-E were amphorae rather than anything resembling Moche ceramic vessels (Figure 7.4).

Prompts 11 and 12, on the other hand, were formulated to generate shan shui ink paintings, i.e. Chinese landscape paintings. The simple prompt of 'shan shui paintings' shows results that clearly demonstrate DALL-E was trained for this style of image (Figure 7.5 top left). However, DALL-E struggled to produce an out-of-context landscape – the Grand Teton mountains in Wyoming, United States – in a convincing shan shui style (Figure 7.5 top right). The results show styles of brushwork that are more consistent with oil painting and use a bright colour palette in contrast to shan shui paintings which are created with ink in a

FIGURE 7.4: AI-generated images created with the prompts (clockwise from top left): 'Shan shui painting'; 'Shan shui painting of the Grand Tetons'; 'Ikegobo depicting the Queen of England and her children'; and 'Ikegobo'. DALL-E 2, December 2022.

monochromatic or minimal colour palette. For whatever reason, DALL-E struggled with transposition of the style to another geographical area.

Finally, prompts 13 and 14 attempt to generate Ikegobo, celebratory altars from the kingdom of Benin. Prompt 13, simply using the word Ikegobo, did not have any English anchoring words like the Moche prompts and therefore demonstrates very clearly that DALL-E was not trained in this type of object. In my test, the prompt produced primarily images of plants (Figure 7.5 bottom left), possibly due to the fact that 'gobo' is the Japanese word for burdock root. Adding text for

FIGURE 7.5: AI-generated images created with the prompts (clockwise from top left): 'Moche jug'; 'Stirrup spout vessel'; 'Moche pottery depicting Queen Victoria'. DALL-E 2, December 2022.

an incongruous subject matter into the prompt, 'the Queen of England and her children' produced images of dolls clothed in East Asian dress and stylings (Figure 7.5 bottom right). It is clear that DALL-E was not trained in this form of art and, indeed, generally struggled to replicate the non-western styles I tested – particularly with incongruous subject matter.

Based on my overall sense of what types of images are present in these categories on WikiArt and the deviations from these style categories in the results from DALL-E, I do not believe that WikiArt has played a dominant role in training

artistic style for DALL-E. However, it is likely that a similar western-centric dataset has been used, as the results from the prompts I tested suggest.

Decolonizing art datasets

As this limited study shows, style categories in art datasets become reified through their use in machine learning. The terms tend to lose their historical context and nuance in favour of simply standing in for a given set of reductively defined visual qualities. This means that derogatory terms like 'primitive' may be treated as essentially non-western rather than as the western constructs they are. Western styles too are solidified in their meaning as a select grouping of visual qualities rather than contentious or historically situated terms. This stripping of context begins with how an art dataset has been compiled and is exacerbated by its implementation in training machine learning tools. In this way, non-malicious expedience can quickly balloon into harmful stereotype and bias.

There has been a push in recent years to 'decolonize' art history. This means not only rethinking the use of the western canon in teaching art history or adding artists or artworks from under-represented groups or geographical regions to art history coursework but also rethinking the founding principles of the field and how these principles are practically applied in both academia and art institutions (Grant and Price 2020). Concerns about decolonization have been almost entirely ignored in the compilation of art datasets up to now. This raises the question: how can art datasets be decolonized? Or, are the 'neat little boxes' of the dataset unavoidably western-centric? The first challenge in creating or conceptualizing a decolonized art dataset is that projects for mass digitization and the attendant metadata creation have thus far largely been funded by and conducted by western institutions, meaning that there is a decided lack of digital data outside of the traditional western canon. Merely adding more digitized content from outside of this milieu may not, however, correct the biases of such datasets.

On a deeper level, big art datasets reflect an implied narrative of art history that is western in its structure. No matter how many datapoints are added from other parts of the world, the underlying premise remains. In order to decolonize art datasets, their foundations and construction must be interrogated. As Audre Lorde famously wrote, 'The master's tools will never dismantle the master's house' (Lorde 1981: 98). Some scholars in the humanities might argue that, by quantifying humanistic data – squeezing it into datasets and on/off states – reductivism is inevitable. If we give up on trying to create fairer, more equitable, and representative datasets (or conceptualizations of data we might imagine *beyond* the current form datasets take), we implicitly accept the biased, western-centric points of

view embedded in them. These datasets drive our contemporary machine learning systems, invisibly guiding them, and are the crystallization of our knowledge in machine-interpretable form.

Data needs to be understood and curated, not haphazardly scraped together. While scraping internet data may be expedient for training deep learning models, it dramatically increases the potential for implicit bias and stereotype as well as reductivism and misinformation. For it to function in ways that will be appropriate and fair to diverse groups of people in different regions of the world, data must be constantly interrogated rather than piled up into ever larger quantities, creating layers upon layers of inscrutability. Going forward, researchers need to not only remain aware of biases and data reifications but also creatively imagine ways to reconceptualize our understanding of images in the context of large image datasets.

ACKNOWLEDGEMENT

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NOTES

1. WebMuseum: https://www.ibiblio.org/wm/about/about.html (accessed 9 October 2023).
2. Web Gallery of Art: https://www.wga.hu/index1.html (accessed 9 October 2023).
3. Google Open Images Dataset V7: https://storage.googleapis.com/openimages/web/visualizer/index.html (accessed 16 November 2022).
4. COCO: https://cocodataset.org/#explore (accessed 16 November 2022).
5. In a widely distributed study, Kate Crawford and Trevor Paglen 'excavated' one large image dataset, the ImageNet dataset, in order to expose the racist, sexist, and otherwise biased and bizarre labelling of images regularly used in machine learning (Crawford and Paglen 2019).
6. www.wikiart.org.
7. See also Imagen, Make-a-Scene, Night Café, Craiyon, DeepAI, Photosonic, Jasper Art, Fotor GoArt, Deep Dream Generator, Artbreeder, and StarryAI.
8. Influential early art historians and proto-art historians included Johann Joachim Winckelmann, G.W.F. Hegel, Heinrich Wölfflin, and Alois Riegl.
9. A full listing of prompts and images tested/produced can be viewed at: http://www.amandawasielewski.com/dall-e-tests/ (accessed 16 January 2024).
10. For all of these prompts, I used variations on the terms. In prompts 1 and 2, I entered both post-impressionism and post-impressionist (with and without a hyphen). I did not find that the suffix or hyphen made any difference for the output. I also used the grammatically incorrect –ism suffix for Naïve-Primitivism and Primitivism in prompts 3, 6, and 7 as well

as the –ist suffixes to see if the change made any significant difference. I did not find that it made any noticeable difference.

11. During the post-impressionist period, artists like Georges Seurat depicted contemporaneous scenes of everyday (clothed) people enjoying swimming areas (see *Bathers at Asnières*, 1884). However, in the case of the DALL-E output here, the scenes appear more or less contemporary to today.

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8

Hyperformalism: Notes on Machine Vision and Art Historical Method

Benjamin Zweig

> *Its [the computer's] power is awesome. But it cannot make its own [historical] records, and it cannot speculate or hypothesize. It cannot replace, but it does stimulate and challenge, the historical imagination.*
>
> (Herlihy 1992: 230)

Introduction

These words of the historian David Herlihy, written in 1992, might sound familiar to us today. It is uncontroversial to acknowledge that the computer has impacted humanities scholarship in many ways, from a renewed focus on quantitative analysis – a slight re-tread of the 'quantitative turn' of the 1960s and 1970s – to the emergence of the digital humanities and Digital Art History as semi-distinct scholarly fields, and recently to the role of machine learning and 'Artificial Intelligence' as breakthroughs that promise to drag the humanities into the future (Ruggles and Magnuson 2019). But Herlihy's words resonate because we are in some ways in the same predicament as we were in 1992. The computer promises much. It challenges, facilitates, frustrates, enlightens, engages, and disappoints. But it cannot *do* history or, in our case, art history. This is perhaps no truer than with the rise of one of the great recent challenges for our field: machine vision, and what it means for the history of art (Impett and Offert 2023; Nygren and Drimmer 2023; Wasielewski 2023).

In 2009, the computer scientist David Stork made the stark claim regarding the machine's ability to identify and attribute artworks that 'In some cases, these

computer methods are more accurate than highly trained connoisseurs, art historians and artists' (Stork 2009: 9). Such pronouncements that a computer can be trained to be more art historian than an art historian have become something of a theme in recent years, for example the recent AI-powered attribution of a Raphael painting that later came into question (Greenberger 2023). The occasional breathless coverage of machines beating art historians at their own game or making near miraculous historical discoveries, such as the dubious Raphael, that art historians should have made if only they had looked hard enough with the steely objectivism of the algorithm, even when the results turn out to be false, attracts much attention – and much criticism (Bishop 2018).

As Sonja Drimmer, Griselda Pollock, and Claire Bishop have vociferously noted, this characterization of the discipline leaves a bad taste for many art historians (Bishop 2018: 123–24; Drimmer 2021; Elgammal 2014; Nygren and Drimmer 2023; Pollock 2014). The framing that machines can do art history better, often meaning more objectively, than art historians themselves is grating because it reduces art history to a discrete series of tasks to be done: identification, attribution, categorization, and organizing objects according to a binary of similarity/dissimilarity. This framing, however, reduces art history to what the machine is good at. When the work of art history is characterized as such, then no wonder it seems that machines are primed to be better. For, like the mentats in Frank Herbert's *Dune*, what are art historians if not image calculators?

This is not to say that computer vision has no application for the history of art. Quite the opposite, and such characterizations as those above are unfair for both art history and computer science. The role that computer vision and machine learning more broadly might play in understanding art has become an ever-more critical part of both Digital Art History and computer science (Rodríguez-Ortega 2020; Mercuriali 2018). Indeed, there is no shortage of discussion on computer vision and art history going back at least to William Vaughan's pioneering *MORELLI* project in the 1980s (Rodríguez-Ortega 2020: 338–40). But any pronouncement that computer vision is set to transform art history has not as of yet been borne out.

Part of the above problem is that we often encounter a different set of expectations from computer scientists and art historians about what art history does and what we think machine vision can do for it. From the computer science and machine learning perspective, the assumption is often that art history is primarily concerned with identification, attribution, dating, and style. These are things that can be tested. It sees art history as arguably more organizational than analytical. But art history as a discipline has long moved past this type of study – important as it might be – as its core work, which brings us to the heart of the issue and theme of this essay: computer vision and machine learning's engagement or disengagement with art historical *method*, and attendant theoretical concepts like form and style.

In the following, I would like to examine more closely the relationship between the use of art historical methods and the assumptions of computer vision's application for it. In particular, I will explore several computer vision projects that take Giovanni Morelli and Heinrich Wölfflin as their guides to present what I believe are the clear limitations of using them or their methods as models, and then examine the particular ideas of computational connoisseurship and image similarity. I would then like to posit an alternative model for computer vision by looking at the work of the Viennese art historian Alois Riegl and his concept of *Stilfragen* and the history of ornament as a means to rethink computer vision's application for the history of art and widen the scope (Figure 8.1).

FIGURE 8.1: Portrait of Alois Riegl, *c.*1890. Photograph. Wikimedia Commons.

As has been pointed out many times before, the computer's advantage is its capacity and the scale at which it can process images (Rodríguez-Ortega 2020: 340; Bell and Ommer 2016: 188; Impett 2020: 386). But, as will be examined, its limits are decidedly formalist. This mixture of capacity and scale with formalist limitations gives rise to what I like to think of as *hyperformalism*. This is formalism at a scale only the machine can do and thus should be part of the distinct practice of Digital Art History. But for it to be so, it must use the right models, such as Riegl, and lead with decidedly art historical questions that make sense for it to help us answer. I should note that this is a speculative and somewhat theoretical essay. And its goal is not to describe a specific project or test a hypothesis and relay its results. Rather, it is to think about what machine or computer vision can do, in the spirit of recent work by Nuria Rodríguez-Ortega, from a distinctly art historical point of view (Rodríguez-Ortega 2020).

Morelli and Wölfflin. Connoisseurship and similarity

Many computer vision models trying to understand art have in general cited a few main culprits of art history: Giovanni Morelli, Heinrich Wölfflin, Erwin Panofsky, and Aby Warburg (Rodríguez-Ortega 2020). This is because computer vision is a *formalist* enterprise that in many ways is reconnecting with the approaches from the nineteenth and early twentieth centuries (Näslund Dahlgren and Wasielewski 2021). Its chief aims, or perhaps more accurately its abilities, are identifying the formal properties of an artwork, either from a holistic perspective or an object or feature-oriented one. While computer vision can identify simple objects and subjects, colour and hue, brightness and value, compositions, gestures, and brushstrokes, it does not deal with the interpretation of an artwork's meaning or its history and context (Lang and Ommer 2019). Consequently, much of the discussion around computer vision and art history treads familiar formalist territory: connoisseurship (identification), style, or periodization (similarity/dissimilarity), and a very basic level of iconography (object/subject detection). In some ways, computer vision's formalist constraints can make it feel somewhat old fashioned and ripe for the kind of criticism outlined above.

The term one encounters frequently in regard to computer vision and art history is connoisseurship. That is, the computer is primed to become a kind of digital connoisseur, objectively able to identify an artwork and its artist through attribution of form and style. Indeed, the question of connoisseurship has become relevant in relation to computer vision and as a practice within Digital Art History by many scholars, including Vaughan, Stork, Bell, and Offert, and recently Wasielewski (Bell and Offert 2021; Wasielewski 2023). But why is connoisseurship so frequent

in the discussion on computer vision and art history? And what does it say about the assumptions of computer science and the history of art?

The first part of the answer lies in part on the general underpinnings and workings of computer vision: retrieval by identifying similarity. Many computer vision projects and the algorithms that they use are constructed upon the precept of finding like images. This is how computer vision applications both commercial and non-commercial operate, including Google Vision, Microsoft Azure, TinEye, and TensorFlow. Indeed, Vaughan's *MORELLI* project was initiated on the premise that a computer could help organize and identify artworks by Rembrandt (Vaughan 1987, 1992). The algorithm is trained on groups of similar images ('buckets') that can be categorized and then tested against unseen images – the train-test-validation model (Lang and Ommer 2018). Similarity can be based on a holistic reading of the image, such as the general contours of a composition using edge detection; through object detection and bounding boxes to find objects such as skulls or horses; or through properties such as shape, colour, and brightness (Lang and Ommer 2018). This is how computer vision has been used in museums and libraries such as the multi-institution *PHAROS* photo archiving project (Caraffa et al. 2020).

If the primary purpose behind computer vision is to assess similarity and consequently to support discovery, then it is little wonder why connoisseurship is an appealing art historical method. It shares the directives of identify, correlate, and attribute. And it is why someone like Giovanni Morelli (1816–91), the famous Italian never-was-physician-turned-art critic, seems like a good art historical guide for computer vision (Figure 8.2).

Morelli gained fame for his practice of identifying minute details from primarily Renaissance artists that were almost unconsciously carried over through their work such as drapery folds, earlobes, and fingernails (Hinojosa 2009). He would then use these unconscious details as the source of attributions, a practice carried over famously by connoisseurs Bernard Berenson and Alfred Beazely. Morelli proposed his method of close looking as a kind of direct observable science that was objectively validated, as a doctor diagnosing a disease through a symptom.

Morelli has long been used as a model or at least a general all-purpose reference point for computer vision projects that use art or art history as their subject – William Vaughen even noted the naming of his project *MORELLI* was superficial (Bell and Offert 2021). Recently, a project by computer scientists Rodriguez and Craig and art historians Langmead and Nygren has taken the step of more thoroughly testing Morelli as a model for computer vision (Rodriguez et al. 2020). They placed images of artworks into a convolutional neural network (CNN), used to detect and classify objects in an inputted image through computational layers, that they had pre-trained on 'naturalistic images' (Rodriguez et al. 2020). The basic premise of the project is:

FIGURE 8.2: After Franz von Lenbach, Portrait of Giovanni Morelli, before 1889, photogravure print. Academy of Sciences of Turin/Wikimedia Commons.

If art historians cannot satisfactorily agree on what features are most relevant, perhaps there are other, more empirical ways, that computers can be enlisted to bring clarity to the problem. It is plausible to hypothesize that computers might do

> a better job of directly, and accurately, attributing artists to artworks, if only we could tell the computer what to look for and what to learn.
>
> (Rodriguez et al. 2020: 358)

In the end, they find that their CNN visually discriminates between groups of paintings, again based on similarity as the operator, but that it does not pool them into more specific categories such as 'artist' or 'style' (Rodriguez et al. 2020). In another project, they specifically operationalized Morelli's method into an algorithm to test its actual limits when human judgement was ostensibly removed; or, as they say, through a 'computational mirror' (Impett 2020; Langmead et al. 2021). They conclude with the

> unavoidable truth that computers have not earned their place in the conversation about artistic attribution because the linkage between 'style' and authorship is not some immutable law of physics that is easily computable, but rather a humanistic commitment that requires human judgment.
>
> (Langmead et al. 2021: n.pag.)

As the results of their projects suggest, the purported objectivity of computational classification runs into problems with Morelli as a guide. What we end up with are in some ways the opposite of Morelli. We get broad-scale generalization but no actual attributions. We get image sorting through attributes like the dominant colour but not through the shape of thumbnails. But more than this, the premise of their projects raises a series of important questions. If art historians cannot agree on relevant features, how then would a computer? And if we could tell a computer what to look for and what to learn, would not that then indicate there *are* in fact agreed-upon features? And if there are agreed-upon relevant features that art historians use, how is the computer doing anything different, much less empirically or objectively, than humans?

These questions bring us back to using Morelli. What is happening is that computer science is looking not so much for art historical methods as guides as much as the closest point of validation of computer science's own methods (Wasielewski 2023). This is understandable to a degree, and Morelli's purported objectivism and clear purpose theoretically complements the computational model. But in reality, Morelli's approach that relied on intuitive distinctions and subjective judgements was a kind of ersatz scientism. Morelli's 'method' was not so much a well-defined set of criteria as it was feigned amateurism written against the theoretical and documentary-oriented nineteenth-century (especially German) academicism and that was also bound up with the art market of the late nineteenth century (Fernie 1995: 103–05). Therefore, when computer vision projects invoke

either connoisseurship or Morelli, they carry with them a set of methodological and ethical assumptions that need to be questioned. For instance, is the intention of using Morelli to replicate him or operationalize his method? Or is Morelli simply a convenient scaffolding, a post hoc nod to art history because it aligns closest with computer science? Then, we should ask, is Morelli even trustworthy as a guide? If not, then why should a machine that uses Morelli as a model be any less suspect, especially if used in conjunction with the art market? When computer vision adopts Morelli as a guide, whether strongly or weakly, it adopts the limits of his imagination.

This is true for any art historian or art historical method that computer vision takes as its Charon. Take, for example, Ahmed Elgammal's computer vision project that sought to have a machine classify and predict style (Elgammal et al. 2018: 2183). Using Heinrich Wölfflin's *Principles of Art History* (1915) as his guide, Elgammal claims that a computer could 'place works of art in a smooth temporal arrangement mainly based on learning style labels' (Elgammal et al. 2018: 2183). His dataset consisted of 81,449 paintings from Wikiart (sculpture and photography were excluded) (Elgammal et al. 2018). The dataset was then split into training, validation, and testing groups. Elgammal is enthused that the machine identified certain artists as representative for certain styles or periods such as Van Eyck and Dürer for Northern Renaissance or Monet for Impressionism: 'The fact that the representation chose a representative artist or artists for each style – among thousands of paintings by many artists in each style – highlights quantitatively the significance of these particular artists in defining the styles they belong to' (Elgammal et al. 2018: 2187).

Yet one wonders about the underlying methodology that supports such results and the quality and make-up of the dataset. Elgammal's project looked specifically at paintings. Wikiart includes many duplicates of artworks and counts multi-part objects as separate works. For example, the wings and the central panel of the Mérode Altarpiece (attributed to Robert Campin) triptych appear as three different objects and then all together as one – four in total. It is not clear how or if Elgammal's project counted these objects or duplicates. If a single artwork was counted three times, then we have a good likelihood of overrepresentation in the conclusion. And contrary to his claim of using only paintings, Elgammal's own plotting and visualization show that he included a print of Dürer's *Four Horsemen of the Apocalypse*. It is further not clear how many prints might have been accidentally counted as paintings, or if the distinction was in fact made at all.

The second question regards a conclusion that the machine reached. Elgammal states that the computer outputted a 'smooth temporal evolution of style' without any knowledge of dates (Elgammal et al. 2018: 2186). This seems an impressive achievement. But it might not be the machine's achievement so much as a

byproduct of the project using style labels to organize the data. The visualizations produced group together similar artworks using the labels, and then a chronology is subsequently inferred after the fact. When style labels are applied to images, they are going to have a temporal dimension to them because styles are rooted in time. So the fact that a neural net placed like images together based on style labels and the end result is something of a timeline is not all that surprising.

The third question for Elgammal's project concerns the use of Wölfflin as a model. According to him, 'We chose Wölfflin's theory because of his emphasis on formal, discriminative features and the compare/contrast logic of his system, qualities that make it conducive to machine learning' (Elgammal et al. 2018: 2189). Indeed, like Morelli, Wölfflin provides a clear organizational method that feels ready-made for the computer. He posits easily identifiable categories: linear/painterly, planar/recessional, open/closed, multiplicity/unity, and absolute/relative clarity. These categories, ostensibly judgement free, can serve as buckets into which one can place art and from which one can create a model for distinguishing similarity/dissimilarity. But the same problems and questions arise that we encounter with Morelli when art historical method is operationalized as an algorithm. One asks who is making the decision about which images fall into which categories? Is it the machine? If not, then who? Ultimately, the machine might lend an empirical and objective weight to Wölfflin's theory that is not warranted. Moreover, it is not necessarily the case that the computer is validating Wölfflin's theory as much as replicating its assumptions. As such, it can feel as though the results are pre-determined by the method. In the end, what we are left with is a formalist reductionism that in many ways misunderstands Wölfflin, whose principles were intended to understand the history of vision more than a teleological checklist for a history of style (Fernie 1995: 127–28).

Let us return to the question of similarity as it pertains to computer vision and art history a bit more broadly. As we can see, both Morelli and Wölfflin's approach presupposed understanding artworks by degrees of similarity, as does computer vision, which makes their theories so attractive. Because similarity is integral to computer vision and machine learning, there are many projects that use art based on similarity without explicitly looking at art historical methods or questions. Some of these are designed with the directive of supporting cataloguing and research by enabling finding similar images from different datasets such as the *PHAROS* photo archiving project mentioned earlier (Caraffa et al. 2020). Others take holistic similarity and play loosely with the output. Take, for example, Lev Manovich's Style Space and the Google experiment *X Degree of Separation* by artist Mario Klingemann (Manovich 2011). Manovich creates impressive and engaging visualizations based upon visual features such as brightness or hue that are translated into spatial distances. The result is a plot that groups together

similar images and pushes away dissimilar ones. Manovich is clear that his project is a means to explore image sets rather than to explain them. Klingemann's project takes a large corpus of images from Google Arts and Culture and uses an algorithm to map out degrees of separation between any two images a user might choose. The result is a scale of images from *a* to *b* that purport to show a kind of intermediate range of artworks that ostensibly connects the two selected artworks.

Although these experiments would not be considered art history, both projects raise an interesting issue for art history and machine vision: the limits of similarity as an analytical category. While visualizing artworks based on formal properties is engaging and can aid discovery, especially serendipitous discovery, the conclusions that similarity ostensibly provides are not as clear as one might hope. That a machine can identify similarity between artworks tells us one thing: that the artworks are similar. That one Madonna and Child looks like another is not surprising given how historical conventions of representation develop and emerge. With similarity, we encounter something of a tautology. In the best case, this tautology can help enable exploration and discovery, which, to be fair, is often a desired outcome for computer vision projects. And, to be clear, there *is* much value in this work. At the same time, such results can unintentionally lead us astray by assuming that there is a logically necessary connection between similar objects, akin to the modal scope fallacy, or that creates outright false connections. For instance, *X Degrees of Separation* allows users to 'connect' any two artworks that they choose and for which the algorithm will discover the hidden connections across space and time. But the connections are not really between the works as among basic visual features derived from the digital image that the computer has determined and plotted through space (Mercuriali 2018). The connections posited are completely arbitrary and nonsensical from a historical point of view, although they make for an interesting exploratory experience. But for this to have any meaning beyond 'similar things are similar', necessary conditions for their relationships need to be proven rather than inferred or assumed by the output.

A slightly different form of similarity that might yield more concrete results is that of object or subject detection. Object detection does very much what it sounds like. A machine can be trained to detect certain discrete objects within artworks, such as a horse or a flower, and find basically similar instances in a range of untested images. Björn Ommer's group at Heidelberg University have initiated several interesting projects that have specifically looked at object detection for art history. For instance, the *COMPOSITO* project takes a large corpus of architectural drawings and trains a computer to identify similar shapes and sections, such as balustrades, arches, and capitals, without human input (that is, unsupervised) (Ommer et al.: n.d.). Ommer's group acknowledges that architecture posed distinct problems for the algorithm, as does the unsupervised approach. In another

project where Ommer and Lang sought to use object detection more broadly that was not trained on any kind of image metadata, they note specifically how the algorithm had difficulty with pre-modern and non-standard objects and compositions (Lang and Ommer 2021). Again, we see some of the limits of similarity, but here it is the inability of the computer to work well with objects outside of a particular scope of analysis.

Object or subject detection has held a long-promised but not-yet-realized potential for the history of art. On the surface of things, object detection seems like a natural extension of iconography into machine vision, and precisely something that the computer could do at a hyperformalistic scale. In theory, it would allow one to propose one image and seek its correspondents through tens or hundreds of thousands of images. But there are (as always) difficulties from both an art historical and practical perspective. Object or subject detection in the way the computer might be able to do it shares a mostly superficial correspondence with iconography in that it is concerned with the content of an artwork rather than features like color. It is not – and nor is it trying to be – a redux of Panofsky, as it cannot tell you anything beyond the *what* within the image. But the larger problem for object/subject detection is having the computer figure out the *what* in the first place and matching it with art historical thinking. Simply, what objects or subjects are important for art history? The answer, of course, is whatever the art historian seeks. A computer might be able to identify objects at a general level – a human, a tree, a house, and so on – but this might not be especially helpful for art history that often seeks more specific identification. The fact is that object detection is generally not well calibrated for art as one truly wishes – at least in its current state.

The lack of specificity in something like object detection is a challenging task for computer vision's potential application for art history. On some occasions, one can train a specific set of images to identify a specific set of objects/subjects such as the *COMPOSITO* project did. But there exists a deeper two-fold challenge here. As Peter Bell notes, the first challenge is that automated image retrieval continues to pose an 'ambitious Computer Vision task' that is still very much underway (Bell and Ommer 2016: 195). The second challenge regards where training sets for computer vision originate and the underlying assumptions of many computer vision models. A primary source for many models is ImageNet, a repository of 14 million images that are organized along predefined categories and based on the structure of WordNet (Deng et al., n.d.). Because ImageNet contains primarily photographs and has a limited descriptive structure, it works well enough with photographs of natural or built objects that can be consistently identified. But as pointed out by Lang and Ommer, '[such systems] fail when confronted with objects belonging to pre-modern times. Failure cases occur for medieval objects or clothing and pre-modern architecture, because systems are simply unfamiliar

with these categories. Algorithms are further challenged by less standardized and complex composition' (Lang and Ommer 2019: 650). Indeed, looking through the ImageNet hierarchy, one cannot find the needed specificity of description that would make sense for a broad swath of art history.

In fact, one major hurdle that computer vision and art history face is that many of the results have been both over-promised and underwhelming. And this can be the case in the best scenario. Take, for example, the project on using computer vision for object detection by Ufer, Simon, Lang, and Ommer that took the 'Rubens' horse' equestrian motif as a subject of analysis (Ufer et al. 2021). They find that the algorithm can identify the same equestrian motif in works by Jan Breughel. This result seems quite insightful, until they qualify the finding with the following:

> If we consult the literature we find that both painters were not only bound by their profession or hometown of Antwerp but above all by their life-long friendship and partnership. Between 1598 and 1625 both painters collaborated on around twenty-four artworks.
>
> (Ufer et al. 2021: 19)

Similarly, a project that examined the rendering of light in Vermeer's *Girl with a Pearl Earring* concludes that 'realist painters, including Vermeer, possessed the ability to appropriately and coherently render actual lighting information in the scene' (Wang et al. 2020: 307). In both cases, what we end up with from a historical point of view is something of a statement of the obvious. The end result may be interesting for computer science and to see how well an algorithm performed, but it is perhaps less surprising for the history of art.

Even with all these issues and criticisms outlined above, I believe there is still promise in the use of machine vision for art history. And many of the projects above are helping the field to find it. With that said, might there be a space for exploiting computer vision's inherently formalist workings that neither re-constructs Morellian connoisseurship or Wölfflin's style categories nor restricts itself to object detection but that still engages with art historical method?

Hyperformalism: Alois Riegl and the history of ornament as method

In the discussions of machine vision and art history, it is perhaps surprising that the name Alois Riegl and more broadly the formalist enterprises of the Vienna School of art history are often absent from the discussion. To be fair, machine vision projects and articles on it occasionally bring up Riegl's name as part of a general

discussion on style or formalism (Bell and Offert 2021; Mansfield et al. 2022). But I have yet to see Riegl's theories engaged with at the same level of seriousness as those of Morelli, Wölfflin, Panofsky, or Warburg. There are perhaps several reasons for this. First, Riegl and much of the Vienna school can be somewhat inscrutable if not esoteric to those outside of the history of art, with the nebulous and often difficult-to-translate terms and ideas of *Stilfragen*, *Kunstwollen*, and *Strukturanalyse* (Wood 2003). Second, they lack the direct intention of Morelli or the schematic clarity of Wölfflin or even Panofsky that promises a clear application of art historical method onto computer vision. And yet given that machine vision is at its core a formalist enterprise, and Riegl and the later Vienna school were concerned primarily with pictorial form – both the internal logic of image structure (*Strukturanalyse*) and the long historical arc of motifs – we should take a deeper look into how and to what ends their ideas may contribute, in particular Riegl's, to machine vision and art history.

Alois Riegl is amongst the most important founders of art history as a distinct discipline (Iversen 1993; Podro 1982). A leader of the Vienna school of art history, Riegl was a strong proponent of formalism and stylistic comparison as a central practice of art history, generally eschewing discussion of content or metaphysics. While he is perhaps lesser known outside of art history than Morelli, Wölfflin, and Panofsky, his impact on the history of art through concepts of such *Stilfragen* (the question of stye), *Kunstwollen* ('will to art'), and haptic/optic are profound. Not all of Riegl's theories and interests are applicable for computer vision. But the theory of *Stilfragen* and its focus on ornament might provide both a different model for hyperformalist work and expand the scope of subject matter and research questions for which the machine might be well poised to help us answer.

First, what is *Stilfragen*? It is Riegl's investigation and the title of his 1893 book that examines the long history of ornament, from band friezes in ancient Egypt and Greece to tendril ornament in Byzantine and Islamic art through the Ottoman empire (Riegl 1992). Riegl traces the origins and adaptations of ornamental forms and motifs such as the palmette, zig-zag, lotus, scrab, uraeus, and arabesque across centuries and across cultures. His aim was to demonstrate the *longue durée* adoption and transformation of form, effectively the long life of ornament. While Riegl's approach is formalist and comparative, it is strongly morphological, for it seeks out not only what one thing is but also how it became that thing in the first place.

Why, then, might *Stilfragen* be a potential model for computer vision and art history? The first reason has to do with the scope of the question and how the computer might be able to expand it. Riegl's approach is, in many ways, akin to distant viewing, as it seeks to understand the long history of form or a motif that

can only be seen from five miles above the ground. Moreover, the morphology of form that Riegl seeks to explain has a strong quantitative dimension to it and requires a very large corpus of objects – as large as possible. The machine is clearly primed for this type of work. But in the nineteenth century, Riegl worked with limitations that veered him more towards case studies. Thus, the machine might facilitate the analysis of the question at a scale that it deserves.

The second reason is that Riegl presents a very different type of formalist model than those of Morelli or Wölfflin. Both Morelli and Wölfflin based their theories and approaches primarily (though not exclusively) on the analysis of paintings and masterworks by well-known artists. Because Riegl's question is about ornamental form, it is not bound to any one medium. Ornamental motifs, its repetitions and modulations, are found in paintings, drawings, manuscripts, sculpture, architecture, textiles, and decorative arts. Moreover, ornament appears on many everyday objects that might fall outside the more traditional scope of objects that Morelli or Wölfflin would have examined such as tattoos, engraved animal bones, bricks, and frames. As such, ornament is less hierarchical. Indeed, Riegl used a 'value-neutral' approach to his objects of study (Wood 2003). According to Christopher Wood, 'Riegl took no interest in *value*. He recognized no hierarchies among the images and artifacts of the past. Any shaped object – even a scrap of paper – was subject to formal analysis' (Wood 2003: 28). He turned his attention towards non-classical styles and periods, focusing on prosaic or seemingly meaningless details that moved him 'away from masterpieces and major artists and onto undistinguished, even unattributed artifacts' (Wood 2003: 14). Thus, if one were to take Riegl as a guide over Morelli or Wölfflin, the range of potential material to examine increases in both depth and breadth, for we would be unconstrained by the limitations of their interests. Might, then, we find ourselves peering towards a value-free (though not to be confused with an objective) art history by joining Riegl with the machine?

There is something else in Riegl that we might find interesting as a guiding method for computer vision: that there is a distinct art historical question driving it. That Digital Art History lacks a central question or is just data without a research question is well-known criticism (Bishop 2018). Moreover, and as noted in the introduction, one of the perennial disappointments in computer vision and art history is that it often seems as though the results are restatements of the already known. But when a research question *is* foregrounded, however, the results are almost always more enlightening such as Leonardo Impett and Peter Bell's work on gesture (Impett 2020; Bell et al. 2013). *Stilfragen* presents a ready-made question that, with its focus on form and necessary scale, a machine can help answer. And the question of ornament still engages with fundamental computer vision features of similarity/dissimilarity, for the problem is how to do forms change

over time. But what we might theoretically encounter is not a binary, but instead a subtle and modulated scale that ranges from more similar to less similar based on a close looking of discrete forms. It is both distant viewing and close looking, transitioning from a close-up to the panorama and back again, only to find oneself in a slightly different landscape.

Finally, let us take a moment to discuss the actual subject of *Stilfragen* – ornament itself (Figure 8.3). Ornament presents a particularly good challenge for machine vision for several reasons. First, ornament is everywhere. The human compulsion towards ornamentation is long and deep, and leaves behind an enormous corpus to examine that is ripe for the hyperformalistic scale that is the domain of the machine. Moreover, there is an enormous literature on ornament in art history, and as a subject it, along with the attendant study of surface, has seen a renewed interest from art historians of various fields (Necipoğlu and Payne 2016). Second, a single ornamental motif can be found across cultures; across space and time; and across materials from everyday objects to luxury goods. It is mobile and transmissible. Ornament is historically interesting because in some ways it defies simple periodization, while at other times it is intrinsic to a period style. It repeats through time, modulating and undulating, often like a consistent rhythm, occasionally like an emphatic strum. It is both staid and slowly transformative. Third, ornament can take us away from a critical point of failure of many machine vision and art history projects: the reification of a post-Renaissance western canon as the central object of study. Ornament provides an expanded field that might better be able to encompass non-western and non-figurative art such as Islamic art (Rodríguez-Ortega 2020).

There are both theoretical and practical issues if one were to take Riegl as a guide and ornament or *Stilfragen* as a guiding principle for computer vision. The first has to do with Riegl himself and parts of his theory. Much of *Stilfragen* stands in relation to Riegl's broader concept of *Kunstwollen*, or a 'will to art.' *Kunstwollen* is something between an explanation of the change of style and the broader cultural imperative that undergirds it (Elsner 2006). But *Kunstwollen* contains a general principle of cultural determinism that we should perhaps avoid so as not to use the machine to validate Riegl's own conclusions, especially those that rely on what Meyer Schapiro called the 'dogma of autonomous principles' (Schapiro in Wood 2003: 474). We should also note that while Riegl's approach was 'value free' in which objects it took under its purview, Riegl himself could be very judgemental regarding how different cultures treated or reconfigured ornament, such as his dismissal of Achamaenid and Persian art, which he found to be 'overestimated' in its quality (Riegl 1992). We must then properly calibrate rather than import Riegl's theory before any operationalization for the computer is to occur.

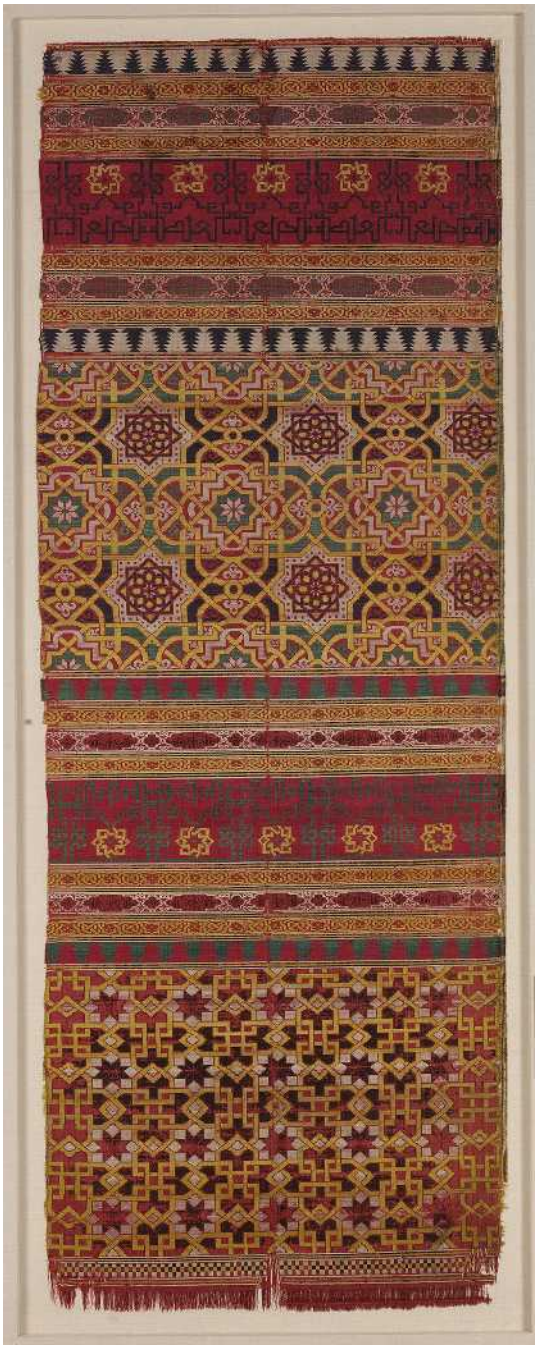

FIGURE 8.3: Fourteenth-century textile with geometric and calligraphic ornament. Metropolitan Museum of Art, New York. Courtesy of the Metropolitan Museum of Art.

The practical issues have much to do with how we might train a machine to work with Riegl as a guide and ornament as a subject. For the training-validation-testing model needed for machine vision, there is unlikely a ready-made dataset available of ornament. It is unlikely that ImageNet, the Web Gallery of Art, Wikiart, or similar sources will yield what is needed without considerable effort. In some ways, one imagines ornament to be easy, since it can be abstracted into a discrete closed pattern – think of Owen Jones' famous compilation 1856 *Grammar of Ornament* as one potential source for training (Jones 2016). But this is not necessarily the case since ornament is not catalogued or tagged with nearly the same frequency as figures/objects or general subject matter. Either a completely new dataset needs to be created from scratch or one may try to leverage object detection and extract a training set. Indeed, Ommer references a training model proposed by Shen that uses a self-supervised approach to find corresponding image regions for a training set that works best with lots of repeated motifs for training (Ufer et al. 2021). But there will likely be much work involved in gathering the appropriate data, and with that one imagines a much heavier supervised approach. And since ornament can be found as the complete surface of objects, with no beginning or end, or as individual motifs, segmenting or scratching ornament from its greater pictorial or material context might pose intense challenges.

Another part of the challenge, both practical and intellectual, is the technical and descriptive nature of ornament. One reason why training sets like ImageNet might not cover the various classes and subclasses of ornament is because the terminology of ornament is often highly abstract. Some terms like arabesque, acanthus, and scroll are available in highly structured taxonomies like the Getty Art and Architecture Thesaurus. But overall ornament is often used as a general term in and of itself. A machine vision project centred on ornament would need the expertise and input of art historians to direct what the machine is actually looking at. The art historian must direct the computer and not just respond to its results. To this, Bell and Ommer have developed an algorithm to find 'same and similar parts in an unlabeled dataset within a feasible response time' (Bell and Ommer 2016: 192). To increase confidence in the matches, the algorithm then relies in part on user-generated feedback and the marking of higher or lower-quality matches to move on to the next iteration. It is precisely this iterative process that can merge art historical expertise with the capacity of the computer that is required, but one that cannot be done with commercial products. As Bell and Ommer state, 'Merely adopting commercial solutions of software companies or off-the-shelf approaches in the digital humanities cannot provide the competence which art historic image processing needs' (Bell and Ommer 2016: 189). This is undoubtedly true. And it gets to the heart of the matter: technology should not lead. The art historical question should.

Conclusion

While Riegl might provide a different art historical model for computer vision from Morelli or Wölfflin, he should not be uncritically imported into it or as a part of the broader practices of Digital Art History. In some ways, the use of Riegl as outlined above is Riegl without the abstraction of historical change or causation found in *Kunstwollen*. Indeed, we should be wary of whether such a model might be truly 'value free' and whether it is simply Riegl's subjectivity bestowed with an aura of objectivity laundered through the machine.

All art historical methods have limitations. Any art historical method's application must ideally make sense towards the question that it seeks to answer. The problem with machine vision's use of Morelli or Wölfflin is that they might not in fact be as well suited to its task as it at first seems. But might Riegl, *Stilfragen*, and ornament provide a new model for machine vision and art history? Might it avoid the problems of being guided by Morelli and Wölfflin? Might it open up computer vision to an expanded historical field? Might it lead us towards a true hyperformalistic method that uses the computer's capacity for scale with ornament's historical expanse? These are the questions that this essay has sought to address, however imperfectly, and with which it must conclude.

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9

What Is at Stake at the Interface? Agents of Mediation in Digital Curation

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Explorations of how new media and digital art can be presented, preserved, and interpreted within museum collections have provided a medium-specific approach to curating digital art (Graham and Cook 2010; Hölling 2019). However, less work has been done to address the curation of physical objects that have transitioned online, or to purely digital platforms. Current critical analysis often focuses on the integration of hardware and software into physical museum spaces, where interfaces such as QR codes, touchscreens, and audio-visual displays invite the viewer to explore further than the physical limits of the museum by linking to web pages providing more information about objects and their histories (Lester 2022; Parry 2013). Here, digital curation is a slightly external addition, as something 'used to complement, rather than initiate, the encounter with the artwork and the gallery' (Proctor 2011: 215). We have come to expect and anticipate these technologies as staple parts of exhibitions and museums, which Ross Parry describes in terms of 'normalization' that extends to contemporary curatorial practice, where the use of technologies is 'logically wired into the reasoning of the museum' (Parry 2013: 30). However, even as these interfaces dissolve into the architecture of museum spaces, their normalization also heightens the significance of their function.

As digital technologies become more pervasive as a curatorial approach, we should critically assess how its practices are evolving. This chapter will look at the transition from material to digital in curatorial practice, identifying its unique characteristics and approaches, and examining how it addresses our changing interactions with art and culture as a result of the application of digital technologies. One of my crucial concerns that this chapter responds to is whether current approaches to digital curation within museums provide the levels of access to their collections that these technologies have come to represent.

The issue of access to museum spaces has been magnified since the COVID-19 pandemic when many galleries and museums were closed to the public and turned to digital exhibitions to remaining available to the public. In 2020, The National Gallery in London opened an exhibition showing the work of Artemisia Gentileschi, which was postponed from Spring to Autumn after the first COVID-19 lockdown. Finally, the exhibition moved online after the subsequent Autumn lockdown meant the museum had to close again. 'Artemisia, A Curator led exhibition film' was made available to watch through the Fabrique designed gallery website for £8 per ticket. Earlier, in 2016, the Sainsbury wing galleries housing the Early Renaissance collection with paintings from 1200 to 1500 were recreated in virtual reality (VR) by Oculus, using Matterport's 3D camera technology. Over 270 paintings could be explored by audiences from around the world that could immerse themselves within the galleries through a VR headset or through a 360-degree tour available on devices, including mobile phones, tablets, and desktop computers. The gallery was recreated as a virtual dollhouse that the viewer could zoom into by interacting with the Oculus interface. Panoramic photographs of the galleries occupy the screen, and the viewer could engage with the image by clicking, zooming, and rotating the camera angle to give the impression of moving into different rooms, and seeing views of the physical space based on their interests. On the one hand, the gallery tours of the Artemisia Gentileschi exhibition and the online iteration of the Sainsbury Wing provided an illusion of embodied and physical sense of artworks in situ at the museum, whilst expanding on the information available in a physical space through the online interface. But I would question whether this illusion of access is sufficient. By recreating the gallery space in these terms, one that insinuates the need for physical engagement with the space, arguably compounds the need to be present. Instead of making the gallery accessible, we are felt with the feeling that we should have been there and wander these virtual rooms surrounded by artworks that are merely ghosts of their material counterparts.

These 3D virtual environments are just one example of digital curation, but they are increasingly pervasive and exemplify the complex nature of access within digital curation. In addition to responding to the COVID-19 pandemic, The National Gallery exhibitions introduce social stakes to accessibility in digital curation. Here, digital technology is used to bring people to a version of the museum where they otherwise couldn't, and this shapes some of the social ecologies of digital curation as a democratic intention to make more content available to more people. Andrew Hoskins and Amy Holdsworth describe this characteristic of digitality in museums stating,

> [T]he sudden abundance, pervasiveness and immediacy of communication networks, notes, and digital media content which opens up new histories: new ways of sorting,

> sifting, and seeing the past in the present is suddenly and inexorably visible and accessible in an emergent 'post-scarcity' culture.
>
> (Hoskins and Holdsworth 2015: 1)

In these terms, access is defined by availability, whereby more content being available to more people in more places has the potential to open new routes to explore fixed museum collections. This is a dynamic and active proposal for the 3D virtual environment, and there are some of these characteristics within The National Gallery online exhibitions. Through the interactive user led VR tours, the viewer is immersed within the gallery and can select their own route, connecting them with their interests which can be shared with other users. In addition, the curator led tour of the Artemisia Gentileschi exhibition provides a level of insight to the artworks that could not be realized through an in-person visit. Here, digital curation prioritizes access by presenting an expansive point of contact between exhibition content, viewer, curator, and institution (Graham and Cook 2010: 10).

Historically, accessibility has involved the integration of technology into displays and exhibitions. However, availability always had social limits which I will expand on in this chapter. There are Early Modern examples that showcase how relevant this relationship is. In the studiolo of Franceso I de Medici in Florence, which was completed in 1590, a small room was designed act as a gilded repository for the patron's intellect and wealth (Parry and Sawyer 2005: 41). Ornately painted panels could be opened to reveal shelves filled with books, gems, and other curiosities. This space wrapped the viewer in a gilded reliquary of dynamic display techniques as the cupboards could be opened used cutting-edge hinges and carpentry techniques to enable physical access as well as layers of connections and associations depending on the objects position (Parry and Sawyer 2005: 41). The way the studiolo unfurls shapes an access point that frames a particular perspective, which in this case was the wealth and knowledge of its patron.

Transitioning from the *studiolo* to the similarly immersive environment of the 3D virtual museum spaces presents a more socially progressive definition of access. Digitization of museum spaces speaks to an ongoing post-colonial project of national museums to question their relationships with their collections (Hogsden and Poultner 2012: 267). The art and artefacts held in national museums represent from communities across the world, which in the United Kingdom were mostly obtained as a result of Empire and exploitation (Macdonald 2007). These objects participate in contentious histories that renders them diasporic, having been emotionally and physically removed from their origins and this escalates the social stakes of accessibility significantly (Clifford 1997: 213). Indeed, the impact

of making these objects available online has been described by Julian Raby as a move from 'information' to 'emotion' where an intimate and interactive experience shapes new dynamic with the museum objects and space (Raby, quoted by Proctor 2011: 215).

As was the case in the digitization of the Artemisia Gentileschi exhibition as a response to the COVID-19 pandemic, there are crucial social ecologies at stake in making museum collections accessible through digital curation. Does making more content available adequately address the post-colonial legacy of these institutions? In Sharon Macdonald's analysis of extensive role of the museum in this context, it is strongly suggested they do not. Macdonald states that

> The museum is not, however, merely a product of or a site for displaying the narratives of modern developments; it is also one of the technologies through which modernity – and the democratic ideals, social differences and exclusions, and other contradictions which this has produced – is constituted.
>
> (Macdonald 2007: 183)

Here, the museum is more than a mediative entity that represents social ecologies for the viewer to reflect on, but they are the source that produces conventions, ideals, differences, and exclusions. As in the Medici *studiolo* that provided limited access to the rich and powerful and reflected their standing, contemporary museum spaces are built around limiting social standings that require critical consideration before being transplanted to virtual space. In my experience, clicking through the halls of a 3D rendered digital museum environments has little critical contextualization, and I will argue that they fail to address the significance of these spaces Macdonald describes. Arguably, this digital curatorial model should be given the same critical scrutiny and ethical attention as the physical curatorial methods of these complex and contested collections (ICOM 2017: 25; Museum Association 2016).

As I will argue, replicating museum spaces as 3D rendered virtual environments draws attention to the social and historical context of the physical museum. In the section entitled, 'Access and availability in museum spaces', I will examine this relationship to demonstrate why digital curation needs to respond to the transition from material to digital and contextualize the interaction taking place within the virtual environment. The partial view we receive in the virtual space of museums and their contentious histories obscures the political and social agendas of this physical architecture, as well as the digital infrastructure that supports it. Digital spaces like physical spaces are not neutral platforms (Bosche 2007: 504; Lefebvre 1991: 91). Using the example of The National Gallery VR tour and The British

Musem's participation in the Google Arts project, I will show how this model of digital curation reiterates the social ecologies of the physical architecture it represents, compounding a problematic interaction between the museum collection and the viewer in a digital environment.

Digital curation needs to acknowledge the specificity of its digital environments, the digitization of the collections it presents, and the needs of a contemporary, global audience. Responding to the need for specificity within digital curation, section two begins with an analysis of the digital museum object and its presentation within collection management systems. Even in representing a physical museum object, the digital museum object is an object in its own right, with its own unique characteristics. One of the defining features that shapes it as such is the interface that shapes interactivity and articulates the transition from material to digital (Ekbia 2009: 2554). The technical characteristics of the interface expand the point of interaction, framing it as an equal engagement between humans and machines (Hookway 2014: 12). As a result, interfacial interactivity provides an ideal metaphor for a specific and productive approach to digital curation. Interfacial interactivity already shares many parallels with the curatorial process as a mediative dynamic that shapes and frames connections (Graham and Cook 2010: 10).

As Peter Lester describes in considering the interaction between viewers and museum collections, it is an equal 'encounter' (Lester 2022: 2). Lester points out that public engagement and participation have been sidelined by historical exhibition models such as those of The National Gallery and British Museum (Lester 2022: 2). I would argue that by outsourcing the curation of its digital collection to the Google Art project, museums such as The British Museum dismiss participation from their audience and relinquish responsibility for articulating complex encounters between audiences and its historically contentious collections under the pretext of making them more 'globally accessible'. Museum audiences require poly-vocal interactions that represent the global public body experiencing a digital exhibition, as well as sensitively addressing the trans-national nature of their collections (Kéfi and Pallud 2011: 276). This self-reflexive and revelatory interfacial process is arguably more representative of the realities of these interactions between the museum, the viewer, and the collection. As interfaces map the channels that shape and define how we navigate the digital world, they articulate interactions in a self-reflexive way. In discussing the invisible and intuitive nature of the interface the way they expose themselves and the process by which they enable connections between humans and machines is clear. As a result, an interfacial approach is an ideal metaphor to redefine and recalibrate the interaction between the museum collection, the viewer, and the curator needed to present digital objects.

Access and availability in the virtual museum space

In 1946, Andre Malraux introduced his concept of an 'Imaginary Museum' at the general conference for the United Nations Educational, Scientific and Cultural Organization (UNESCO). In his opening session, he proposed a museum space produced through digital technologies, envisioning a globally accessible collection of art and culture (Vanhove 2021: 121). In Malraux's words, 'our Imaginary Museum, worldwide in its scope, will confront us, for the first time, with the plastic inheritance of all mankind' ([Malraux] Vanhove 2021: 122). By 1965, Malraux's 'Imaginary Museum' became more concrete, developing into 'a Museum without Walls' and these approaches to cultural access retained a dispersed, virtual dimension defined by contemporary technology. By combining high-definition photography with cheap, fast image reproduction, Malraux proposed a record of previously overlooked artworks stored in museum archives, elevating them to new prominence and allowing viewers around the world access to international art (Malraux [1965] 1978: 21). These diverse and varied collections of masterpieces would allow the viewer to develop multiple, simultaneous connections that would enrich art historical interpretations in a democratic, user-led format (Malreaux [1965] 1978: 44). The application of technology into curation which Malraux envisioned gained substantial support from the UNESCO Director General, Julian Huxley. Huxley also wanted to reinvigorate museum and curatorial processes and saw technological developments as ways to 'explore all methods for sharing [these] treasures more widely', using 'all the new means of projecting museums and their collections outside their walls – notably films and television, as well as by abundant and improved reproduction' (Huxley 1946: 56).

Malraux's 'Imagined Museum' and Huxley's vision for bringing museum collections into people's homes anticipate the entirely virtual museum spaces we see populating digital curation today. While reproductive technologies now use giga-pixel capable cameras to render panoramic views of gallery spaces, the premise is very similar to 3D rendered digital museum environments (Proctor 2011: 117). This is particularly apparent in the shared association between technology, access and availability which has only crystallized over time. As Parry and Sawyer describe digital technologies,

> [H]ave heightened the sense of the museum as an immersive experience, that have brought precious collections (literally) closer to the public, that have aligned the museum to discourses of theatricality and visual spectacle, that have allowed museum spaces to be active and participatory experiences, and that have helped establish the museum as a place that transplants the visitor to another time or space.
>
> (Parry and Sawyer 2005: 42)

In contextualizing the relationship between access and availability, Parry and Sawyer outline the substantial promises digital curation makes to its audiences. By using digital interfaces, the viewer is given an impression of an active participation in their interactions with museum collections as well as unlimited access to any time or space through the authorial position of the museum.

On one level, 3D rendered environments such as The National Gallery tour of The Sainsbury Wing provides an immersive experience, where the viewer has the agency to choose their own routes in a user-led dynamic through an online platform that is readily accessible (Proctor 2011: 219). But the way this access is framed has not expanded far beyond the social limits of the physical museum space. In analysing another model of the 3D virtual museum, The Google Art Project, Nancy Proctor argues that regardless of the quantity of content available, these digital environments have not changed their curatorial methods to suit the diverse audiences they attract (Proctor 2011: 216). In fact, the information presented assumes levels of contextual comprehension and knowledge that can 'limit remote audiences understanding', especially if only a partial understanding is presented (Proctor 2011: 216). These limitations are very apparent within The National Gallery Museum view. Clicking close to paintings on the walls gives an impression of their scale and visual appearance. But the image resolution does not pick up the gallery labels meaning their title, artists, and dates are obscured in a pixelated blur. As a result, the global availability of these gallery spaces is somewhat limited to a purely visual relationship and these virtual spaces provide no more, or less accessible than their physical counterparts. These virtual environments do not provide the kind of access these technologies promise to, especially in the 'heightened' terms Parry and Sawyer have proposed. In fact, by assuming a level of knowledge in its audience and denying them any social and historical context of these artworks, this model of digital curation simply replicates its physical counterpart.

The social and political stakes of this limited perspective are particularly apparent in some examples of these virtual museum spaces such as The British Museum's participation in The Google Art Project. Launched in 2011, the Google Art Project used the familiar visual language of Google Street View to present select interior spaces of several of the world's most prominent museum collections. The website 'museum views' boasts over 2000 museum collections, historical landmarks and art galleries navigable, 'as though you were there in person' (Google Arts and Culture [2011] 2023). Audiences from all over the world can experience these spaces, provided they have access to the necessary hardware and an internet connection.

This project represents the global application of the virtual environment as a model for digital curation that shows how influential this model is becoming.

The British Museum was a founding participant in the project and its virtual footprint provides the largest interior space available on the platform. The Great Court alone covering over 8000 square meters, and over 60 galleries are available to explore. When it opened its doors in 1759, The British Museum possessed the same scale and impact as its globally available digital model. With its grand Greek-temple-front portico, the museum expresses authority as a repository for knowledge and its collections were accumulated to showcase empirical knowledge of human history as an objective, infallible record of world culture (Duncan 1995: 9). The curation of these spaces enhanced this perspective, the wide galleries containing simple plinths elevate artworks, and the vast glass fronted vitrines house a collection of art and artefacts from across the global. This space has always been formulated to provide access through a supposedly neutral platform for its diverse collections (Macdonald 2007: 177).

However, the way access is framed within these physical museum spaces is far from neutral as Sharon Macdonald points out; these spaces had a social, cultural, and political agenda by design (Macdonald 2007: 176). In the case of the British Museum, this agenda was shaped by Euro-centric teleology of western civilization and ideas of shaping ideal citizens, motivated by self-education and improvement (Bennett 1995: 8; Duncan 1995: 8). During the nineteenth century, museums and exhibitions extoled the virtues of making cultural material accessible and available according to what Carole Duncan defines as a 'A Civilising Ritual', where the visitor is caught within a performative act that follows certain social conventions unique to Museums. As a monument to knowledge, the visitor venerates the museum space like a secular temple (Duncan 1995: 10). Within this interaction, the curation of the museum space shapes an experience for the viewer according to the social ecologies the institution represents. In the case of The British Museum, this reflects the ideals of a paternalistic colonialist perspective disguised as a universal view (Macdonald 2007: 184). In Timothy Mitchell's extensive examination of nineteenth-century exhibitions, he analysis how displays of objects collection from around the world position the western gaze as universal, while situating international cultures as a condescendingly fetishized Other (Mitchell 1991: 2).

Mitchell's analysis shows how the social and racial inequalities these displays represent are not simply dispersed through exhibitions. He states, 'Exhibitions, museums and other spectacles were not just reflections of this certainty, however, but the means of its production, by their technique of rendering history, progress, culture and empire in "objective" form' (Mitchell 1991: 7). This universalizing model of curation does more to mediate a world view by providing a framework to represent it; they are the means production. Mitchell's observations foreground the importance of not replicating these enlightenment models of curation, because doing so only enables their ongoing legacy.

The British Museum intentions with their digital output were outlined in 2006 as wishing to

> transform the website into a public page for multifaceted cross-cultural enquiry, to make it not merely a source of information about the collection and the Museum, but a natural extension of its core purpose to be a laboratory of comparative cultural investigation.
>
> (British Museum 2006: 9)

This was updated in 2007 to include 'allowing the public much greater access to the BM's intellectual resources' (British Museum 2007: 53). However, as part of its digital output, the virtual rendering of their galleries does not provide the dynamic, multifaceted platform for any cross-cultural discussion. Instead, we are faced with a replica of an architectural framework that demands this 'civilizing ritual' without the critical contextual information to examine these spaces with. In these terms, access enabled by these spaces is defined within the limited scope of an enlightenment philosophy, and the contemporary attitudes that advocated for a hierarchy of civilizations. This analysis demonstrates how problematic these spaces are and why social and historical contextualization is essential to their representation.

This may seem an overly simplistic observation, but in a digital context the patterns of hierarchical, universalizing ideology can be recognized across digital technologies and their integration into curation. For example, Malraux and Huxley also possessed a universalizing vision that was ultimately 'Euro-centric in its outlook and exuded a top-down developmental logic', that was based on ideals of global American hegemony (Vanhove 2021: 122). He continues, 'during these immediate post-war years, [Huxley] remained in favour of reformed colonial model as one of the driving forces behind global development' (Vanhove 2021: 122). Huxley took this homogenizing perspective to Darwinian extreme during the 1946 UNESCO session when he called for a 'common pool' of genetic material that would bring together racial groups that he referred to as remote and backward (UNESCO 1948: 343). However democratic the motivations of 'The Museum without Walls' were, they were still framed by a model of access that was limited to a singular, authorial voice coming from a western hegemonic power based on derogatory, universalizing principles.

Turning to technical infrastructure of the internet that supports these virtual environments such as those examples we see in The Google Art Project shows how far the legacy of enlightenment thinking has encroached as digital technologies are consistently discussed using the same universalizing vernacular and systemic biases as the enlightenment museum. In 1995, Microsoft's Bill Gates made ambitious

claims about the forms of social equity that can be achieved online in his book *The Road Ahead*. He states,

> One of the wonderful things about the information highway is that virtual equity is far easier to achieve than real-world equity [...] We are all created equal in the virtual world, and we can use this equality to help address some of the sociological problems that society has yet to solve in the physical world.
>
> (Gates 1995: 258)

Gates continues, arguing that existing online renders the user anonymous, meaning that any real-world identifiers that subject an individual to racism, sexism, homophobia, transphobia, islamophobia, antisemitism or any form of discrimination are made invisible and ineffective. However, Gates' commentary on the internet implies anonymity is the only option to avoid discrimination which in turn denies individuality and specificity has no credibility. As Wendy Chun argues that Gates drastically inflates the empowering agency technology can provide and the social justice Gates extolls suggests that individual identity, particularly in the context of race, does not matter online (Chun 2005: 130). As a result, Gates' claims make the case for the kind of homogenous thinking that erases individuality and denies the user their identity. While his approach may seem superficially appear idealistic, if naïve thinking, Gates' dismissal of the need for individuality is profoundly damaging when considered in the context of curatorial models that both claim to enable access and utilize these technologies. This has been raised by Annette Van den Bosche in relation to globalization and producing universal, accessible cultural content online. She states:

> A cultural globalisation that loses locality, identity, and cultural context in a world culture that lays claim to the universal does not constitute a complete break from the past. The means of transmitting this model are global, the reach of the model is global, yet the model has a local, first world – a Northern and particularly North American identity. Other national and cultural identities do not vanish; they become subordinated.
>
> (Van den Bosche 2007: 504)

To Bosche, writing in 2014, online interactivity was something that should enable specificity, a personal experience created for the individual user, who cannot exist in old-world curatorial models.

In the case of The British Museum, where the physical architecture forms part of a universalizing civilizing ritual, the dismissal of individuality and the denial of real-world discrimination prevalent in digital infrastructures are compounded within

the digital museum space. The model of the universal museum is extended into digital curation, identity is denied, and we are provided with a level of superficial, and misleading form of access. There is a clear need to negotiate these virtual spaces with more consideration. In writing about space, Henri Lefebvre explores its role as a 'lived experience' (Lefebvre 1991: 91). Space is a dynamic participant in human relationships, and considering the way The British Museum represents the expanses of human culture it's spaces cannot be removed from those relationships despite imposing a role of impartiality through its 'civilizing rituals' (Duncan 1995: 24) The British Museum shapes and is shaped by the social, political, and emotional relationships formed by its walls (Lefebvre 1991: 26). The digital curatorial project needs to acknowledge the way its space participates in the 'lived experience' of its global audiences and address the poly-vocal perspectives through which these communities experience its collections. As Meehan states in relation to trans-national object stories, the

> openness of process becomes even more salient, given the unequal ability of all actors to contribute to the narratives crafted around these collections. Institutions must also acknowledge that visitors to their digital spaces have increasingly transnational identities and that constructing meaning and memories from digital museum objects is thus an inherently transnational activity.
>
> (Meehan 2022: 176)

In considering the identity of museum visitors, a digital curatorial approach needs to provide a collective experience that acknowledges diversity but does not enforce universality. Regardless of the increased content available, to a global audience in a virtual environment these replicas of the museum gallery simply reiterate and compound the historical process of engaging the viewer in a civilizing ritual from a homogenizing universal perspective. This is because these virtual environments do not reflexively negotiate the contentious nature of the spaces they replicate nor sufficiently produce a digitally specific interaction that can fulfil some of the promises of accessibility. Digital curation does not, by the nature of being digital, relinquish the responsibility of social access and mobility, and technology alone is not capable of changing these for the better.

Interfacial approaches and post-internet curation

There are potential ways to approach a digital curatorial method that acknowledges the capacity and specificity of the technologies being applied, whilst engaging in a reflexive social interaction between museum collections, the viewer, and the curatorial process. Looking to contemporary collection management systems

shows how digital technologies can be integrated into display techniques in ways that do not undermine social and historical context and enrich the viewing experience. These systems are designed to provide a digital record of objects for the benefit of institutional archives and conservation efforts, educational purposes, as well as visitor experiences (Bernardi and Dimmock 2017: 188). What we are presented with in these records are digital objects, which Nicöle Meehan loosely defines as a 'true and faithful digitized image of a physical museum object (in 2D or 3D) or a born digital object' (Meehan 2022: 174). These definitions of digital objects have often been dismissed as simplistic copies of their physical counterparts, and are subsequently maligned for their lack of physicality, their lack of aura, and their capacity to be infinitely reproduced and distributed (Groys 2016: 4; Kallinikos et al. 2010: 2).

There is a tendency to make ontological assumptions about computational systems which has led to these unfair comparisons between digital and physical museum object (Smith 1996, On the Origin of Objects: 50) They share many similar characteristics, and in some cases the digital object surpasses the physical to create something new. For example, the lack of a physical presence is replaced by a physical relationship with the viewer, who is required to move their cursor, use their finger to swipe, sweep, and pinch to interact with the high-definition rendering in front of them (Meehan 2022: 174). These forms of haptic feedback are arguably far greater than what is available in physical museums, where visitors are still encouraged not to touch, and 'are confronted by the glass case separating them from the majority of the objects on display' (Dudley 2009: 19). This observation by Sandra Dudley about the lack of tactile interactivity in physical museums is only enhanced when considering aura where the physical museum object is already disadvantaged. According to Walter Benjamin's 'Work of Art in the Age of Mechanical Reproduction', a museum object's 'exhibition value' relates to the removal of the object from its original social and historical context where it was used as part of lived experience, resulting in the loss of aura (Benjamin [1936] 2008: 26). In the case of the digital object, its meta-data allows it to be located within a search engine, tethering it to a particular place and collection (Groys 2016: 4). This arguably positions the digital object within the same 'exhibition value' as the physical museum object, because despite being removed from its original context it still retains connections with its origins and is presented with significance in its new location.

It is apparent that while there are similar attributes to digital objects and physical objects, digital objects achieve a different kind of relationship with the viewer. This might seem obvious, but those differences are often interpreted in such a way that frames digital object as a diminished version of its physical counterpart. This is not the case and instead the digital museum object creates a

unique experience as an object defined by its digitization. Nicôle Meehan makes this case stating that

> in the post digital landscape it is […] more accurate to consider the digital museum object not as devoid of aura, but rather as possessing a different type of aura, an aura that has been transformed and augmented, not depleted, by its journey from physical to digital.
>
> (Meehan 2022: 174)

Here Meehan suggests that digital museum object and its alternative aura are enhanced and enriched by the process of transformation that situates it within an online platform. This is evident in digital objects within The National Gallery online collections. Acquired by the museum in 2017, Artemisia Gentileschi's 'Self Portrait of Saint Katherine of Alexandria' is available as a high-resolution digital object on The National Gallery website.

It floats on the screen in a dark grey background with the ornate black and gold frame cropped out. Drop down menus provide some contextual information such as the artist's biography, the donors names, and some formal analysis of the painting. But interacting with this image through the online interface, the exemplifying features of the digital object emerge. Bringing the portrait into full screen, the serene face of the artist dressed as Saint Katherine is centred in sharp definition and the interface allows the viewer to get even closer. Looking into the eyes of the artist gives a previously unrealized level of intimacy with this painting and Gentileschi's process. The proximity to the picture plane the interface allows exposes the impression of the artist's brush as she formed her own features, with delicate layers of paint and varnish demonstrating her skill in crafting illusionistic flesh that looks warm to the touch. The visceral sensation this evokes is remarkable and entirely dependent on the painting's digital objecthood to experience. This technical interactivity defines the digital museum object as specific with unique characteristics; it is not a diminished version of the original; it is a unique artefact that should be treated as such (Bernardi and Dimmock 2017: 187).

Where the digital curatorial model that replicated the galleries of The National Gallery and British Museum fail to achieve this kind of proximity and interactivity, 'Self Portrait of Saint Katherine of Alexandria' as a digital object creates a palpable feeling of closeness to the image that extends far beyond the capacity of even the physical gallery space. But these interactions currently remain tied to an archival capacity. How can we translate the interactive perspective provided by this digital museum object to a digital curatorial method? The digital museum object provides us with the medium specificity that crucially acknowledges the distinctive dynamics of interacting with them. Meehan attributes the unique aura

of the digital object to the transition from material to digital and this is supported by Hamid Ekbia who describes digital artefacts as possessing 'novel properties that largely derive from the processes that mediate their creation, and that can be best understood by a close examination of such processes' (Ekbia 2009: 2554). In other words, the digital object's specificity is shaped by the mediative process that creates them, and this technical process is constituted within the interface itself.

Interfaces are the technical process that enables the transition from material to digital. In exploring the ways interfaces have altered our relationships to new media and net.art, Louise Poissant paints a picture of how interfaces negotiate this change. She states,

> The passage from material to interface suggests the creation of a cartography that would make an inventory of points of transition and rupture the transformation or even the drift of the continents that compose the territory of classical art history. We must locate the most prominent islands, the current's flow and direction, explore possible worlds, and prepare the migration toward a universe of bits.
>
> (Poissant 2007: 229)

The fundamental shift from a material to interfacial articulates a way to make sense of a fragmented map of dispersed and multiple 'islands' making up the global diffusion of digital space. Here it is the channels in-between these islands that create a dynamic zone that delineate and clarify this space. Poissant's poetic metaphor reflects how interfacial approaches to curating might respond to the specificity of digital museum objects, and negotiate a reflexive interactivity between museum collections, the viewer, and the curatorial process.

On a technical level, computational interfaces first appeared in 1968 when Douglas Engelbart presented 'the mother of all demos' at the Fall Joint Computer Conference in San Francisco. At this event, Engelbart showcased a combination of machines that had never been seen before: the connected network of a computer display workstation consisting of a monitor, computer, keyboard and mouse. Engelbart inputted information through this hardware, which was processed through the computer and then presented to him on his monitor (Paulsen 2017: 1). That monitor was filmed, and the onscreen image was projected behind him onto a larger screen for the audience to see. In this demonstration, the interface was created through the combined hardware and software, which together made up the graphical user interface (GUI) (Bratton 2015: 219).

GUIs are the most recognizable interface, and these facilitate and shape the relationship between humans and machines (Hookway 2014: 1). Without them it would be near impossible to decipher the binary code that forms the machine language beyond these interfaces (Kallinikos 2009: 192). In the context of digital

museum platforms, there are many GUIs in the form of screens, websites, and interactive technologies that enable connections and relationships with digital artefacts (Parry and Sawyer 2005: 189). Given the fundamental need for interfaces within all digital interactions, digital curatorial approaches should critically engage with the way interfacial processes function (Hookway 2014: 1). Indeed, beyond the hardware and software currently used, there are several interpretative and representational dynamics that showcase the parallels between the curatorial process and the way interfaces function (Graham and Cook 2010: 10). Like curation, the interface takes up a position in-between the object and viewer in the form of a screen or webpage. The interface, as a mediative entity, shapes the visual experience of the digital environment, enabling access to contextual information and content (Paulsen 2017: 37).

The pre-existing parallels between curation and interfaces show how relevant their association is, but I would also argue that an interfacial metaphor applied as a curatorial approach is an appropriate response to the ways digital technologies have changed the way we view cultural material. In Poissant's universe of 'bits', the viewer anticipates multiplicity and simultaneity, multiple times and spaces, and in framing the consumption of culture we should create a curatorial model that relates to this perspective (Hoskins and Holdsworth 2015: 2; Poissant 2007: 229).

Usefully, metaphorical interfacial interaction is reflected in the technical realities of interfaces and digital technology. Jannis Kallinikos makes the point that digital interactions have changed the perceptual habits of viewer as a result of […], 'the deepening involvement of computation in instrumental settings thus reframes the perceptive and action modalities by which human agents confront the world' (Kallinikos 2009: 183). An interfacial curatorial approach proves productive because it is both the material and the method of interaction between the digital museum object, the cultural institution, and the viewer. Interfaces speak to the specificity digital technologies and the kinds of interactions they shape because they both activate and are activated by them. In Hookway's words, 'the interface is a form of relation […] between two or more distinct entities, conditions, or states such that is only comes into being as these distinct entities enter into an active relation to each other' (Hookway 2014: 4). Translating this form of relationship that is contingent and connected to a curatorial model prioritizes an active engagement between the viewer, the digital museum object, and the institution as equal participants (Hookway 2014: 12).

The egalitarian image of interfacial interactivity this presents responds to key needs for digital curation. As discussed in section one, virtual museum spaces often undermine the accessibility they attempt to provide by reiterating universal approaches that overlook the specific needs of their diverse audiences. At best this presents a naïve

idealization of accessibility, and at worst a dismissal of their viewers identities and needs in relation to the museum collections (Meehan 2022: 179). But in the interests of exploring a technically specific model of digital curation, it is worth unpacking the limitations of the interfacial process as well, because the social and cultural stakes of digital infrastructures explored in section one expose their lack of neutrality that coerces a homogenizing view of global audiences.

Within the transition from material to digital that the interface articulates, the digital museum object undergoes necessary reshaping (Kallinikos 2009: 191). While this does not alter the character of the object, Kallinikos argues that this process does mould a new reality for it, and by obscuring this process, '[T]he computer screens through which reality is mediated by means of data or information tokens are windows, masks and blindfolds at the same time' (Kallinikos 2009: 188). Looking through these windows we gain a great deal, but we are blinded to the process taking place as a direct result of the interface. In most circumstances involving screens and websites, we only see the interface when it breaks down, exposing the inner workings of the machine through cracked glass, a prism of bleeding colours or an impenetrable wall of binary code (Bratton 2015: 219). In developing critical approaches towards interfacial interactivity, Alexander Galloway makes the point that in order to provide an intuitive interaction between human and machines, the interface must achieve an illusionistic form of 'self-annihilation' that renders itself and its processes invisible (Galloway 2012: 25). We see this moment early in the Engelbart's demonstration where he points directly at the camera, locking eyes with the audience and reaching across the multitude of interfacial mediations to interact in a way that created the appearance uninhibited contact (Paulsen 2017: 1). The interfacial hardware and software enabling this contact melted into the background of the interaction, even though it was the subject of the demonstration.

Considering how the interpretive process of curation is hidden from the viewer, the invisible interface, shaping and enabling interactivity, strongly resembles the negative connotations of the curatorial process. Indeed, computational language relating to interfaces is often used in critiquing this curatorial dynamic. Within her analysis, Macdonald uses the phrase 'black box' to refer to the hidden background knowledge and working shaping methods of display in museums. Kallinikos does the same to point out how the human-machine interface is routinely obscured in order to provide an apparently seamless interaction between a computational process and cultural products experienced by the viewer (Macdonald 2007: 177; Kallinikos 2009: 188). In doing so, Kallinikos sees it as vital to know the 'ways technological information reveals and hides, discloses, distorts, magnifies or conceals' (Kallinikos 2009: 188).

Technically, digital interfaces' functional mandate requires for them to be invisible. But in expanding on the broader characteristics of interfacial interactivity,

Hookway turns to its original definition within fluid dynamics. Here, the interface also shapes the interaction between entities, such as liquids that are different temperatures, or moving at different rates (Thomson 1882). In doing so, the interface marks a point of tension between these distinct fluids, enabling and facilitating their connection but crucially allowing them to retain their individual characteristics (Hookway 2014: 69). In doing so, the 'interface constitutes the site where a dynamic process of forming may become visible, legible, knowable' (Hookway 2014: 69).

In these terms, interfacial mediation becomes a process of revelation. Although it may not be visible, the results of its dynamic process of forming are made visible, legible, and knowable. As a result, the interfaces articulate a self-reflexive and dynamic point of contact. Building on this reflexivity, this point of tension at the fluid interface identifies and acknowledges the distinct characteristics of the liquids interacting there. Arguably this self-reflexive, dynamic process that identifies specificity as part of its process provides an ideal metaphor for a method of digital curation. By making these points of tension in the interaction between viewer and collection visible, legible, and knowable, an interfacial curatorial approach does not dismiss the complexity of the objects it presents but necessarily participates in a dialogue with them. As the curatorial model that produces a replica of museum spaces fails to address these dynamics and instead provides a universalizing interaction, an interfacial approach provides an alternative framework. It acknowledges and prioritizes the specificity of the viewer and their individual relationships with museum collections as a necessary part of the interaction that also exposes its curatorial framework. Boris Groys encapsulates this process, stating 'The selection is universalist not when it is all-inclusive. The selection becomes universalist when. It reveals the universalist practise of framing' (Groys 2022: 64).

Some of these interfacial characteristics manifest within current digital museum platforms that help demonstrate how productive this approach is. The New Museum ATLAS project is intended to engage in discussions about the museums' digital archive and reflexively examine the ways a museum that 'deals with the "new" can activate its own past' through discussions about artmaking, curation culture, and criticism (The New Museum 2019). These intentions are realized through the content and website of ATLAS, where its interface also produces an interfacial process. The project launched with a series of articles, including Critical Object Studies that situate the digital museum object within the context of the museum and the archive. For example, in the presentation of Nari Ward's Carpet Angel (1992) online, we are provided with a careful comparison between different installations of the physical work, providing a biography of its display and outlining how this has changed depending on different institutional settings (Mustard 2019). In revealing these curatorial processes, ATLAS removes the authorial hierarchy and responds to the needs to a contemporary viewer.

Furthermore, a written article complements photographic records. This discusses the recording of the installation as a 35 mm slide, and its subsequent transition to a digital format. Photographs show the extent and scale of The New Museum slide archive, while discussing how the slide of Carpet Angel entered the archive and was subsequently documented as a digital museum object. ATLAS is more than a collection of articles that discuss the work; each webpage is an interface that engages with an interfacial method of presenting a digital museum object, the framing images, and hyperlinked references. The content of ATLAS speaks to this self-reflexive, interfacial process of revelation that enables interactivity.

Conclusion

The way we interact with cultural material has changed as a result of networked digital technologies and as we anticipate a networked, multiple, and simultaneous form of access, the interfacial curatorial approach is both a method and the material of these changes. Instead of speaking a universal, homogenizing language to convey knowledge and information, interfacial interactivity speaks to the multiplicity and simultaneity of digital technologies. This approach to digital curation reflects the way we negotiate interactivity in digital environments, creating a process that is specific to the digital museum object. Where the 3D-rendered virtual environment enables access by making more available, the interfacial metaphor prioritizes and exposes the social ecologies of interacting with digital collections. As the interface facilitates connections, it creates self-reflexive dynamic that reveals processes shaping these interactions. This revelation provides a zone for critical dialogue between the museum collection, the viewer, and the curatorial process.

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Critical Digital Art History

Interface and Data Politics in the Post-Digital Era

Digital Art History has often aligned itself with the practical concerns of digital technology and the responsibilities of art institutions and associated institutional roles such as collection managers, information specialists, curators and conservators. This emphasis on practicalities and implementation, while undeniably important, has often left little room for critical examination of the broader implications of digital technology and computational methodologies in art history.

A long-standing concern of the field – and a major focal point of this book – is museum and collecting practices in the digital era. While there is a certain degree of continuity in the field, there are also important shifts and changes to address – namely, the widespread uptake of artificial intelligence tools and increased attention to both the broader historical and societal aspects of the use of digital repositories and tools. This anthology seeks to address the dearth of critical reflection by critically assessing specific case study examples and considering the political dimensions associated with large-scale digitization and the application of digital tools within museums and collection management.

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