Building Meaning in Digitized Photographs

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Abstract

This paper explores how visual meaning is built through the transformation of photographic images from analog (prints or negatives) to digital bitmaps. The paper frames the issue of digitization of photographs and their use in digital humanities scholarship within varying theoretical perspectives on visual representation. The paper incorporates a model that describes how digitization procedures (guidelines and best practices) express the intentions of the digitizer. It illustrates the mechanisms at play in digital collection building, particularly the extent to which technical decisions regarding image quality affect the digital representations of original photographic resources in ways that may be detectable and important to digital humanities scholars. The paper concludes with implications for digital humanities scholarship of using general-purpose Image Digital Archives.

The Legacy of Digitization

Sometimes a cartoon in *The New Yorker* can get us to the truth of a matter more effectively than a tightly argued essay. In one particularly memorable one, a retired and clearly not-quite-satisfied gentleman says to another equally unhappy man, "I aspired to authenticity, but I never got beyond verisimilitude."[1] Today, after fifteen years of effort to digitize significant collections of historical photographs, perhaps it is right to pause and examine the intellectual legacy of photographic digitization to date. In the face of pressure to increase dramatically the scale of these efforts,[2] it is particularly important to look closely at the potential impact of digitization on the ways that humanities scholars extract meaning from digital representations or photographic artifacts.

Scholars in the humanities who wish to work primarily in the digital domain face a fundamental dilemma in the choice either to create a thematically focused collection of images tailored to a specific study (purpose-built) or to make use of large collections of digitized images created by an archives, a library, or other cultural heritage organization (general purpose). Purpose-built digital collections based in universities, such as those supported by Virginia's Institute for Advanced Technology in the Humanities (IATH), Nebraska's Center for Digital Research in the Humanities, and the Maryland Institute for Technology in the Humanities, empower self-identified scholarly collaboratives to build and organize digital content to support their hypotheses and conduct analyses with often specially developed tools that are themselves contributions to scholarship.[3] The Walt Whitman Archive, for example, is advancing the art and science of text markup by assembling text and image versions of the extraordinarily rich and complex corpus of Whitman manuscripts. Scholars who 'own and operate' purpose-built digital collections – text based, imaged based, or a combination of both – tend to write about both their digitization processes and the intellectual premises behind them. Price considers the project's major contribution not simply to be the delivery

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[1] *The New Yorker*, June 25, 2007. Artist: Lee Lorenz. ID: 124060.

[2] Erway and Schaffner 2007.

[3] Palmer 2004.

of Whitman online, but "an enabling interpretive tool that advances how analysis itself is done."[4] We have a good idea how the intentionality of representation works scholars are the builders.

We know less about digital collections built for general audiences but tapped for new scholarship in the humanities. General-purpose Image Digital Archives (IDA) are emerging as ubiquitous components of cultural heritage organizations. The notion of IDA emerged from the confluence of digital library research and development[5] and the increasing desire of archives, libraries, and museums to deliver holdings from locally built and maintained databases.[6] Ross notes that IDAs are simultaneously mechanisms for delivering digital surrogates of archival holdings and new archival collections in their own right that reflect the decisions that digital curators make throughout the digitization process.[7] If the builders of IDAs (archivists, librarians, etc.) endow digital collections with archival properties, either by transferring these properties from the original sources or by adding value through the transformation process, then it is important for digital humanists and other deeply vested users to understand how digitization processes influence the shape and substance of these general purpose IDAs.

Practically no research has explored the relationship between building and using digital archives of images. Saracevic reviewed a decade of digital library evaluation studies and found that "more often than not, digital library users and digital libraries are in an adversarial position."[8] Of the more than 80 evaluation studies that Saracevic studied, only four explicitly involve image-based collections, all of which focus on retrieval effectiveness. Use studies conducted at Penn State[9] and the University of California, Berkeley[10] provide important demographic insights but reach no conclusions about the processes and procedures of constructing the digital image collections used. A seminar on mass digitization and the humanities called explicitly for research with an archival perspective. The subtext of the proposed research agenda is oriented toward preserving digital collections, rather than on collection building through digitization.[11]

This paper sketches and illustrates one important but relatively under-explored aspect of digitization: how meaning may be influenced by the decisions that digitizers make in representing historical photographic media in digital form. The paper begins by contextualizing the challenge of understanding meaning through digitization and then presents and illustrates a model of digital rendering that exposes how the display of digitized photographs varies based on the intentions of the digitization process. The paper then attempts to make the case that intent may be codified in the set of digitization guidelines developed over a decade or more of experimentation and synthesis by

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[4] 2005.

[5] Borgman 2000.

[6] Kenney and Rieger 2000.

[7] Ross 2007.

[8] 2004.

[9] Pisciotta et al. 2001.

[10] Harley et al. 2006.

[11] Council on Library and Information Resources 2007.

the cultural heritage community. Particular attention is paid to a set of post-scan processing routines, with examples that show how these routines generate varying results. Textual analysis of four recently published guidelines suggests subtle stances regarding the representation of digitized photos. The paper concludes with implications of large scale digitization for digital humanities scholarships and outlines the need for further research on the issues raised by this exploratory review. The work presented here is part of a larger study that explores the association of digital collection building with end-user judgments of value.

Context

Building collections of photographs through digitization is fundamentally a process of representation, far more interesting and complex than merely copying them to another medium. Theories of representation – and the vast literature derived from them – are at the heart of humanities scholarship and of particular relevance for scholars who work primarily or exclusively in the digital domain. Mitchell defines representation through signs or symbols as a mediated relationship between the maker and the viewer of one object that stands for another. "Representation is always *of* something or someone, *by* something or someone, *to* someone."[12] To Mitchell, representation is an intentional relationship between the maker and the viewer, fraught with the potential for communication problems ranging from misinterpretation and misunderstanding to falsehood and forgery.

Representation in the domain of visual studies is a particularly dynamic area of scholarship.[13] Representation, visual studies, and the increasingly dominant position of the visual in culture intersect most pointedly in the evolution of photography from tangible artifacts to digital objects. Scholars from a wide variety of disciplines are just beginning to explore how theories of visual representation bear upon the creation and use of digital collections whose origins are in photography. Considerable debate centers on the representational value of photography itself and how these values are or are not transmitted to digital surrogates.[14]

Making meaning in the digitization of photographs begins with the materiality of photography itself. Scholars steeped in traditional photography or trained as photograph archivists run the gamut from profound skepticism to enthusiasm about the processes that transform photographs from analog to digital. Schwartz notes that the apparent reality and objective photographic process masks "the human decision making embedded in the elements of meaning making."[15] Koltun claims that a digitized photograph "leaves behind another originating document whose disposal or retention can inspire other archival debates focused around original attributes and meanings not 'translated' into, even distorted by, the new medium."[16] Sassoon largely sees diminished meaning ("an ephemeral ghost") through digitization,[17] whereas Mitchell finds potential transcendence. "In a world where the

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[12] 1995, 12.

[13] Mitchell 1994; Elkins 2003.

[14] Scruton 1981; Wicks 1989.

[15] 2000, 75.

[16] 1999, 124.

[17] 2004, 199.

very idea of the unique original seems a merely nominal or legal fiction, the copy has every chance of being an improvement or enhancement of whatever counts as the original."[18] Skeptics and enthusiasts on both sides of this argument stake their claims on unspecified digital conversion techniques in a sort of procedural vacuum.

Bolter and Grusin's theory of remediation provides an essential bridge between the analog and its digital representation. They argue that the near constant churning of "new media" is a culturally driven desire both "to multiply its media and to erase all traces of mediation: it wants to erase its media in the very act of multiplying technologies of mediation."[19] Evidence of remediation of content through new technologies is found in the repurposing of photographs as new digital collections and, most recently, the wide distribution of large collections of digitized photographs in social network sites such a Flickr.[20] Bolter and Grusin make the fundamental point that since the justification for the digital version is access to older media, those who build digital collections seek to establish the same relationship to the image as if viewing the original – technological transparency, "… but of course this is never so. The computer always intervenes and makes its presence felt in some way." In the face of the failure of transparency, Bolter and Grusin see in remediation the additional complexity that occurs when new technologies "refashion the older medium entirely, while still marking the presence of the older media and therefore maintaining a sense of multiplicity."[21] The net result of re-presentation through the vehicle of remediation is the potential of mixed messages where the distinction between old and new media is lost in the technical minutia of the digitization process.

Digitization, Rendering, and Meaning

A primary challenge in establishing how re-presentation or remediation through digitization builds meaning is exploring the connection between digitization processes and the rendering of the digital version to a computer screen. Working initially under contract to the Library of Congress and through the auspices of the Rochester Institute of Technology's Image Permanence Institute, Franziska Frey and James Reilly developed a model of rendering intent that provides a useful point of departure for assessing the potential impact of digitization on the interpretation of meaning. "Decisions have to be made about spatial resolution, tone reproduction, and color space **before** images are digitized. In most cases, it will not be the goal to reproduce the physical properties of the original, but to reproduce its appearance under certain viewing conditions."[22] Their original model is influenced by the potential power of image enhancement technologies to alter the way the original photographic image appears when rendered digitally on a computer screen. The Frey/Reilly model draws its technological power from a philosophical stance regarding the extent to which a digital scan should be optimized to represent the color values of the original source or to represent the appearance of the original image on a computer screen.[23]

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[18] 2003, 497.

[19] Bolter and Grusin 1996, 312.

[20] Library of Congress Photostream. The Commons. Flickr. http://www.flickr.com/photos/library_of_congress/

[21] Bolter and Grusin 1996, 339.

[22] Frey and Reilly 1999/2006, 28. Emphasis in original.

[23] Süsstrunk 2002.

Depending upon the type, condition, and perceived values of the originals, the Frey/Reilly model articulates four separate rendering outcomes that re-present the fundamental characteristics of the original photographic artifact. The following is an adaptation of the Frey/Reilly model to clarify the direct relationship between photograph digitization processes and the appearance of the digital product.

1. The photographic image is rendered.

"The images are scanned with the intent to match the appearance of the original photographic image."[24] For Frey and Reilly this first approach re-presents the photograph as it appears at the time it is digitized, including any damage, fading, or blemishes that provide evidence of storage, handling, and use. Ideally rendering decisions take place under controlled lighting and through a carefully calibrated computer monitor, tools that may not be readily available to even the most skilled user. This approach defines much of the subjective judgment as a visual matching process by skilled technicians.

Figure 1, depicting a Ute Indian family, is an extreme example of a once-complete photograph that is represented digitally with all the signs of age and damage, including evidence of dirt , staining, discoloration, and other blemishes. Representing photographs "As Is" is most frequently expressed by the guidelines when they choose to discuss communicate directly the relationship between the artifact and its digital representation.

As IS

Fig. 1. W. J. Carpenter, "Ute Family,"1890. Albumen print; 25 x 17 cm. (10 x 7 in.) mounted on cardboard album page. Denver Public Library, Western History and Genealogy. CHS.X9291. http://photoswest.org/cgi-bin/imager?20009291+CHS.X9291

2. The original appearance of the photograph is rendered.

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[24] Frey and Reilly 1999/2006, 28.

"Often, older color photographs are faded and no longer have sufficient visual color information to make accurate judgments about the original."[25] This approach to rendering requires sophisticated color restoration techniques or image manipulation activities designed to lessen the effects of aging and improve tonal value across the image. Human judgment in this approach often involves subjective assessments of what a faded photograph might have looked like when new as well as decisions about the meaning and value of cracks, scratches, blemished, dirt, mold, and other evidence of aging.

Figure 2 is an image of an early baseball card prototype showing ten members of the Atlantics of Brooklyn baseball club, one of the earliest known African-American teams. The visible of evidence of color and gray scale calibration targets marks the potential to correct fading and distortion. If these targets are placed with new objects at the point of scanning or photographing, it is technically feasible to adjust image characteristics to account for future changes in the color and tone value of the original. Achieving these corrections retrospectively requires an extraordinarily high degree of visual judgment.

As WAS

Fig. 2. C. H. Williamson, "Champions of America," c1865. Color film copy transparency. Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA. cph 3g04572 http://hdl.loc.gov/loc.pnp/cph.3g04572

3. The photographer's intent is rendered.

"There are many photographs with high content value that were not exposed or processed correctly. They can have a color cast, be over- or underexposed, or have the wrong contrast. In these cases, the photographer's intent, not the original photograph, needs to be rendered to achieve a pleasing reproduction."[26] This approach to re-presentation utilizes significant adjustments in tone and color

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[25] Ibid.

[26] Ibid., 29.

values to address what the digitizing technician believes are inherent weaknesses in the original item. This approach also allows for the reversal of negative images to positive polarity re-presentations, under the rationale that a photographer never intended viewing to take place from the negative film medium but rather from a positive print.

Figure 3 represents a positive polarity representation of an original nitrate film negative. Positive representations of original negatives are more natural to read. Image processing software provides deceptively simple tools to reverse polarity of an image. Significant technical expertise and judgment are required, however, to reverse tonal values in accordance with the intentions of the original photographer, especially when the body of surviving work is small.

As Desired

Fig. 3. Two boys, Charles A. 'Little Teenie' Harris, and John Allen, holding hand in backyard of 7604 Mulford Street, Homewood," c. 1935. Black and white negative, possible nitrate film. H: 3 1/2 x W: 5 1/2 inches (H: 9 x W: 14 cm). Carnegie Museum of Art, Teenie Harris Collection. 2001.35.8332.

4. The original scene is rendered.

"When photographic reproductions of original artwork are scanned, the original scene has to be rendered and the film characteristics have to be subtracted."[27] This approach to rendering recognizes that some digitization of photographic images takes place not from the original image but from a photographic copy, such as microfilm, a slide, or other film-based intermediate. Digitization processing seeks to remove the effects of the intermediate so that only the artifact and visual characteristics of the original item are presented. At a more complex level, attempting to render the original scene is to attempt to render the vision of the photographer at the point the original image is created. The illusion of anti-materiality can be accomplished either by the aggressive removal of

[27] Ibid.

surface effects or by cropping the image to destroy the relationship of the image to its physical boundaries.

Figure 4 on one level is an evocative and formal portrait of the great American singer Marian Anderson, who performed at the Lincoln Memorial after being denied the opportunity at the Daughters of the American Revolution's Constitution Hall. The example in this figure however, is a digital representation of a negative film copy of a positive original print. Significant image processing after creating the original scan is required so that the digital version can mimic the richness of an original print.

Original Scene (As Seen)

Fig. 4. Carl Van Vechten, "Portrait of Marian Anderson," 1940. Gelatin silver print. Copy from black and white copy negative. Library of Congress, American Memory, Creative American, Portraits by Carl Van Vechten. cph 3c05575 http://hdl.loc.gov/loc.pnp/cph.3c05575

These four examples begin to show that the creation of a general-purpose collection of digitized photographs is a complex, multifaceted process where technological tools, source characteristics, and the often unexpressed goals of the collection interact at every step of the process.[28] The four major steps include the identification and selection of photographs, digitization, indexing at the item level, and website development to support online searching, browsing, display, and other functions. Each of these steps is complex and time consuming. Each of these steps involves a significant variety of decision making – processes that are increasingly well articulated in digitization guidelines.

The central step of digitization encompasses a suite of conversion processes that generates page-images for use. Kenney and Rieger[29] outline the many facets of the major steps of the digitization process, including,

- scanner calibration for consistent operation,
- benchmarking to establish settings for the scanner or digital camera,
- digital scanning if each item,
- quality review and adjustments of the resulting image data, and
- image post processing of the image data to create versions for access.

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[28] Conway 1999.

[29] 2000.

Each of these steps requires a combination of technical decisions that are amenable to objective testing and verification and human judgment that is inherently subjective.

Codifying Intent Through Digitization Guidelines

Collections of digitized resources for general purpose use are not constructed randomly, but rather in reference to rules derived from experience with specific, but evolving technologies. The cultural heritage sector generally has been skeptical about the attainability or even the desirability of generalized standards for the creation of IDAs. According to the National Information Standards Organization's broad based recommendations, it is impossible to write "absolute rules" in relation to the creation of quality digital objects because "every project is unique, with its own goals and needs," and institutional identity.[30] Kenney & Rieger assert in their widely used manual, "what works for the Library of Congress probably will not work for a local historical society."[31] The best that can be offered, due to the great variance between repositories that engage in digital imaging projects, is "guidance not guidelines." When communicated across institutions through formally published guidelines, best practices are a time-sensitive community consensus on technical comparability.[32]

No known published or unpublished research assesses the value or impact of digitization guidelines and best practices on end users. Liu reviews digitization guidelines somewhat haphazardly and reaches no specific conclusions about their recommendations.[33] Lopatin assembles a selective literature focusing on project management, funding, selection for digitization, metadata, and related matters, but cites no specific guidelines and draws no conclusions about the origins, development or application of quality specifications.[34] Puglia & Rhodes see trends in improved quality specifications over time but little real change over time. "It is a little humbling to look back and admit that we are still asking many of the difficult questions that we were asking over a decade ago."[35]

Conway describes the networks of expertise associated with seventeen photograph digitization guidelines published between 1995 and 2006.[36] The earliest guidelines related to the digitization of photographs date from the mid-1990s and reflect the results of systematic experiments with new and emerging digital scanning devices (scanners and cameras) and the challenges managing the various steps of a digitization project. Over time, the recommendations in guidelines derive less and less directly from experimentation in one organizational setting toward the synthesis of experience from multiple projects and a variety of organizations. Conway reaches two conclusions that are relevant to the discussion of intentional representation of photographic meaning. First, by the year 2000 a small, cohesive community of digitization experts engineered a stable consensus on

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[30] NISO 2004.

[31] 2000, 4.

[32] Rada 2004.

[33] 2004.

[34] 2006.

[35] 2007.

[36] 2008.

digitization best practices—little meaningful development on core scanning parameters occurred after that point. It is apparent that little or no experimentation since 2000 has attempted to correlate the scanning parameters with end user perceptions. Second, guidelines developed after 2000 show no consensus on other technical issues associated with representation beyond specific scanning parameters. The primary purpose of digitization guidelines is to help create a procedural bridge for a targeted community between objective technical processes and the subjective judgments that users make throughout a project workflow.

Since 2004, at least four important guidelines on the digitization of photographic materials have been published in the United States. They are listed together at the end of this article, prior to the references and colophon. Each of the four documents is a complex, multifaceted production. Each represents a synthesis of experience, drawn in part from earlier versions of a given guideline and in part from secondary literature, workshops and conference presentations (and other forms of hearsay), and the specific experience of consultants and other experts who develop a specific guideline. None of the four guidelines is exclusively focused on photographic material, but all four contain specific and explicit advice about all aspects of the photographic digitization process. Two of the four guidelines have been developed by the National Archives and Records Administration[37] and the Library of Congress[38] to support large scale internal digitization programs but are distributed widely for possible use by other archives and libraries that are constructing general purpose digital collections. Two guidelines were developed and published by state-wide collaboratives of libraries, archives, and museums. The North Carolina guideline[39] is a largely an adaption and interpretation of the National Archives guidelines, with supplemental information on project workflow oriented toward small and medium sized organizations. The Colorado guideline[40] is a significant revision of a multi state collaborative digitization guideline, reflecting new experience and a richer approach to the creation of access derivatives.

In photograph digitization, guidelines emphasize the creation of a master image that is true to the original, from which access copies are derived. The image obtained from the scanner (flatbed scanner or digital camera; raw or corrected) is rarely delivered to the user through a browser interface. Guidelines are explicit about allowing the manipulation of the derivative (or service master) to optimize its appearance on a computer screen. In some cases the distinction between the archival master file established at or near the point of scanning and one or more access versions delivered to the user can be quite dramatic. Each of the four guidelines establishes some form of distinction between an archival master and access derivatives. All four specify the creation of an archival master. Only the Library of Congress guideline talks about distributing this master file directly to users. All four guidelines are explicit about the value of adjusting the information values of the master to create access versions that more accurately match the appearance of the original source. The Colorado guideline is most directive in providing procedural guidance, including recommending the creation of a service master so that the archival master is not accidentally altered in the process of making access versions.

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[37] Puglia et al. 2004.

[38] 2006.

[39] Wisser 2007.

[40] CDP 2008.

Each of the four digitization guidelines takes a somewhat different philosophical stance regarding how the decisions made during digitization respond to the perceived needs of users. For example:

- The National Archives is particularly interested in a consistent representation of particular types of materials. "We recommend doing minor post-scan adjustment to optimize image quality and bring all images to a common rendition."[41] Such adjustments to the access version of the image add one level of mediation between the original source and its digital surrogate.
- The Library of Congress guideline's perspective on user needs focuses on maintaining a connection between the original source and its digital surrogate. "The Library wishes to provide researchers with a reproduction of the entire original item."[42] The guidelines discuss explicitly the issue of borders and boundaries of photographic items, providing explicit instructions on the circumstances under which cropping is and is not permitted.
- The North Carolina guideline is most explicit about the importance of optimizing the original scan data to improve the appearance on the computer screen. "Access images may be of varying quality and are generally manipulated for better display upon the screen or page."[43] The guidelines are less clear about the relative judgments required by the scanner operator to optimize display quality.
- The Colorado guideline focused on the subjective nature of technical scanning guidelines, calling for judgments about the imaging requirements of each item. "As a rule, the key to quality imaging is not to capture at the highest resolution possible, but to scan at a level that matches the informational content of the original."[44]

On the surface, each of these discrete pieces of guidance – typical of the types of pointed advice offered in the documents – appears to be reasonable and logical, especially if applied consistently within a given collection of photographs or within an institution's total digitization effort. Closer inspection of this and related specific guidance reveals inconsistencies and contradictions across guidelines that cumulate to send varying messages to the end-user. The messages are subtle and not easily detected in the abstract, but become readily apparent when examples of particular post-processing techniques are compared side by side.

The four digitization guidelines under review here provide guidance on a set of seven decisions that are required to establish the visual properties of the representation. While the specific terminology defining these decisions varies somewhat across the guidelines (after all, two of the four guidelines are explicitly about clarifying complex technical ideas for the non-specialist) the essential concepts are identical across guidelines.

1. Adjust or correct the color values of the digital scan to match the appearance of the original item. At its most technically rigorous, this subjective decision can only be made under controlled lighting with a calibrated monitor. More typically, scanning technicians make color adjustment decisions on the fly.

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[41] NARA 2004, 31.

[42] LC 2006, 5.

[43] Wisser 2007, sec. 4.2.

[44] CDP 2008, 22.

2. Adjust or correct the tonal values of the digital scan to increase or decrease the lightest and darkest regions of the digital file. As with color correction, tonal adjustments can be made with the assistance of sophisticated software tools or done on the fly.

3. Crop the image to remove extraneous materials, such as calibration targets and cardboard mounts. The license to crop, when exercised at its limits, can remove evidence of the boundary of the original image.

4. De-skew the image so that it is aligned perfectly parallel with the edge of the computer monitor frame. Viewers of graphic materials online have remarkably low tolerance for images that are out of alignment.

5. Reverse polarity to represent an original camera negative as a positive image. Options for handling such reversal range from relying completely on the default settings of image processing software to manipulating values across the image in ways quite similar to what a skilled technician can accomplish in a photographic darkroom.

6. Apply sharpening routines to generate the appearance of crisp clarity when the image is viewed on a computer screen. Sharpening is a computer mediated process that actually blurs the alignment of pixels.

7. Resize the image for screen display, the net effect of which is to homogenize re-presentation. Digital versions of stunningly large and amazingly small photographic images can and are shown sequentially or in juxtaposed "light table" displays. When every image is a thumbnail, spatial relationships are inconsequential.

The following are brief illustrations of how three of the decisions allowed and described in photograph digitization guidelines impact the appearance of the digital access version.

1. Tonal Values.

Tonal values of a digitized photograph may be manipulated consciously to expose visual information that may not be readily intelligible in a photographic negative or print. In 1998, the Nebraska State Historical Society conducted a set of experiments on the potential of conscious manipulation of digital scans of 19th century glass plate negatives depicting life on the Prairie.[45] Figure 5 shows an image of the full glass plate negative, whose polarity has been reversed to mimic a positive print. The two associated thumbnails are enlargements of the doorway of the sod house, one of which has been adjusted to expose an image of a bed just inside the door. Making this tonal adjustment for shadowed areas alone may be informative; adjusting the entire image to expose shadows or darken highlights would distort the overall image.

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[45] Nebraska State Historical Society 1998.

Adjust Tone

Fig. 5. Solomon D. Butcher, "Unidentified family near West Union, Nebraska, 1886. Glass plate negative (dimensions) and detail with adjustment to high density segment of doorway. Omaha, Nebraska State Historical Society.

2. Cropping.

The decision to crop a digital copy has significant consequences for re-presentation, particularly when specialized historical photographic media are involved. Figure 6a is digital copy of a stereograph from 1866, which may depict a group of African-American dining car attendants on an Union Pacific excursion. When viewed through a stereograph viewer, the dual images yield a striking depth of field that appeared magical to contemporaries and remains visually arresting today. Figure 6b is one half of a stereograph image of Union Army teamsters during the Civil War. Figure 6c is an uncropped scanned (polarity reversed) negative that could have served as the source for the image depicted in Figure 6b, but which contains significant information at the borders that is reflected in the caption. Cropping and resizing of photographic images neaten the computer screen appearance of the artifact but fundamentally alter the relationship of the artifact and its digital surrogate.

Cropping

Fig. 6a. John Carbutt, "Platte River and Kinsley's Brigade Graphic, 1866. Stereograph, albumen ; 9 x 18 cm. (3 1/2 x 7 in.). Denver Public Library, Western History and Genealogy. Z-3307. http://photoswest.org/cgi-bin/imager?11003307+Z-3307

Cropping

Fig. 6b. "Afro-American Army Teamsters," ca. 1861-1865. Stereoview, (dimensions not specified). Ohio Historical Society. SC5227.
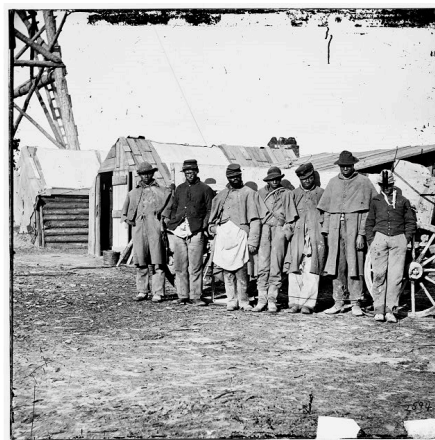
Cropping

Fig. 6c. "Bermuda Hundred, Va. African-American Teamsters Near the Signal Tower," 1864. Negative, glass, wet collodion. Library of Congress, American Memory, Selected Civil War Photographs, 1861-1865. LC-B11-2594A. http://hdl.loc.gov/loc.pnp/cwpb.02004 (digital file from original neg.).

3. Blemish removal.

Figurer 7 is two versions of a stunning daguerreotype image of woman likely associated with the Liberian colonization movement prior to the Civil War. The hand colored original one-of-a-kind plate, when represented digitally show evidence of aging damage, but retains much if its visual power. Calibration targets allow the scan technician to adjust the scanner to capture a complex, richly detailed three-dimensional object. The second image is a digital scan of a copy negative of the original daguerreotype, processed to remove blemished, scratches and much of the other evidence of aging. The scanning of black and white film intermediate also removes much of the evidence of hand-coloring, perhaps exposing the image as captured in the photographer's studio.

Blemish Removal

Fig. 7. Augustus Washington, "Unidentified woman, probably a member of the Urias McGill family, three-quarter length portrait, facing front, holding daguerreotype case," 1855. Photograph : sixth plate daguerreotype, hand-colored. Library of Congress, American Memory, America's First Look into the Camera: Daguerreotype Portraits and Views, 1839-1864. LC-USZC4-3937 DLC (color film copy transparency post-1992) cph 3g03937 http://hdl.loc.gov/loc.pnp/cph.3g03937; LC-USZ6-1949 DLC (b&w film copy neg. post-1992) cph 3d01949 http://hdl.loc.gov/loc.pnp/cph. 3d01949

Implications for Digital Humanists

Digital humanities scholarship derived from general purpose digitized collections is absolutely dependent on the set of semi-codified procedures and processes that convert the rich intellectual and material content of a photograph into digital form and represent that content through computer interfaces. This illustrated summary review of the digitization and display of historical photographs, with particular reference to the guidelines for creating digital surrogates, raises a number of important issues for the digital humanities. First, it is important to recognize that the versions of digitized photographs displayed online quite often do not fully represent the visual information contained in the master digital file. With the exception of the Library of Congress and a few significant digital collections that follow their guidelines, it is unlikely that the digital surrogate is presented to the user without having undergone a variety of post-scan enhancements. Digitizers who make these enhancements intend to improve the visual legibility and the visual usability of the digital surrogate. But post-scan enhancements add a layer of intentional mediation between artifact

and end user that may have unintended implications for their ability to make an intellectual connection between the surrogate and the original object.

The second issue for digital humanists is the challenge of obtaining and using technical information about the terms and conditions under which photographs are digitized and presented online. Photograph digitization guidelines are readily available but the connection between a given guideline and a specific collection of digitized photographs is often obscure, at best. Digitization guidelines are rarely written for interpretation or use by the end users. Technical jargon and the varying application of technical terms can make the interpretation of digitization rules difficult for even the most technologically inclined. Digital humanists whose work depends on maintaining the intellectual bond between artifact and digital re-presentation must know how the rules of digitization are codified and applied.

The third implication of this work for the digital humanities is the absence of explicit understanding in digitization guidelines about the visual information needs of end users and how digitization practices do and do not help end users do their work. Those who develop and promote the use of guidelines have significant expertise on the technical processes of digitization but largely serve as proxies for the end user. As humanities scholars increasingly gravitate to the visual as a complementary source of research evidence, the limitations and inconsistencies that currently mark photograph digitization practice will become barriers to the creation of new knowledge. It behooves the digital humanities scholars to take principled stands on their visual representation needs and communicate those needs to what are clearly quite cohesive communities of digitizers.

Digital re-presentation of photographs is a fundamental consequence of many small but meaningful decisions during the course of a digitization process that can be numbing in its routine. The overall findings of this study reaffirm Bolter and Grusin's assertion that remediation's goal of technological transparency is honored in the breach. The technologies of digitization processes mediate the experience of the user in subtle but unmistakable ways. It remains to be discovered whether this mediation is a barrier to understanding or merely an annoying feature of technologies that are rapidly evolving.

As they have evolved over the past decade or more, guidelines for the digitization of visual resources actually devalue the digital product, privileging the original source artifact over its digital re-presentation. The clearest evidence for this conclusion is the technological gulf that separates the fairly strict rules governing the creation of master image files and the permissions granted digitizers to manipulate the master image while creating versions directly available online. As long as this technical disconnect persists, the digital humanist can expect to peruse digital re-presentations of photographic materials that often to not obtain the levels of information quality that are embedded in the archival masters. In this regard, digital access to historical photographs (actually but perhaps unintentionally) diminishes, masks, or even distorts visual cues that are potentially fundamental to the extraction of meaning. What often is lost in translation from master image to access copy is not the aura of materiality, but rather simply the physicality of the artifact itself.

Although it seems clear that the application of photographic digitization guidelines involves complex decision making, it is less certain that the results of the digitization process (including the inevitable inconsistencies within and across collections) affect how users interpret meaning in a re-presentation. No one would mistake any of the illustrations in this article as anything other than digital representations of photographs. Their sources are not block prints, they are not cartoons,

they are not any of the many forms of graphic representation. Further research is needed to understand how conflicting visual cues in digitized photographs influence the willingness of a user to read the content of the image. It may well be that the loss of physicality and the muddying of the relationship between original artifact and digital re-presentation is more than offset by the inherent advantages of remote access. As we continue the transition to what for all practical purposes is an all digital research environment, it is important to focus special attention on what it takes to incorporate visual resources into the rich mix of digital humanities scholarship.

Colophon

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