Double-Checking History: Designing Assessable Systems for Historical Photo Identification

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Abstract

Identifying historical photographs of people can generate significant cultural and economic value, but misidentifications can cause harms such as falsifying the historical record, spreading disinformation, and feeding conspiracy theories. In this paper, we introduce *DoubleCheck*, a quality assessment framework based on the concepts of information provenance and stewardship for verifying historical photo identifications. We built and evaluated DoubleCheck on Civil War Photo Sleuth (CWPS), a popular online community dedicated to identifying photos from the American Civil War era (1861-65) using facial recognition and crowdsourcing.

Introduction

For nearly 200 years, photos of people have served as a rich, visual form of historical documentation. Identifying people in historical photos is important for preserving material culture, while also contributing significant cultural and economic value (Martinez 2012; Fortin 2018). The task of identifying historical photos — compared to modern photos — comes with its own unique challenges, such as low resolution and lack of reference images, making them prone to *misidentification*. When the identity of a well-known historical photo is corrected, it often draws national attention. For example, in the iconic World War II photograph of the US Marine Corps raising the flag at Iwo Jima, James Bradley, author of the bestseller *Flags of Our Fathers*, misidentified one of the Marines as his father, only to be corrected after new visual evidence was presented 70 years after the photo (Schmidt 2018). Misidentifying historical photos can cause significant harm, as they can be used to spawn conspiracy theories (Colimore 2019) or sow disinformation in modern times (Evon 2020).

With the growth of online history communities, identifying historical photos has become more popular and widely accessible than ever, enabling users of different expertise levels to contribute towards a common effort. Platforms also offer powerful automated tools, such as text search engines or face recognition, that support users in identifying or discovering people in historical photos. While platforms like Ancestry, Find-a-Grave, and Civil War Photo Sleuth (CWPS) have been successful in archiving old records and identifying photos that were previously unknown (Ruane 2014; Mohanty et al. 2019), they are also susceptible to the problem of *misidentification*, and risk amplifying misinformation to a wider audience. A study on Ancestry.com showed inexperienced family history researchers creating erroneous family trees after accepting unverified suggestions from the platform's automated search feature, which was prone to false positives (Willever-Farr and Forte 2014). Mohanty et al. (2020) conducted a study on CWPS, and found several photos from the American Civil War era (1861–65) misidentified as a result of suggestions from the platform's facial recognition. Users, with limited experience in verifying historical photo identities (IDs), may find themselves being misled by misidentified photos on these platforms, and may end up referring to them as evidence in their research. This problem highlights the need for supporting users in making accurate assessments of historical photo IDs and validating them.

Forte et al. (2014) proposed a framework for *assessable designs*, based on the concepts of information provenance and stewardship, and found that visualizations depicting these concepts can positively impact how users assess information on Wikipedia. The provenance visualizations, however, are contingent on the source information (i.e., citations) and the categories being available, which raises the challenge of capturing accurate provenance information via existing workflows in online history communities. Building on this work, Wiggins and He (2016) observed community stewardship behaviors on iNaturalist, an online platform dedicated to identifying photos of plant and animal species, where the community expressed binary agreements and disagreements on an ID. However, the task of identifying people in historical photos is fundamentally different from identifying plant and animal species in modern photos. For the latter, it might be possible to capture multiple high-resolution photos of multiple occurrences, which can further aid in the verification process. However, the same may not be true for historical photos. Finding multiple photos of the same individual becomes more difficult as one goes back further in time, and one would also require additional evidence beyond comparing two photos for verifying historical photo IDs.

To address these challenges, we introduce *DoubleCheck*,

a holistic quality assessment framework for supporting historical photo ID verifications, based on the concepts of provenance and stewardship. Specifically, we address the following research questions:

1. How can we design a system that operationalizes the concepts of information provenance and stewardship through crowdsourcing and AI to support users in making accurate assessments of historical photo ID?
2. How does provenance and stewardship impact users' assessment of historical photo IDs?

System Overview

We focused on Civil War Photo Sleuth (CWPS), an AI-infused online platform for identifying historical photos, which has over 17,000 registered users and over 25,000 identified Civil War portraits. Like many online history communities, CWPS faces the problem of historical photo misidentification (Mohanty et al. 2019). We identified the challenges faced by users of the platform which informed the design goals for DoubleCheck. We then developed DoubleCheck on top of the existing CWPS platform to support its users in making accurate assessment and validation of photo IDs.

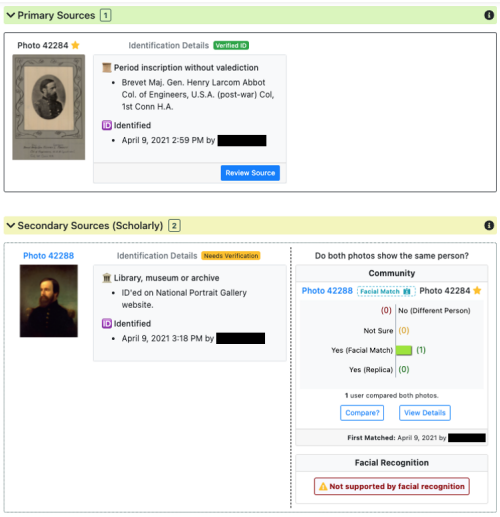

Figure 1: DoubleCheck's presentation of provenance information for an identified photo.

As part of DoubleCheck, we modified CWPS's architecture for capturing accurate provenance information, and incorporated domain knowledge to determine source trustworthiness, which was used for organizing the provenance information (see Figure 1). Primary sources (i.e., sources that were present physically on or near the photo) are the most trustworthy sources, followed by scholarly secondary sources (i.e., sources that relied on the expertise of published authors and museum professionals). Least trustworthy were other (non-scholarly) secondary sources, e.g., word-of-mouth identifications made by dealers or descendants, or from social media.

We also built a validation workflow that allows users to first compare two photos for facial similarity (see Figure 2) and then express their fine-grained opinions on the ID of a photo. For comparing two photos, users indicate whether two photos are facial matches (i.e., same person, different view), or replicas (i.e., same person, same view), or different people. Users then vote on whether the query photo can be identified as the target identity by expressing their confidence.

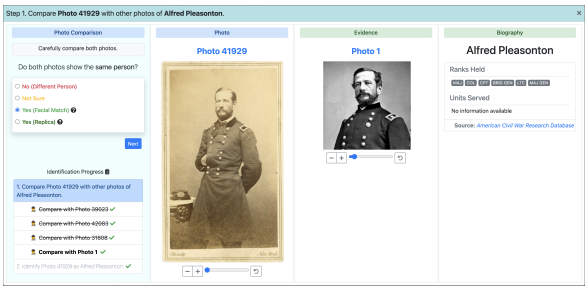

Figure 2: DoubleCheck's validation workflow (Step 1).

Finally, we built an automated quality assessment engine that determines whether an ID is verified or not, based on community opinions and source trustworthiness.

DoubleCheck further visualizes stewardship information at three different levels, by showing: 1) whether the community and AI (i.e., CWPS's facial recognition system) consider a source matched via facial similarity to be reliable; 2) whether the community considers an ID to be reliable; and 3) the current quality status of a photo, including whether it needs verification.

Preliminary Results and Future Work

We publicly released DoubleCheck on CWPS in the last quarter of 2020 and conducted a mixed-methods evaluation of four months of usage, which included interviews with potential users of different expertise levels, and log analysis of provenance and stewardship behaviors on the platform. We found that users were able to assess Civil War photo IDs better using the DoubleCheck framework. The stewardship visualizations, which included the community opinions and the quality assessment status of an ID, boosted the confidence of users' assessments. Users provided a wide range of provenance information, and found the organization of sources to be useful for their assessment. Users validated hundreds of different IDs on the platform, and found the workflow to be useful for validating photo IDs with careful deliberation.

As part of future work, we plan on conducting a large-scale study on CWPS to validate the effectiveness of DoubleCheck. This work opens doors for exploring new ways to engage the community and AI for building assessable online information systems for historical photo identification.

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