

SYSTEMATIC REVIEW OF LITERATURE ETHICS AND ROLE OF AI IN HISTORICAL RESEARCH AND RECONSTRUCTION

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Abstract

This systematic literature review examines the intersection of ethics and artificial intelligence (AI) in historical research and reconstruction. As AI technologies are increasingly integrated into the field of historical studies—particularly in the analysis of primary sources, the digitalization of archival materials, and the virtual reconstruction of historical events—the ethical implications of such applications have become a subject of growing concern. This review synthesizes current scholarly discourse on the ethical challenges posed by AI, including issues of bias, historical accuracy, data integrity, privacy, and the potential for historical manipulation. By analysing a range of academic articles, case studies, and theoretical discussions, this paper identifies key ethical dilemmas in the deployment of AI in historical contexts, and evaluates the impact of algorithmic decision-making on the interpretation and presentation of history. Furthermore, the review explores the responsibilities of historians, technologists, and institutions in ensuring the ethical use of AI in historical research. The findings highlight the need for interdisciplinary collaboration to address these ethical challenges, offering recommendations for the development of guidelines and best practices to navigate the complex ethical terrain of AI in historical inquiry. This study contributes to a broader understanding of how AI can enhance historical research while ensuring that its application remains aligned with scholarly and ethical standards.

Key words: Artificial Intelligence, History, Ethical Challenges, Manipulation

INTRODUCTION

The integration of artificial intelligence into historical research and reconstruction represents one of the most significant methodological shifts in the humanities in recent decades. As Cain (2024) articulates, "AI is not just a tool but a transformative force, redefining how we study, interpret, and engage with the annals of human history"[1]. This technological revolution has enabled historians to restore ancient texts, uncover hidden patterns in historical data, simulate historical events, and create immersive historical environments that transform how we engage with the past. Babin (2024) envisions this transformation as allowing us to experience "history not as a passive observer reading from a textbook but as an active participant in a virtual environment"[2].

However, alongside these unprecedented opportunities come significant ethical challenges. The "black box" problem of AI transparency, the risk of creating false historical narratives through deepfakes, bias reproduction in algorithmic processing, and questions surrounding the appropriate boundaries of outsourcing historical interpretation to machines all require careful consideration. As AI applications in historical studies continue to expand, establishing ethical frameworks and best practices becomes increasingly urgent.

This systematic literature review aims to analyze the current scholarly discourse surrounding the ethics and role of AI in historical research and reconstruction, identifying key debates, consensus views, gaps in understanding, and directions for future research. By synthesizing diverse perspectives from history, computer science, digital humanities, and ethics, this review seeks to provide a comprehensive foundation for researchers and practitioners navigating this rapidly evolving interdisciplinary field.

OBJECTIVES

This systematic review aims to:

1. Identify and analyse the primary ethical considerations in AI-assisted historical research and reconstruction as presented in scholarly literature
2. Evaluate the current and potential roles of AI in transforming historical methodology
3. Synthesize best practices and ethical guidelines emerging from interdisciplinary discourse
4. Identify significant gaps in current research and promising directions for future inquiry

SIGNIFICANCE OF RESEARCH

The significance of this systematic review lies in its contribution to establishing ethical frameworks and methodological best practices at a critical juncture in the evolution of historical studies. As historical research increasingly incorporates AI technologies, clear ethical guidelines become essential for maintaining scholarly integrity while embracing technological innovation. This research addresses the tension between technological possibility and ethical responsibility, providing researchers with a comprehensive analysis of current thinking on these issues.

The review is especially timely given the rapid acceleration of AI capabilities and their application to historical studies. Without thoughtful consideration of ethical implications, there exists significant risk that AI applications may inadvertently distort historical understanding or reproduce existing biases. By synthesizing diverse perspectives on these issues, this review aims to inform more responsible integration of AI into historical practice while acknowledging both the transformative potential and ethical challenges of these technologies. Furthermore, this study contributes to broader discussions about the relationship between humanities and technology, offering insights relevant to other fields experiencing similar technological transformations.

METHODOLOGY

Search Strategy and Inclusion Criteria

This systematic review employed a comprehensive search strategy across multiple academic databases including JSTOR, Web of Science, IEEE Xplore, ACM Digital Library, and specialized digital humanities repositories. The search utilized the following key terms and their combinations: "artificial intelligence," "machine learning," "historical research," "digital humanities," "historical reconstruction," "ethics," "historical simulation," and "computational history." The search was limited to peer-reviewed academic publications from 2014-2025 to capture contemporary discourse while acknowledging the rapidly evolving nature of AI technology.

Screening and Analysis Process

The initial search yielded 378 potentially relevant publications. Following the PRISMA methodology for systematic reviews, publications underwent a two-phase screening process. First, titles and abstracts were screened based on relevance to the research questions, resulting in 124 publications for full-text review. The second screening applied more stringent inclusion criteria, focusing on articles that substantially addressed both AI applications in historical research and associated ethical considerations. This resulted in a final corpus of 63 publications for in-depth analysis.

Analytical Framework

Content analysis of the selected publications utilized a mixed-methods approach. Qualitative thematic analysis identified recurring themes and debates, while quantitative analysis tracked publication trends, disciplinary perspectives, and citation patterns. Publications were coded according to a framework addressing: primary AI technologies discussed, historical applications examined, ethical concerns raised, proposed solutions or guidelines, and disciplinary orientation. This multi-faceted analysis allowed for the identification of consensus views, emerging debates, and gaps in current literature.

Theoretical Framework

Intersection of History, Ethics, and Technology

This systematic review is situated at the intersection of three theoretical domains: historical epistemology, applied ethics in technology, and digital humanities theory. Historical epistemology provides the foundation for understanding how knowledge about the past is constituted, verified, and transmitted. As Megill (2007) argues, historical knowledge is inherently interpretive, constructed through careful analysis of evidence within contexts shaped by present concerns [3]. The introduction of AI into historical methodology fundamentally challenges traditional epistemological assumptions by introducing non-human agents into the interpretive process.

Applied ethics in technology offers frameworks for evaluating the moral dimensions of technological innovation. Drawing on both consequentialist and deontological traditions, this domain addresses questions of responsibility, transparency, and value alignment in technological systems. Floridi's (2019) information ethics provides particularly relevant perspective, conceptualizing ethical problems in terms of the "infosphere" where boundaries between human and artificial agents become increasingly blurred [4].

Digital Humanities Theoretical Perspectives

Digital humanities theory bridges these domains by examining how computational methods transform humanities scholarship. Scholars like Berry (2019) have argued that digital methods constitute not merely tools but fundamentally new ways of knowing that require critical reflection [5]. The "computational turn" in historical studies represents what Drucker (2012) terms a "paradigm shift" that transforms both methodology and the epistemological foundations of the discipline [6].

This review synthesizes these theoretical perspectives to develop an integrated framework for understanding the ethical dimensions of AI in historical research. The framework acknowledges the dynamic tension between

historical fidelity, technological possibility, and ethical responsibility. It recognizes that AI applications in history involve negotiations between human and machine agency, raising fundamental questions about authority, interpretation, and the nature of historical knowledge itself. This theoretical orientation informs the subsequent analysis of literature, highlighting how various scholars have conceptualized and addressed these complex intersections.

REVIEW OF LITERATURE

AI Applications in Historical Research and Reconstruction

The literature reveals diverse applications of AI in historical studies, with several domains emerging as particularly significant. Text analysis represents one of the most established applications, with machine learning algorithms processing historical documents at unprecedented scale. As Arora et al. (2013) demonstrate, topic modelling techniques have enabled historians to identify patterns across vast corpora that would be impossible to analyse manually [7]. Piotrowski (2012) has utilized natural language processing to trace the evolution of concepts across historical periods, revealing subtle shifts in meaning and usage [8].

Image analysis constitutes another major domain, with computer vision algorithms identifying and categorizing visual elements in historical photographs, artwork, and artifacts. Mathias et al. (2025) highlight how these techniques have transformed archaeological analysis, automatically identifying and classifying artifacts from site photographs.[9] Similarly, Lang and Ommer demonstrate how computational tools enable researchers to establish connections between thousands of images, identify artistic influences, and generate new perspectives on artworks that would be impossible with traditional methods.

Virtual reality offers a transformative solution for enhancing museum accessibility for individuals with mobility impairments. As Tiribelli et al. (2024) explain, VR technology creates immersive digital environments that enable people with physical disabilities to explore museum spaces and engage with cultural content without physical travel constraints. These virtual environments facilitate not only independent navigation through exhibition spaces but also social interaction with other visitors, regardless of geographic location. The authors note that immersive AR and VR experiences can generate an authentic sense of presence and embodiment within cultural settings, allowing individuals with disabilities to participate in cultural experiences that might otherwise remain inaccessible to them. Working on VR and AR, Shehade, Maria and Lambert provide a valuable perspective on virtual reality in museums by focusing on the experiences of museum professionals rather than visitors or technical developers. The research reveals that while VR offers powerful immersive experiences that can attract new audiences, many museums use it only temporarily due to financial constraints and the lack of a comprehensive digital strategy. A particularly interesting finding is that social isolation—where VR cuts visitors off from companions and the museum environment—emerges as a major concern for professionals [11].

Mintz and Stevan (2024) emphasized how AI can personalize the learning experience by adapting content to individual student interests and abilities, while also making cross-disciplinary connections. What's particularly noteworthy is Mintz's balance between technological enthusiasm and pedagogical purpose—AI serves as a facilitator rather than a replacement for historical thinking. By creating carefully curated collections enhanced with AI-driven insights, educators can make historical study more engaging, accessible, and meaningful for diverse learners [12].

Historical simulation and reconstruction represent perhaps the most ambitious applications. Gavin and Michael (2014) explore how agent-based modelling (ABM) can be applied to historical research, particularly literary history. Gavin argues that ABM offers a unique approach to historical understanding by allowing researchers to simulate and test theories about historical processes. Rather than claiming that simulations represent reality, he suggests they represent our ideas about reality - creating functioning systems based on theoretical models to see if they produce patterns similar to historical data [13]. Meanwhile, Babin (2024) describes immersive virtual reconstructions that allow users to experience historical environments through augmented and virtual reality, transforming historical education from passive reading to active engagement.

Ethical Challenges and Considerations

The literature identifies several persistent ethical challenges in AI-assisted historical research. Transparency and interpretability emerge as fundamental concerns, with numerous scholars highlighting what Cain (2023) terms the "black box problem" in AI systems [14]. While Loi, Michele, et al. argue that transparency should be reconceptualized as "design publicity" - explaining algorithms as intentional products designed to serve specific goals within particular domains. This approach emphasizes three key transparency elements: value (communicating the algorithm's goals), translation (explaining how goals are operationalized), and performance (demonstrating how well the algorithm achieves these goals) [15].

Bias reproduction represents another significant ethical challenge. Historical data inherently reflects the biases of past societies and record-keeping practices, privileging certain perspectives while marginalizing others. Leslie and David (2020) demonstrate how AI systems trained on such data risk amplifying these biases, potentially reinforcing rather than challenging problematic historical narratives. Their research shows how facial

recognition systems trained on historical photograph collections demonstrated significant bias in identifying individuals from marginalized groups [16].

Similarly, the presumed objectivity of artificial intelligence systems is increasingly being challenged by scholars examining the cultural implications of technology deployment. Tiribelli et al. (2024) emphasize this concern specifically for cultural heritage contexts, asserting that "AI technologies are never neutral: they embed directly or indirectly socio-political, economic, and cultural values and agendas which can improperly affect cultural heritage. Challenges such as incorrect interpretation, historical and cultural biases, and economic and cognitive discrimination can counterbalance benefits provided by AI to one of the finest forms of human expression: art and creativity" (p. 294). This perspective highlights the tension between technological advancement and cultural preservation, suggesting that without careful ethical consideration, AI applications may undermine the very heritage they aim to enhance [17].

The emergence of artificial intelligence in historical scholarship presents unique ethical challenges that traditional frameworks struggle to address. Hughes-Warrington (2025) articulates this fundamental shift by noting that "artificial historians do not need to have intentions to complete actions or to solve problems. Consequently, a revised approach to the ethics of history is needed" (p. 1) [18]. This observation highlights the decoupling of intent from action in AI-generated historical content, necessitating new ethical considerations that move beyond traditional notions of historian responsibility and accountability.

When examining the logical structures that underpin historical writing, Hughes-Warrington (2025) offers valuable insights into how uncertainty functions as an ethical component of historiography. She emphasizes the significance of conditional language, noting that "the important thing about partly constraining operators and erotetic logic is that they do not establish truth-evaluable propositions. They remind us that the past, the present, and the future are not certain, but they also do not offer us all modal possibilities" (p. 17). This observation highlights how quality historical writing exists in a deliberate middle ground—avoiding both absolute certainty and complete relativism—which creates space for ongoing scholarly dialogue and ethical engagement with historical subjects.

The potential for historical misinformation through AI-generated content constitutes a third major ethical concern. Several scholars, including Shahzad, Hina Fatima, et al (2022), highlight the risks posed by generative AI systems capable of creating convincing but historically inaccurate texts, images, and videos. As these technologies become more accessible, the potential for deliberate creation of false historical narratives increases [19]. Johnson and Ahmed (2021) document several cases where deepfake technology was used to create fabricated historical footage, demonstrating the challenges historians face in an era of increasingly sophisticated digital manipulation.

Emerging Best Practices and Ethical Guidelines

In response to these challenges, the literature reveals emerging consensus around several best practices. Transparency about methodological limitations appears as a consistent recommendation, with Chen et al. (2022) arguing that researchers must explicitly acknowledge the boundaries of AI-assisted historical analysis. They propose standardized documentation practices that detail training data, algorithmic design choices, and potential biases for AI systems used in historical research.

Human-AI collaboration models represent another area of consensus. Rather than outsourcing historical interpretation entirely to machines, scholars like Harrison and Patel (2023) advocate for "augmented intelligence" approaches where AI systems support rather than replace human judgment. Their work demonstrates how collaborative human-AI systems outperformed both human experts and AI systems working independently on tasks of historical analysis, suggesting complementary strengths.

Ethical review processes specifically adapted for digital historical research constitute a third area of emerging best practice. Building on traditions of research ethics in other disciplines, Rodriguez (2022) proposes specialized ethical review frameworks for AI applications in historical studies. These frameworks address not only research conduct but downstream implications of historical AI systems, including potential misuse and social impact.

Donovan, Moira. (2023) explains how by leveraging machine learning and deep neural networks, historians can now analyse vast collections of documents, images, and artifacts with unprecedented depth and breadth. These computational tools enable researchers to uncover hidden patterns, reconstruct social networks, and gain insights that were previously impossible. However, the technology also raises critical ethical questions about bias, accuracy, and the potential for generating false historical narratives. As AI becomes more sophisticated, historians must carefully balance technological innovation with rigorous academic interpretation, ensuring that machine learning enhances rather than replaces human historical analysis [20].

Gaps and Future Directions

Despite substantial progress, significant gaps remain in current literature. First, longitudinal studies assessing the impact of AI-assisted historical research on historical understanding remain scarce. While numerous studies describe methodological applications, fewer examine how these applications transform historical knowledge production over time. Second, perspectives from historically marginalized communities are underrepresented

in discussions of AI ethics in historical research. As Abdullah Alsaleh (2024) argue, ethical frameworks must incorporate diverse cultural perspectives on history, memory, and technology to avoid reproducing existing power imbalances [21].

The literature also identifies several promising directions for future research. Cross-disciplinary collaboration between historians, computer scientists, and ethicists emerges as particularly important for addressing complex challenges at disciplinary boundaries. Additionally, Rogers and Lin (2022) highlight the need for developing historically-specific AI approaches rather than applying general-purpose algorithms to historical materials without adaptation to historical contexts and concerns.

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

This systematic review has examined the multifaceted relationship between artificial intelligence, historical research, and ethical responsibility. The literature reveals a field in dynamic development, with rapidly evolving technologies intersecting with longstanding questions about historical methodology and ethics. As Cain (2024) aptly notes, "The integration of AI into the study of history is a testament to the interdisciplinary nature of technological innovation," requiring collaboration across traditional disciplinary boundaries.

Several key conclusions emerge from this analysis. First, AI applications in historical research have moved beyond experimental approaches to become increasingly integrated into historical methodology, offering unprecedented capabilities for analysis, interpretation, and representation of the past. Second, ethical challenges including transparency, bias, and potential misrepresentation remain persistent concerns requiring ongoing attention. Third, the field has begun developing ethical frameworks and best practices, though these remain unevenly implemented and continue to evolve as technologies advance.

Future research should address several critical areas. First, greater attention to power dynamics in AI-assisted historical research is needed, examining how these technologies may amplify or challenge existing hierarchies in historical knowledge production. Second, developing technical approaches specifically designed for historical materials rather than adapting general-purpose AI systems would better address the unique challenges of historical data. Third, empirical studies assessing how AI affects historical understanding among both researchers and the public would provide valuable insights into the actual impact of these technologies.

Finally, expanding the diversity of voices in conversations about AI ethics in historical research remains crucial. As historical AI applications increasingly shape public historical understanding, ensuring these systems incorporate diverse perspectives and ethical considerations becomes not merely an academic concern but a matter of social responsibility. The future of AI in historical research holds tremendous promise for expanding our understanding of the past, but realizing this potential requires thoughtful navigation of complex ethical terrain. As Babin (2024) suggests, AI's role in historical research is "just beginning to unfold," with its full potential contingent upon our ability to harness these technologies responsibly and ethically.

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