

ІСТОРИКО-КУЛЬТУРНА СПАДЩИНА КРАЇН ЄВРОПИ І ПІВНІЧНОЇ АМЕРИКИ У ФОКУСІ ПРОЄКТІВ З ЦИФРОВОЇ ГУМАНІТАРИСТИКИ

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Ключові слова: історія Європи, історія Північної Америки, цифрова гуманітаристика, культурна спадщина, проєктне дослідження, віртуальна реальність, доповнена реальність, цифрові інфраструктури.

У статті розглянуто особливості збереження та інтерпретації історико-культурної спадщини країн Європи і Північної Америки в контексті розвитку цифрової гуманітаристики. Проаналізовано сучасні проекти, спрямовані на цифровізацію культурних об'єктів, архівних матеріалів та історичних джерел, а також можливості використання технологій віртуальної та доповненої реальності у наукових дослідженнях і викладанні. окрема увага приділяється міждисциплінарному підходу, який поєднує історичні, культурологічні та інформаційно-технологічні практики для створення інтерактивних моделей культурної спадщини. Показано, що цифрові гуманітарні інструменти сприяють не лише збереженню пам'яток і документів, а й формуванню нових стратегій їх презентації в академічному та суспільному середовищі. Продемонстровано, що міжнародна співпраця в межах цифрових проектів відкриває перспективи для розширення доступу до історико-культурних ресурсів та формування глобального науково-освітнього простору.

HISTORICAL AND CULTURAL HERITAGE OF EUROPEAN AND NORTH AMERICAN COUNTRIES IN THE FOCUS OF DIGITAL HUMANITIES PROJECTS

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Key words: European history, North American history, Digital Humanities, cultural heritage, project-based research, Virtual Reality (VR), Augmented Reality (AR), digital infrastructures.

The article examines the historical and cultural heritage of European and North American countries through the lens of digital humanities, focusing on the ways in which new technologies are reshaping the preservation, study, and public presentation of cultural memory. Special attention is given to projects that digitize cultural objects, archival collections, and historical sources, as well as to initiatives that employ virtual and augmented reality for academic research and teaching. By analyzing current practices, the study highlights how digital humanities foster new methodological frameworks that combine historical scholarship, cultural studies, and information technologies, thus creating innovative approaches to cultural heritage interpretation. These interdisciplinary projects enable the development of interactive models of monuments, artifacts, and historical environments, offering both researchers and the wider public immersive experiences that deepen understanding of the past.

The article argues that the integration of digital tools into the humanities contributes not only to safeguarding fragile historical documents and cultural sites but also to building sustainable strategies for their dissemination in academic, educational, and societal contexts. International cooperation is identified as a crucial factor for success, as many digital heritage projects are designed within cross-border research consortia and educational networks. Such collaboration facilitates the exchange of expertise, the creation of unified standards for digitization and metadata management, and the broadening of open access to cultural resources. Moreover, it allows for the construction of a global digital space that connects institutions, researchers, and communities across regions.

Ultimately, the research demonstrates that the digital humanities provide a transformative perspective on cultural heritage studies. By enabling both innovative scholarly inquiry and inclusive public engagement, they serve as a bridge between the historical past and the digital future, ensuring that European and North American heritage can be preserved, reinterpreted, and transmitted to future generations in dynamic and meaningful ways.

Problem Statement. The study of historical and cultural heritage of European and North American countries faces significant methodological challenges in the era of digital humanities. While traditional historiography relies on textual, archival, and material sources, the rapid development of digital tools, databases, and interactive platforms introduces both opportunities and complexities for historical research. Key challenges include ensuring the reliability and authenticity of digital sources, addressing biases in digitized archives, and developing analytical frameworks that respect historical context while leveraging computational methods. In the study of European history, digital projects allow for cross-regional comparisons, network analyses, and interactive visualizations that were previously impossible, yet their methodological application often requires careful calibration to avoid misinterpretation or oversimplification of historical processes. Integrating digital approaches into historical research thus demands a balance between technological innovation and rigorous historiographical standards, ensuring that such projects advance

scholarly understanding of European cultural and historical heritage rather than merely serving technical or aesthetic purposes.

Analysis of Recent Scientific Publications. The integration of digital technologies into the study and preservation of cultural heritage has become a significant focus in both Europe and North America. Scholars have extensively explored various aspects of this intersection, contributing to the development of digital humanities (DH) as a field.

One notable contribution is the work by Giulia Marsili and Lucia Maria Orlandi, who examined the BYZART project, which aimed to enhance Byzantine and Post-Byzantine artistic and cultural heritage within the Europeana platform. Their study highlighted the use of digital tools to enrich existing collections with multimedia objects, demonstrating the potential of digital humanities in preserving cultural heritage¹. Similarly, Franco Niccolucci, Achille

¹ Marsili G. Digital Humanities and Cultural Heritage Preservation: The Case of the BYZART Project. *Studies in Digital Heritage*. 2019. 3(2). URL: https://www.researchgate.net/publication/342475037_Digital_Humanities_and_Cultural_Heritage

Felicetti, and Sorin Hermon introduced the concept of «Heritage Digital Twins», proposing a semantic infrastructure for the digital space of cultural heritage. Their work emphasized the need for a novel ontology to manage complex cultural heritage data, facilitating interoperability and integration with platforms like Europeana². The collaborative nature of DH projects is evident in the work of Lotte Wilms, who discussed the LIBER Digital Humanities Working Group. This initiative aimed to connect European library staff working in digital humanities, fostering international collaboration and knowledge sharing among institutions³. Gustavo Candela and colleagues proposed a novel methodological approach for developing use cases for cultural heritage e-infrastructures. Their research highlighted the diversity of research practices and the need for a consistent approach to creating use cases, thereby supporting the expansion of e-infrastructures in the digital heritage domain⁴.

Razifah Othman conducted a bibliometric analysis of digital humanities publications, identifying key trends and patterns in the field. Her study provided insights into the distribution and intellectual structures of digital humanities research, underscoring the interdisciplinary nature of the field⁵. Catherine Breathnach addressed the challenges faced by both computing and historical sciences in the context of digital humanities and cultural heritage. Her work outlined a roadmap to address issues such as data access, preservation, and governance, while also exploring the opportunities and threats posed by AI and machine learning⁶.

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² Niccolucci F. Populating the Digital Space for Cultural Heritage with Heritage Digital Twins. 2022. URL: <https://arxiv.org/abs/2205.13206>

³ Wilms L. LIBER Digital Humanities and Digital Cultural Heritage Working Group: A Case Study of International Collaboration and Network Building. *Art Libraries Journal*. 2021. URL: <https://www.cambridge.org/core/journals/art-libraries-journal/article/liber-digital-humanities-and-digital-cultural-heritage-working-group-a-case-study-of-international-collaboration-and-network-building/8DF7E14468B824C8FA1B-35DE22CB0725>

⁴ Andela, G. A Use Case Lens on Digital Cultural Heritage. 2025. URL: <https://arxiv.org/abs/2509.08710>

⁵ Othman R. Charting Digital Humanities: A Bibliometric View of Cultural Heritage. *European Proceedings of Social & Behavioural Sciences*. 2023. URL: https://www.researchgate.net/publication/375665033_Charting_Digital_Humanities_A_Bibliometric_View_of_Cultural_Heritage

⁶ Breathnach, C. Digital Humanities and Cultural Heritage in AI and IT-Driven Environments. *Digital Humanities and Cultural Heritage in AI and IT-Driven Environments* 2023. P. 1–12. Springer. URL: https://link.springer.com/chapter/10.1007/978-3-031-73741-1_1

The aim of the article is to analyze the potential and challenges of using the European digital infrastructure as an interdisciplinary platform for the study of the historical and cultural heritage of Europe and North America, in particular its digital collections, which open up new opportunities for comprehensive research on history, culture, and social transformations. Special attention is given to the role of digital resources in the development of digital humanities methodologies and to the prospects for integrating Ukrainian academic practices into the global scholarly space.

Main Body. The study of historical and cultural heritage in Europe and North America is increasingly shaped by methodologies derived from digital humanities, particularly in the context of complex research ecosystems. The concept of *database thinking*, as articulated in the study of the National Synchrotron Light Source (NSLS) Digital Archive (Hoddeson et al., 2019), offers a compelling model for approaching the study of heritage collections. In such research ecosystems, linear narratives are often insufficient; the interconnectedness of artifacts, collections, personnel, institutions, and funding networks demands flexible, relational frameworks that can capture multiple dimensions simultaneously.

In the new era of cultural heritage research, the equivalent of the NSLS in science – large-scale digital infrastructures such as Dariah, Europeana, and national repositories – enables scholars to track the evolution of collections, their interconnections, and their broader cultural, historical, and social significance. Just as the NSLS supports diverse instruments, programs, and fields, digital heritage platforms provide access to artifacts, archival documents, multimedia records, and metadata that collectively map the complex trajectories of European and North American cultural production. Database thinking allows scholars to explore questions that would be otherwise unanswerable using traditional linear historiography. For example, one can investigate the cross-cultural exchanges between regions, the evolution of artistic or scientific practices over decades, and the relationships between institutions, collections, and users.

The complexity of these digital ecosystems is comparable to the research culture at the NSLS, where experiments do not occur in strings but in a network of interlinked instruments, programs, fields, and collaborations. Similarly, in digital heritage, objects are not isolated: manuscripts relate to exhibitions, artists' works relate to pedagogical programs, and archival records interact with socio-political

contexts. By employing relational databases, scholars can connect seemingly disparate elements, such as provenance, historical ownership, related textual or visual documentation, and material analysis, into a coherent structure that enables multidimensional research⁷.

The benefits of such interconnected approaches are clear in initiatives like Bordignon et al.'s (2024) *Heritage Digital Twins*, which provide 3D reconstructions of cultural artifacts along with detailed metadata, and Marsili and Orlandi's (2019) BYZART project, which enriches European collections with multimedia content. These projects exemplify how database-oriented thinking enhances the interpretive potential of digital collections, enabling researchers to examine the functional, administrative, and social dimensions of cultural heritage simultaneously. Likewise, mobile digital storytelling platforms, as explored by Vrettakis et al. (2019), facilitate public engagement by transforming data-rich digital collections into interactive narratives, further emphasizing the value of relational connections between objects, users, and contexts.

Digital infrastructures also support interdisciplinary collaboration and methodological innovation. Wilms (2021) highlights how international networks like the LIBER Digital Humanities Working Group facilitate knowledge sharing, methodological standardization, and resource integration across institutions. Candela et al. (2025) emphasize the need for structured use-case methodologies to ensure reproducibility and interoperability, which are essential for large-scale digital heritage projects. Ethical considerations, including data governance, intellectual property, and equitable access, remain crucial in this context (Breathnach, 2023).

By approaching historical and cultural heritage through the lens of database thinking, scholars can capture the dynamics of evolving collections, their interactions with social and cultural environments, and their longitudinal development. Just as the NSLS allows scientists to trace connections across experiments, instruments, and disciplines, digital heritage infrastructures enable researchers to examine complex networks of objects, creators, institutions, and users. This paradigm offers significant potential for integrating Ukrainian academic practices into global scholarly frameworks, fostering methodological innovation, and creating opportunities for international

collaboration in the study of European and North American cultural heritage.

The idea of creating the digital platform Dariah emerged in the mid-2000s in response to the need to integrate digital technologies into the humanities. In 2006, the project was included in the ESFRI (European Strategy Forum on Research Infrastructures) roadmap. The first phase, known as *Preparing Dariah*, lasted from September 2008 until the end of 2010 and brought together 14 partners from 10 European countries. In August 2014, the European Commission officially established Dariah as a European Research Infrastructure Consortium (ERIC) with 15 founding members: Austria, Belgium, Croatia, Cyprus, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Poland, and Portugal. As of 2025, Dariah comprises 22 full members and 19 partners from 11 non-ERIC countries⁸. The project's inclusion in the ESFRI roadmap in 2006 subsequently led to its transformation into a sustainable research infrastructure. In 2023, Dariah achieved a record level of external funding, securing five new projects within the Horizon Europe program, reflecting the growing support for digital humanities research at the European level.

Dariah actively promotes the development of digital humanities through the organization of annual events such as the Dariah Annual Event. These events provide a platform for the exchange of knowledge, methodologies, and infrastructure among researchers, fostering community development and strengthening collaboration between academic institutions. The Dariah Annual Event is an annual gathering organized by Dariah (Digital Research Infrastructure for the Arts and Humanities), which brings together researchers, practitioners, and infrastructure providers in the field of digital humanities. The event serves as a forum for sharing knowledge, methods, and tools, supporting commun-

⁷ Crease R. *The Play of Nature: Experimentation as Performance*. Bloomington, IN: Indiana University Press. 2018. 288 p.; Crease R., Westfall C. *The New Big Science*. Physics Today, 2016. Vol. 69. P. 30–36.

⁸ Marsili G. Digital Humanities and Cultural Heritage Preservation: The Case of the BYZART Project. *Studies in Digital Heritage*. 2019. 3(2). URL: https://www.researchgate.net/publication/342475037_Digital_Humanities_and_Cultural_Heritage_Preservation

Niccolucci F. Populating the Digital Space for Cultural Heritage with Heritage Digital Twins. 2022. URL: <https://arxiv.org/abs/2205.13206>

Bowrey B. Revealing Data: Navigating Historical Biomedical Technology Research with Digital Humanities. *Circulating Now*, 2024. URL: <https://circulatingnow.nlm.nih.gov/2024/03/28/revealing-data-navigating-historical-biomedical-technology-research-with-digital-humanities/>; Othman R. Charting Digital Humanities: A Bibliometric View of Cultural Evolution. *European Proceedings*, 2023. URL: <https://www.europeanproceedings.com/article/10.15405/epsbs.2023.11.4>

nity building and enhancing collaboration among research institutions.

The first recorded Dariah Annual Event took place in 2015 in London, United Kingdom, under the theme *Digital Methods in the Humanities*, emphasizing the application of digital methods in humanities research. In 2016, the event was held in Amsterdam, Netherlands, with the theme *Digital Humanities and the Humanities: A Shared Future*, focusing on the shared future of digital and traditional humanities. In 2017, the Annual Event took place in Budapest, Hungary, under the same theme, exploring the interaction between digital humanities and traditional humanistic disciplines.

In 2018, the event was hosted in Warsaw, Poland, under the theme *Digital Cultural Heritage*, which concentrated on the preservation and study of cultural heritage through digital technologies. In 2019, the event took place in Paris, France, focusing on *Digital Methods for the Arts and Humanities*, highlighting the application of digital methods in humanities research.

The 2020 Dariah Annual Event was canceled due to the global COVID-19 pandemic and related restrictions. In 2021, the event was held online from 7 to 9 September under the theme *Interfaces*, which focused on user interaction with digital interfaces in the context of humanities research. The online format attracted approximately 300 participants, demonstrating significant interest in the topic and the importance of the platform for knowledge exchange.

In 2022, the Dariah Annual Event took place from 31 May to 3 June in Athens, Greece, under the theme *Storytelling*, examining the role of narrative in digital humanities. The following year, in 2024, the event was held from 18 to 21 June at NOVA FCSH University in Lisbon, Portugal. The theme of the event was *Workflows: Digital Methods for Reproducible Research Practices in the Arts and Humanities*, emphasizing digital methods for reproducible research practices in the humanities. During the event, representatives from Dariah and the Europeana Foundation jointly presented *Validating a Reproducible Workflow for Publishing Collections as Data: the Case of Europeana*.

The most recent event, the Dariah Annual Event 2025, took place from 17 to 20 June in Göttingen, Germany, at the Göttingen University Library (SUB Göttingen). The central theme of the event was *The Past*, focusing on the study of the past through digital methods and tools. A key highlight of the event was the presentation of the ECHOES project, integrated into three main sessions: the *Workshop*

on Collaborative Research Scenarios, the *Consultation Corner*, and the panel *Let's Talk Infrastructure*⁹.

Through such initiatives, Dariah integrates digital research in the arts and humanities and associated activities across Europe, providing transnational and interdisciplinary approaches. In particular, the organization offers services to its members and stakeholders through data, service, and tool validation and exchange; by providing training and professional development opportunities; through a «bottom-up» organization around current research needs; and via engagement in policy development and foresight. These activities contribute to advancing research methodologies in the arts and humanities, documenting the current state of the field, supporting the preservation and curation of research data with consideration of specific challenges – including diversity, provenance, multimedia collections, and data granularity – and acting as a coordinator and integrator for a diverse community of practitioners.

Structurally, Dariah operates through Europe-wide networks of Virtual Competency Centres (VCCs) and their constituent working groups. Each of the four VCCs is interdisciplinary, multi-level, international, and focused on a specific area of expertise. VCC1, e-Infrastructure, is responsible for Dariah's technological foundations. It maintains a digital environment enabling the exchange of community-created data and tools and ensures the quality, preservation, and development of technical services for the arts and humanities. VCC2 serves as the primary interface with the research and teaching communities. VCC3 manages research content at various stages – from creation, curation, and dissemination to the integration of digital resources and research outputs for reuse. VCC4 focuses on advocacy, impact assessment, and outreach, engaging with key stakeholders in the arts and humanities. Within this structure, Dariah has over 20 dynamic working groups facilitating the

⁹ Marsili G. Digital Humanities and Cultural Heritage Preservation: The Case of the BYZART Project. *Studies in Digital Heritage*. 2019. 3(2). URL: https://www.researchgate.net/publication/342475037_Digital_Humanities_and_Cultural_Heritage_Preservation

Nicolucci F. Populating the Digital Space for Cultural Heritage with Heritage Digital Twins. 2022. URL: <https://arxiv.org/abs/2205.13206>

Spina S. Artificial Intelligence in Archival and Historical Scholarship Workflow: HTS. 2023. URL: <https://arxiv.org/abs/2308.02044>; Massari A., Peroni S., Tomasi F., Heibi I. Representing Provenance and Track Changes of Cultural Heritage Metadata in RDF: A Survey of Existing Approaches. 2023. URL: <https://arxiv.org/abs/2305.08477>

integration of national services within specific operational categories¹⁰.

DARIAH impacts four interrelated domains: research, education, culture, and the economy. The consortium supports the sustainable development of digitally-enabled research in the arts and humanities by providing services for researchers using ICT-based methods. It assists researchers in advancing their work and ensures long-term accessibility of their outputs, thereby directly contributing to the understanding of cultural, economic, social, and political life in Europe and beyond. Moreover, DARIAH provides educational materials and teaching opportunities to foster the development of digital research skills.

DARIAH operates at the forefront of the evolving knowledge discovery landscape and possesses significant expertise in this domain through its partners. It also demonstrates how traditional humanities skills play a vital role in the digital age and how these skills can be applied in commercial contexts¹¹.

In previous years, attempts were made to formalize associations of Regional Hubs within DARIAH; however, these were never officially defined or announced. As of June 2023, following extensive internal discussion and consultation with partners, DARIAH officially established Regional Hubs (DRH) as a new organizational form. Institutions from member and non-member countries, whether they are cooperating partners or not, are invited to apply for membership in a hub.

A DARIAH Regional Hub is a representative consortium of institutions from geographically proximate countries that implements DARIAH's objectives at the regional level and is officially recognized by DARIAH-EU. The primary criterion for establishing a DRH is geographical proximity, as cultural, social, historical, and/or linguistic similarities observed in geographically close countries provide an excellent foundation for productive collaboration on joint projects. DRH members may include institutions from DARIAH member states, observer countries, and non-member countries. Both DARIAH cooperating partners and independent institutions from

non-member countries may join, provided the hub's objectives align with DARIAH's mission: «to provide research communities with digital methods for creating, connecting, and sharing knowledge about culture and society». While Regional Hubs are primarily geographic associations, DRHs may select priority themes to reflect the interests of their members and/or specific funding opportunities.

Regional Hubs implement DARIAH's objectives at the regional level. They aim to foster closer regional collaboration among institutions from different countries with shared cultural traditions and/or similar organizational challenges, and to promote DARIAH's expansion through active engagement with independent institutions from non-member countries that could potentially become cooperating DARIAH partners and/or lead efforts for their countries' accession to DARIAH as members or observers. These objectives are pursued through participation in and co-organization of regional events, including conferences, seminars, workshops, lecture series, and internship programs; serving as direct points of contact for information and knowledge exchange about DARIAH, particularly for independent or newly joined institutions in the region; and by identifying common opportunities for implementing specific projects supported by national and regional funding bodies.

A DRH consortium can be established by at least five institutions from three geographically proximate countries that are Council of Europe member states, associated countries, or third countries that are not associated. While the minimum criterion is five institutions from three countries, DARIAH-EU expects DRHs to be representative of their region and include a significantly larger number of relevant institutions. DRH status is granted to applicant consortia by DARIAH-EU and communicated via the DARIAH-EU website¹².

Membership in a DRH consortium is open to any institution from the research, academic/educational, GLAM (galleries, libraries, archives, and museums), or IT sectors, including small and medium-sized

¹⁰ Strange D. The Challenges and Rewards of Open Digital Humanities Data. *Digital Scholarship in the Humanities*, 2023. Vol. 38, No. 1. P. 45–61.; Atzenhofer-Baumgartner F., Geiger B. C., Trattner C., Vogeler G. Challenges in Implementing a Recommender System for Historical Research in the Humanities. 2024. URL: <https://arxiv.org/abs/2410.20909>

¹¹ Jones M. Digital History. *Journal of the Association for History and Computing*, 2024. Vol. 38, No. 3. P. 98–121.; Zaagsma G. Digital History and the Politics of Digitization. *Digital Scholarship in the Humanities*, 2023. Vol. 38, No. 2. P. 830–848.

¹² Ratto M. Critical Making: Conceptual and Material Studies in Technology and Social Life. *The Information Society*, 2011. Vol. 27, No. 4. P. 252–260.; Underwood T. Theorizing Research Practices We Forgot to Theorize Twenty Years Ago. *Representations*, 2014. Vol. 127, No. 1. P. 64–72.; Strange D. The Challenges and Rewards of Open Digital Humanities Data. *Digital Scholarship in the Humanities*, 2023. Vol. 38, No. 1. P. 45–61.; Atzenhofer-Baumgartner F., Geiger B. C., Trattner C., Vogeler G. Challenges in Implementing a Recommender System for Historical Research in the Humanities. 2024. URL: <https://arxiv.org/abs/2410.20909>.

enterprises (SMEs) and industrial partners capable of contributing to DRH objectives. Institutions from Dariah member countries that are not part of funded national consortia may join a DRH. These institutions must notify their National Dariah Coordinators of their intention to join a DRH and report their activities to ensure that the Coordinators are aware of all Dariah-related initiatives in their country.

Coordination of a DRH may be undertaken by two institutions if desired; in this case, the institutions must be from different countries, and one must be a Dariah partner institution from a member country. Coordinating institutions are elected by the DRH consortium members for a three-year term, renewable¹³.

The Dariah project (Digital Research Infrastructure for the Arts and Humanities) establishes a robust digital infrastructure for research on the history of Europe and the Americas, integrating numerous archives, universities, and scholarly initiatives. A key component of this infrastructure is the Regional Hubs, which form consortia of institutions from geographically proximate countries to coordinate research initiatives at the regional level. These hubs promote the development of digital methodologies in the study of history, culture, and society.

Among the significant projects integrated within Dariah is CENDARI, which provides access to archives and resources across Europe for the study of medieval and modern history, facilitating the integration of archival data into digital infrastructure and easing researchers' access to crucial historical sources. Additionally, the European Holocaust Research Infrastructure brings together archives and scholars from multiple countries, providing access to Holocaust documents and fostering scholarly networks in this field. Archives Portal Europe offers unified access to Europe's archival resources, including documents related to the history of the European Union, while the Blinken Open Society Archives in Budapest preserves materials related to postwar European history, the Cold War, the former Eastern Bloc, samizdat publications, propaganda, human rights, and war crimes.

¹³ Marsili G. Digital Humanities and Cultural Heritage Preservation: The Case of the BYZART Project. *Studies in Digital Heritage*. 2019. 3(2). URL: https://www.researchgate.net/publication/342475037_Digital_Humanities_and_Cultural_Heritage_Preservation

Niccolucci F. Populating the Digital Space for Cultural Heritage with Heritage Digital Twins. 2022. URL: <https://arxiv.org/abs/2205.13206>

Liu A. *Local Transcendence: Essays on Postmodern Historicism and the Database*. Chicago, IL: University of Chicago Press. 2008. 256 p.; Manovich L. *The Language of New Media*. Cambridge: MIT Press. 2001. P. 218–219, 225.

In the United States, digital resources such as the Mountain West Digital Library consolidate materials from libraries, archives, and museums concerning the history of the American West, including migration processes, mineral extraction, and World War II events. The United Kingdom's Archaeology Data Service preserves archaeological data, enabling the study of material culture and European history.

Since 2018, the Digital Art History (DAH) conference series in Zagreb has provided an inclusive international platform for exchanging experiences in digital art history and digital humanities, addressing specific challenges in digitally grounded research. Operating within a context marked by disciplinary and geographical divergences, as well as limited access to commercial academic publications, the conference also emphasizes collaboration among researchers with varying levels of digital expertise¹⁴.

These initiatives give historians access to integrated digital resources, including archival documents, cartographic data, textual sources, museum and library collections, and software tools for digital analysis, creating unique opportunities for comparative studies of European and American history. They enable the identification of cultural, social, and political parallels across regions. Collaborative work based on digital archives allows the reconstruction of cultural contacts, migration flows, political system transformations, and economic networks from the medieval period to the present. The project offers historians flexible forms of collaboration, whereby institutions from Dariah member and non-member countries can participate in hubs as partners, pooling efforts to implement joint projects, organize conferences, seminars, workshops, and internship programs. The inclusion of independent institutions is particularly important, expanding research networks and providing access to new sources, including local archives and private collections that are often inaccessible to the broader scholarly community.

The establishment of Regional Hubs is based on the geographical proximity of countries, which ensures effective coordination and consideration

¹⁴ Hayles N. K. *How We Think: Digital Media and Contemporary Technogenesis*. Chicago, IL: University of Chicago Press. 2012. P. 178–179.; Hoddeson L., Kolb A., Westfall C. *Fermilab: Physics, the Frontier, and Megascience*. Chicago, IL: University of Chicago Press. 2011. 480 p.; Strange D. The Challenges and Rewards of Open Digital Humanities Data. *Digital Scholarship in the Humanities*, 2023. Vol. 38, No. 1. P. 45–61.; Atzenhofer-Baumgartner F., Geiger B. C., Trattner C., Vogeler G. Challenges in Implementing a Recommender System for Historical Research in the Humanities. 2024. URL: <https://arxiv.org/abs/2410.20909>

of cultural and linguistic specificities. Hubs can also focus on thematic areas such as the history of religious movements, transnational interactions, and political and economic transformations, thereby enhancing the applied relevance of research and opening new horizons for academic study. Consequently, DARIAH Regional Hubs provide historians in Europe and the Americas with tools for integrating digital methods into traditional research, creating networks of collaboration across institutions, and enabling more in-depth analysis of regional and transnational historical processes, fostering the development of new scholarly approaches, international knowledge exchange, and strengthening the capacity of digital humanities in the study of cultural and social history.

DARIAH's core activities include the digitization of historical and cultural sources, the creation of shared platforms for data and methodological exchange, the development of standards for digital preservation, and the support of interdisciplinary research in the humanities¹⁵.

At the same time, digital humanities face several challenges, including technological, institutional, methodological, and ethical aspects. Technological challenges involve the rapid evolution of tools and the need to standardize data and metadata; institutional challenges stem from varying levels of digital infrastructure development across countries; methodological challenges relate to combining quantitative and qualitative approaches; and ethical challenges concern ensuring source authenticity and compliance with copyright. DARIAH offers a systematic approach to these issues by creating a unified digital space for researchers, where algorithmic tools can be applied alongside traditional methods of historical criticism.

One of the key objectives of the platform is the long-term preservation of European cultural heritage in digital form. DARIAH provides access to archival collections, supports the development of digital libraries and multimedia projects, and facilitates the study of both tangible and intangible heritage using advanced information technologies. This activity holds strategic significance not only for Europe but also for global scholarship, creating opportunities to engage researchers from North America and other regions worldwide.

¹⁵ Geertz C. *The Interpretation of Culture: Selected Essays*. New York, NY: Basic Books. 1973. 400 p.; Gitelman L. *Raw Data is an Oxymoron*. Cambridge: MIT Press. 2013. 328 p.; Hayles N. K. *Narrative and Database: Natural Symbionts*. PMLA, 2007. Vol. 122. P. 1603–1608.

DARIAH also opens unique opportunities for transnational and comparative studies of European and North American history. The platform enables the analysis of migration processes, cultural contacts, and both wartime and peacetime transformations, employing digital cartography tools, databases, and visualization techniques to examine complex social and cultural phenomena. In this way, DARIAH functions not only as an infrastructure for preserving cultural heritage but also as a platform for developing new approaches in digital historiography.

A major research focus is Holocaust studies. The European Holocaust Research Infrastructure (EHRI) consolidates information on dispersed collections, drawing on more than 20 partner organizations across 13 countries as well as numerous other archives. EHRI aims to develop innovative online tools for searching, researching, and sharing knowledge about the Holocaust. This includes building a sustainable infrastructure for researchers, enabling efficient work with dispersed sources and supporting the development of digital archival projects.

Another significant focus is the study of colonialism and slavery. Digital collections such as the Slave Societies Digital Archives preserve documents related to Africans and African Americans in slaveholding societies, allowing researchers to examine the history of colonialism and its enduring impact on contemporary societies¹⁶.

Digital sources for the history of Europe and the Americas play a crucial role in contemporary historical research, as they provide access to extensive archival materials, manuscripts, cartographic documents, newspapers, periodicals, literary works, photographs, and statistical databases that were previously restricted by physical access or geographic boundaries. Examples include the British Library's digital collection, which comprises digitized early printed books, manuscripts, and newspapers, and the Europeana project, which integrates cultural and historical materials from museums, archives, and libraries across Europe. In the American context, important resources include Harvard University's

¹⁶ Crease R. *The Play of Nature: Experimentation as Performance*. Bloomington, IN: Indiana University Press. 2018. 288 p.; Strange D. The Challenges and Rewards of Open Digital Humanities Data. *Digital Scholarship in the Humanities*, 2023. Vol. 38, No. 1. P. 45–61.; Atzenhofer-Baumgartner F., Geiger B. C., Trattner C., Vogeler G. Challenges in Implementing a Recommender System for Historical Research in the Humanities. 2024. URL: <https://arxiv.org/abs/2410.20909>; Crease R., Westfall C. *The New Big Science*. Physics Today, 2016. Vol. 69. P. 30–36.; Galey A., Ruecker S., the INKE Team. How a Prototype Argues. *Literary and Linguistic Computing*, 2010. Vol. 25, No. 4. P. 405–424.

HOLLIS Digital Collections and the U.S. Library of Congress, which house digitized maps, photographs, and periodicals, as well as digital archives at Yale University and Columbia University, providing access to historical documents from the colonial era to modern times. These resources enable researchers to conduct in-depth analyses using search engines and optical character recognition (OCR) tools for rapid information retrieval and to integrate quantitative and qualitative methods of analysis.

Digital sources foster the development of interdisciplinary approaches, allowing the study of social, political, and cultural transformations across regions and periods while ensuring the preservation and systematic organization of materials in open access, thereby promoting international scholarly collaboration¹⁷. At the same time, working with these sources requires critical evaluation of their authenticity, context of creation, and limitations related to selection and digitization, which has become a specialized competency for contemporary historians, making research more precise, dynamic, and integrated into the global academic context.

Conclusion. The exploration of historical and cultural heritage in European and North American countries through digital humanities projects highlights the profound impact of technological innovation on historical research and cultural preservation. Digital tools, including 3D modeling, virtual archives, interactive databases, and GIS mapping, have transformed the ways scholars access, analyze, and interpret historical sources. By enabling detailed reconstructions of historical sites, visualization of archival materials, and interactive storytelling, these projects provide unprecedented opportunities for both academic research and public engagement.

Moreover, digital humanities foster interdisciplinary collaboration, bringing together historians, archivists, computer scientists, and cultural institutions to create innovative methodologies that expand the boundaries of traditional scholarship. Such projects not only safeguard fragile and endangered heritage but also make it accessible to wider audiences across geographical and social boundaries. They promote a deeper understanding of historical contexts, encourage comparative studies across regions, and support educational initiatives by offering immersive experiences that engage diverse communities.

Importantly, the integration of digital approaches reshapes the conceptualization of heritage itself. It emphasizes the dynamic, participatory nature of historical knowledge, allowing communities to contribute to and interact with the interpretation of their past. The experiences of European and North American digital humanities projects demonstrate that technology does not replace traditional historical methods but complements them, enhancing analytical precision, visualization, and dissemination. This issue is particularly relevant in the context of capturing the history of large-scale scientific enterprises, such as the New Big Science, and intersects with broader theoretical debates surrounding «database history» as an emerging scholarly genre. Traditional historical narratives typically follow a fixed, linear structure, highlighting certain themes while marginalizing others. However, the research generated by facilities like the NSLS is too diverse, massive, and indeterminate – comprising thousands of projects running simultaneously over more than three decades – for conventional narrative forms to adequately capture its scope and complexity. To address this challenge, we propose the creation of an online database providing access to papers, research data, and other historical materials associated with the NSLS. Such a resource is intended not only for historians but also for journalists, policy makers, and members of the public, allowing multiple and potentially unforeseen historical interpretations to emerge.

This proposal raises fundamental questions about the relationship between database design and historical narrative. Classical narratology posits that historical writing, in textual form, generally follows a chronological chain of events, with certain topics emphasized according to the historian's choices, methodological training, and disciplinary norms. Historians select genres to structure their narratives, shaping how evidence is interpreted and presented. In other words, historical databases are never fully neutral: their structure and organization inevitably reflect selective decisions regarding which materials are included, how they are classified, and what relationships are emphasized. Yet this partiality is not necessarily a limitation. Rather, the interplay between narrative and database – famously discussed by Lev Manovich and subsequently nuanced by Hayles – suggests a symbiotic relationship. While databases provide novel tools for identifying patterns across vast quantities of information, narrative is essential for giving those patterns meaning, situating them within arguments, causality,

¹⁷ Geertz C. *The Interpretation of Culture: Selected Essays*. New York, NY: Basic Books. 1973. 400 p.; Gitelman L. *Raw Data is an Oxymoron*. Cambridge: MIT Press. 2013. 328 p.; Hayles N. K. *Narrative and Database: Natural Symbionts*. PMLA, 2007. Vol. 122. P. 1603–1608.

or interpretive frameworks. At the same time, the discipline's narrative conventions guide how data are collected, categorized, and organized within the database, highlighting the inseparability of method and interpretation.

In the context of historical research, the integration of database thinking with historiographic practice represents not an end of narrative nor of history itself, but an extension of historical methodology into materially grounded, practice-based domains – what Ratto has described as «critical making». This approach allows historians to negotiate frameworks of observation at multiple levels, akin to Geertz's notion of «thick description,» where interpretive frameworks are carefully articulated and embedded within the research process. In digital infrastructures, this negotiation occurs at layers often invisible to users, which we might term deep description.

A particular challenge in designing historical databases is avoiding what we call narrative lock: the inadvertent embedding of predetermined narratives through choices made in database architecture. For example, a database on NSLS research could focus exclusively on measurable outputs such as funding flows, publications, or awards, implicitly suggesting that these are the most historically significant aspects of scientific work. While such a database would have practical value – akin to the US DOE's database of user projects – it risks constraining the interpretive possibilities available to researchers. By contrast, the goal of the NSLS database we propose is to facilitate the emergence of new and unexpected narratives, offering research-

ers a level of discovery and surprise comparable to that encountered in oral history interviews. In this way, the database becomes not merely a repository of information but an active tool for generating historical insight, capable of supporting diverse and innovative lines of inquiry.

Ultimately, the effort to reconcile narrative and database reflects a fundamental feature of humanistic scholarship: in the humanities, description is inseparable from method. Unlike scientific procedures, which can often be paraphrased without loss, the framing and presentation of evidence in historical research is integral to interpretation itself. As research objects in the digital humanities grow increasingly complex, establishing principles for the design of digital infrastructures is essential, ensuring that large volumes of heterogeneous data can be meaningfully managed, interpreted, and utilized. By foregrounding both the opportunities and constraints inherent in database design, we highlight the potential for historical databases not only to preserve and organize information but to actively shape the production of knowledge in ways that are reflexive, methodologically rigorous, and intellectually generative.

In conclusion, digital humanities initiatives provide both a practical and theoretical framework for the study, preservation, and promotion of historical and cultural heritage. They underscore the necessity of embracing technological innovation in historical research while maintaining scholarly rigor, ultimately fostering a more inclusive, interactive, and globally informed understanding of the past.

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