INFINITY: an ethical AI to give a new voice to the European cultural heritage

Coordinated by the University of Bologna and funded by the EU with 6 million euros, the project brings together 16 European partners to expand and connect cultural data, facilitating their interpretation and informed reuse. A €650k open call will support cultural and creative organizations that are interested in experimenting with the technologies developed.

Bologna, 17 November 2026 – A **song** can tell the story of a city's identity, a **manuscript** can preserve the memory of an era, and a **photograph** can document the changes of a society. But how can we reconstruct these meanings when the **information** is **scattered** across archives, catalogues, and databases? This is the challenge of INFINITY, a four-year project coordinated by the **University of Bologna** that brings together **16 European partners**, including the **Italian Ministry of Culture through the Central Institute for Archives (ICAR)**, and is funded by the Horizon Europe programme with **6 million euros**. The goal is that of **overcoming the semantic fragmentation** and **ethical ambiguity** that characterize the **vast digital collections** of the **European cultural heritage**.

Thanks to the development and use of tools based on **Artificial Intelligence** and the **Semantic Web**, INFINITY aims to **enrich the descriptions of digital objects**, linking information about them to their respective **historical and social contexts**, as well as to the **rights** that govern their use. The project thus aims to foster a **more comprehensive understanding** of cultural heritage, and a **fully aware reuse** of resources within **research** and the **cultural and creative sectors**. It will also contribute to the technological advancement of the **European Collaborative Cloud for Cultural Heritage** (**ECCCH**), a European initiative aimed at fostering collaboration and the sharing of digital resources and tools dedicated to the cultural heritage.

In the coming months, INFINITY will launch an **Open Call** worth **650k euros**, aimed at **cultural and creative organizations** that are interested in experimenting with the solutions developed.

The INFINITY approach can also be applied to the study of historical archives. Among the materials already examined are documents relating to the **judicial proceedings concerning the death of Aldo Moro. By linking and contextualizing sources, the developed technologies can help reconstruct the relationships among people, events, and records, bringing to light connections** that would be difficult to identify through the examination of individual documents. The analysis can also offer new perspectives for the **study of the language** used by institutions to classify and describe individuals in specific historical contexts.

When the famous song "Futura" by Italian singer Lucio Dalla was recently used to launch a new political movement in Italy, it sparked a public debate that went well beyond politics. This episode has highlighted a broader issue: how can we protect not only the copyright of cultural works, but also their memory, their meaning, and the collective identity which they embody?

A song, an ancient manuscript, or a historic building are never just static files. The song "Futura" carries with it its legal copyrights, the deep roots in the social identity of Bologna, and layers of historical meaning tied to the period in which it was written. However, for most current digital collections, this fundamental context (the legal boundaries, the ethical constraints, and the rich human histories) remains invisible, fragmented, and hidden within inaccessible databases or unstructured sources.

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101233051 (HORIZON-CL2-2024-HERITAGE-ECCCH-01-04). Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Highlighting the project's mission, the **project coordinator, Valentina Presutti (University of Bologna)** stated:

"After decades of investment in the digitization of cultural heritage, we have an unprecedented availability of cultural data; yet these data predominantly convey a single-perspective narrative. We now have the opportunity, the responsibility, and the technological maturity to make these data accurate and reliable, and to enrich them so that they can reflect the different narratives that characterize them."

Rather than simply scanning objects within digital archives, INFINITY provides cultural institutions with AI tools and semantic models to interconnect the legal, economic, historical, and social layers of heritage into an easily accessible network.

The project bridges the gap between raw data and the up-to-date creative economy. By transforming fragmented collections into clear, transparent, and interconnected "knowledge graphs", INFINITY can ensure that journalists, researchers, the creative industries, and citizens can instantly find and properly use cultural objects. Users will be able to interrogate the data through multiple reading lenses, whether by filtering for intellectual property rights or by exploring how a work of art connects to the social history of its time.

INFINITY in practice: multidimensional annotation

To make all this a reality, INFINITY combines the Semantic Web and eXplainable AI (XAI) to create multidimensional knowledge graphs (mKGs). This makes it possible to capture complex spatial, social, and economic layers within interconnected digital resources, ensuring that every AI-driven annotation is transparent, verified, and traceable. By tracking human versus machine origin, INFINITY builds up the trust in high-fidelity data that is essential for obtaining a thriving research ecosystem and creative economy. By enriching digital cultural heritage objects with multiple perspectives and information layers, the project supports AI conversational tools in becoming reliable, and overcoming their current limitations due to a learning activity originating from fragmented, incomplete, and bias-ridden sources.

Use cases: validation of INFINITY technologies

INFINITY validates its technologies through six real-world use cases:

- **MANUSCRIPTS (metadata enrichment and AI-powered transcription):** enhances descriptions of historical manuscripts, making them easier for researchers and the public to find, access, and transcribe.

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101233051 (HORIZON-CL2-2024-HERITAGE-ECCCH-01-04). Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101233051 (HORIZON-CL2-2024-HERITAGE-ECCCH-01-04). Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

- **CROWD (participatory memory):** aggregates private archives and personal narratives to reconstruct collective memories (e.g., accounts from war survivors).

- **AUDIOVISUAL (video archives):** enables film-makers to source and use historical footage while ensuring ethical compliance and respect for copyright.

- **ARCHIVE (ethical documentation):** organizes extensive archives and repositories, visualizing the connections among individuals, places, and events.

- **4DGRID (geo-temporal alignment):** creates 4D digital twins of urban environments by aligning historical maps and photographs with up-to-date geodata.

- **3DARCHEO (digital archaeology):** improves the documentation of prehistorical rock art through innovative RTI workflows which can capture micro-topographical details that are invisible to the naked eye.

The focus: travelling through time via "4DGRID"

A cutting-edge innovation is 4DGRID, a digital time machine. By scanning a building with a smartphone, users can go beyond current reality. INFINITY's AI instantly retrieves thousands of historical photos, floor plans, and period's videos from archives, superimposing them onto the physical environment with pinpoint precision. This 4D reconstruction traces urban evolution over the decades, linking architecture to social history and revolutionizing tourism and urban planning through cities that "can remember" their past in real time.

The Project's partners

The INFINITY consortium comprises 16 international centres of excellence, led by the **University of Bologna** (IT), including: Austrian Institute of Technology GmbH (AT), CNR - Italian National Research Council (IT), Culture & Creativity South West SL (ES), Digital Paths Società Benefit srl (IT), École Polytechnique Fédérale de Lausanne (CH), Europeana (NL), Facts & Files Digital Services GmbH (DE), Friedrich-Schiller-Universität Jena (DE), the Italian Ministry of Culture - Central Institute for Archives (IT), Poznańskie Centrum Superkomputerowo-Sieciowe (PL), Stichting Nederlands Instituut voor Beeld en Geluid (NL), Storypact GmbH (AT), The University of Edinburgh (UK), Time Machine Organisation (AT) e Uniwersytet Wrocławski (PL).

Press contacts: press@infinity-eccch.eu

General e-mail: info@infinity-eccch.eu

Website: https://infinity-eccch.eu/

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101233051 (HORIZON-CL2-2024-HERITAGE-ECCCH-01-04). Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.