

# XV JORNADA D'ESTUDI I DEBAT

Nous patrimonis, nous feudalismes:  
les servituds de la documentació digital

BARCELONA CAIXA FORUM — 15 DE MAIG DE 2024



Associació de Professionals de l'Arxivística  
i la Gestió de Documents de Catalunya



12.00 – 12.45 h

# Digital transformation of cultural heritage: challenges and opportunities, policies and good practices

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Photoconsortium International Association



Associació de Professionals  
de l'Arxivística i la Gestió de  
Documents de Catalunya



# Contents of the presentation

- Digital cultural heritage and digital transformation
- Using digital technology to transform the work of cultural heritage organisations
- Which values to be delivered
- The common European Data Space for Cultural Heritage and the Commission Recommendation of 2021
- Examples of good practices
- Impact of digital transformation on the society





# Digital cultural heritage

*“The identification and interpretation of historical information and cultural value embedded in peoples’ heritage has become an essential and urgent requirement to form and strengthen national identities.”* (IFLA International Federation of Libraries Associations and Institutions, Digital Cultural Heritage: Theory and Practice, 19/2/2024)

Digital representation of cultural heritage include: archival records, texts, still images, audio and videos, graphics, web pages, ...

All these contents are produced according to specific procedures and specifications.

To be accessible by different users and on different platforms the adoption of standards is needed.

Permanent management and maintenance of data is requested to preserve them for the longest possible time.





# Digital transformation

*“Digital transformation is both the process and the result of using digital technology to transform how an organisation operates and delivers value. It helps an organisation to thrive, fulfil its mission and meet the needs of its stakeholders. It enables cultural heritage institutions to contribute to the transformation of a sector powered by digital and a Europe powered by culture.” (Europeana Foundation, Defining digital transformation for the cultural heritage sector, 6/11/2023)*

To transform the work of cultural heritage organisations there is a need of capacity building in terms of:

- Human resources
- Digital infrastructures
- Procedures and policies





# Which values to be delivered

In addition to access and preservation, a question exists about cultural bias in the digital representation of cultural heritage

- A more inclusive and respectful approach is needed to describe cultural heritage
- AI technology can help to detect problematic terms in cultural heritage metadata and provide information about their background, but it can also introduce biases
- Efforts are needed to improve the representation of minority cultures
- Improve the capacity of cultural heritage institutions to analyse and to address biases in their collections





# The case of Topfoto collection of Roma heritage

- Topfoto Image Archive: <https://www.topfoto.co.uk/>
- For older collections preserved by archives since a long time, it is possible that original descriptions of the items, or even the items themselves (e.g. heritage colonial videos, photographs, manuscripts, ...), might include inappropriate terminology and offensive language towards the community that they intend to represent.
- This was the case of the TopFoto Roma collection dating back to 1950s and earlier.
- The collection included content depicting the Roma community.
- Review and validation of metadata was performed in collaboration with Roma media experts, ensuring correct, fair and unbiased representation of the community in the cultural heritage collection.





Ref. 2002202

In Topfoto's image database, this 1940s portrait was simply titled

**“Jettatura”**

which by definition (Collins English Dictionary) means: *A curse of the evil eye, whereby all that the cursed looks upon will suffer bad luck.*

This original title dates back to the 1940s.



**topfoto**  
the image works

The 2022 corrected title, appearing in Europeana by Topfoto, is

**“Romani Woman – c. 1944”**



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**Weave**  
Widen European Access to Cultural  
Communities Via Europeana



# Algorithmic biases can occur

Due to coding based on assumptions and computer misunderstandings, gender, racial, and language algorithmic biases can occur.

**Biases** in facial recognition  
Bias towards Caucasians and women when searching "beauty"

Search: beauty

The screenshot shows a grid of 24 facial recognition results for the search term "beauty". The results are heavily biased towards Caucasian women. The first row shows a woman (Wed, Apr 21, 20...), two women (Mon, Mar 22, 2021), a woman (Mon, Mar 8, 2021), a woman (Wed, Jan 6, 20...), and a man (Sun, Nov 1, 2020). The second row shows a woman (Wed, Aug 26, 2020), a woman (Thu, Feb 27, 2020), a woman (Sun, Feb 16, 2020), and a woman (Thu, Feb 6, 2020). The third row shows a woman (Tue, Jan 28, 2020), a woman (Tue, Dec 24, 2019), a woman (Thu, Dec 19, 2019), a woman (Tue, Nov 19, 2019), and a woman (Wed, Nov 13, ...). The fourth row shows a woman (Thu, Nov 5, 2019), a woman (Wed, Oct 24, 2019), a woman (Tue, Oct 15, 2019), a woman (Tue, Oct 8, 2019), a woman (Thu, Oct 3, 2019), and a woman (Wed, Sep 25, 2019).

Search done in  
June 2022



# Biases in facial recognition


**TIME**

## Are Face-Detection Cameras Racist?

By Adam Rose / Friday, Jan. 22, 2018

Like 134 Tweet Share Save Later

When Jui Wang and her brother bought their mom a Nikon Coolpix S630 digital camera for Mother's Day last year, they discovered what seemed to be a realification. Every time they took a portrait of each other smiling, a message flashed across the screen asking, "Did someone blink?" No one had. "I thought the camera was broken," Wang, 33, recalls. But when her brother posed with his eyes open as wide that he looked "big-eyed," the message stopped.



Art Wang

Wang, a Taiwanese-American strategy consultant who goes by the Web handle "oujiojou," thought it was funny that the camera had difficulties figuring out when her family had their eyes open. So she posted a photo of the blink warning on her blog under the title, "Racist Camera! No, I did not blink... I'm just Asian!" The post was picked up by Gizmodo and Boing Boing, and prompted at least one commenter to note, "You would think that Nikon, being a Japanese company, would have designed this with Asian eyes in mind."

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The Best Travel Gadgets of 2018

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(See the top 10 gadgets of 2018.)

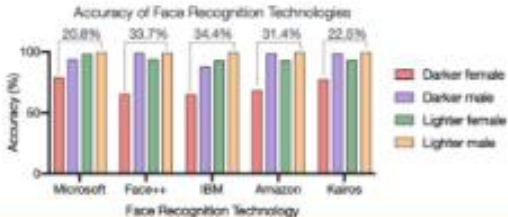
Nikon isn't the only big brand whose consumer cameras have displayed an occasional — though clearly unintentional — bias toward Caucasian faces. Face detection, one of the latest "intelligent" technologies to trickle down to consumer cameras, is supposed to make photography more convenient. Some cameras with face detectors are designed to warn you when someone blinks; others are programmed to automatically take a picture when somebody smiles — a feature that, theoretically, makes the whole problem of timing your shot to catch the brief glimpse of a grin obsolete. Face detection has also found its way into computer webcams, where it can track a

HARVARD UNIVERSITY  
The Graduate School of Arts and Sciences

## Racial Discrimination in Face Recognition Technology

### Inequity in face recognition algorithms

Face recognition algorithms boast high classification accuracy (over 90%), but these outcomes are not universal. A growing body of research exposes divergent error rates across demographic groups, with the poorest accuracy consistently found in subjects who are female, Black, and 18-30 years old. In the landmark 2018 "Gender Shades" project, an intersectional approach was applied to appraise three gender classification algorithms, including those developed by IBM and Microsoft. Subjects were grouped into four categories: darker-skinned females, darker-skinned males, lighter-skinned females, and lighter-skinned males. All three algorithms performed the worst on darker-skinned females, with error rates up to 34% higher than for lighter-skinned males (Figure 1). Independent assessment by the National Institute of Standards and Technology (NIST) has confirmed these studies, finding that face recognition technologies across 189 algorithms are least accurate on women of color.



Technology	Darker female	Darker male	Lighter female	Lighter male
Microsoft	20.8%	~90%	~90%	~90%
Face++	33.7%	~90%	~90%	~90%
IBM	34.4%	~90%	~90%	~90%
Amazon	31.4%	~90%	~90%	~90%
Kairos	22.0%	~90%	~90%	~90%

**MIT News**  
ON CAMPUS AND AROUND THE WORLD


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## Study finds gender and skin-type bias in commercial artificial-intelligence systems

Examination of facial-analysis software shows error rate of 0.8 percent for light-skinned men, 34.7 percent for dark-skinned women.

Watch Video

Larry Hardesty | MIT News Office  
February 11, 2018



Pisa, 28/6/2022, Multiplier event, Citizen Heritage project, funded by Erasmus Plus Programme of the EU  
Author: Dr. Allison Kupietzky, Collection Database Manager Head of Information Center for Israeli Art  
<https://www.citizenheritage.eu/wp-content/uploads/2022/06/4-Cataloguing-Large-Photo-Collections-Allison-Kupietzky.pdf>



Google beauty

Tutti Immagini Prodotti Luoghi Siti di luoghi Altro Strumenti SafeSearch

Logo Salon Spa Scritta Pochette Skincare Sfondo Viso

National Geographic: The idea of beauty is always shifting. Toda...  
 Freepik: Foto Beauty, oltre 89.000 Foto ...  
 Fresha: Centro estetico Monica beauty ce...  
 Cosmoderma: Clean beauty e il nuovo trend nella c...  
 Looka: The Ultimate Guide on How to Start ...  
 Oprah Daily: Beauty Tips And Trends - Hair, Makeup, S...  
 Vogue: The 24 Best Beauty Pro...

Good Housekeeping: Beauty and Anti Aging - Beauty, ...  
 Vogue Business: The year in beauty...  
 The Independent: 7 ways to improve your health and...  
 LVMH: Fenty Beauty by Rihanna  
 Glamour: Lizzo Says She 'Is the Beauty Sta...  
 Dr. Max: Skincare Serale: quali sono gli step fondam...  
 Visage Technologies: Top 5 beauty industry trends - Visage T...

M B W  
 MILANO BEAUTY WEEK

Search done in May 2024: still women but a stronger commercial presence

# The common European Data Spaces

14 Data Spaces:

Agriculture

**Cultural Heritage**

Energy

Finance

Green Deal

Health

Language

Manufacturing

Media

Mobility

Public administration

Research and innovation

Skills

Tourism

- To unlock the potential of data-driven innovation
- To allow data to be made available and exchanged in a trustworthy and secure manner
- To enhance the development of new data-driven products and services in the EU



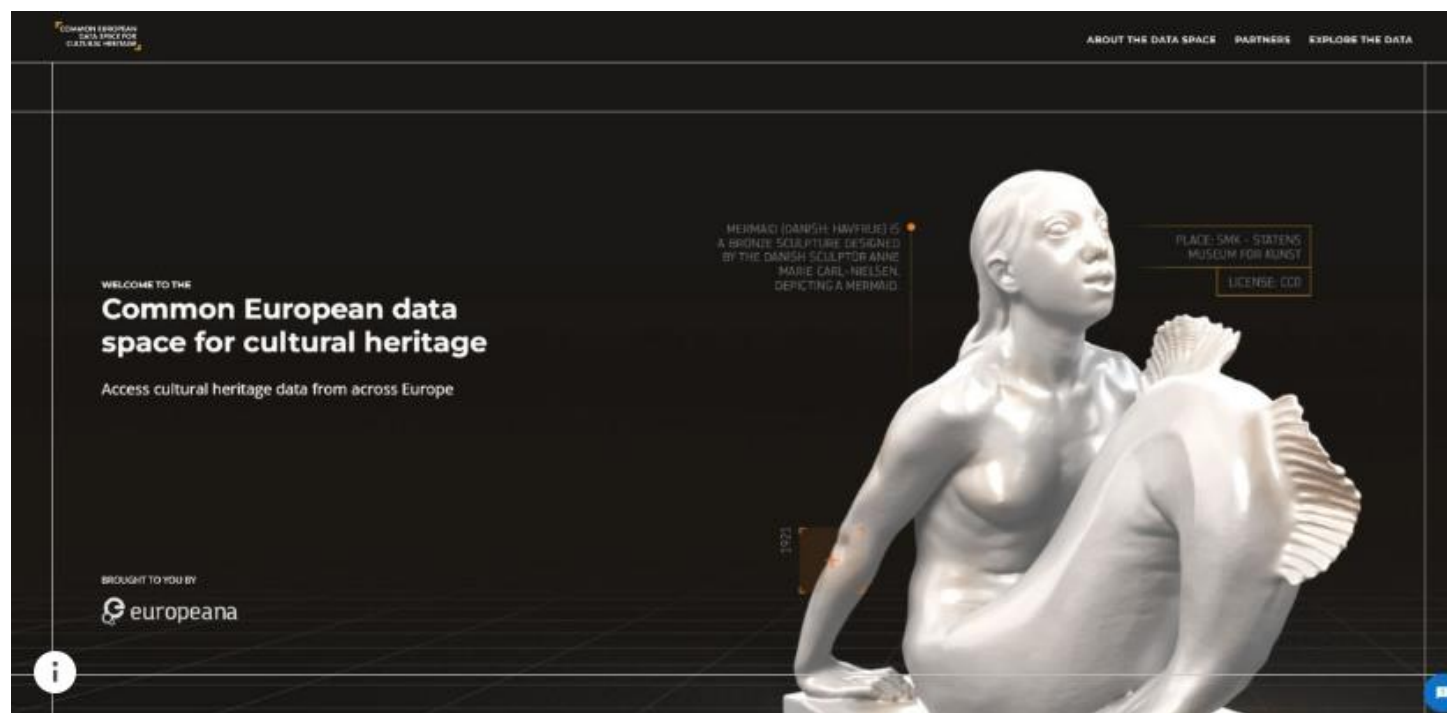


# The common European Data Space for Cultural Heritage

- The common European Data Space for Cultural Heritage is the flagship project of the EU to accelerate the digital transformation of Europe's cultural sector
- Announced in the Commission Recommendation C(2021)7953 of 10 November 2021
- To improve availability of high-quality cultural contents in the digital world
- To foster the reuse of digitised cultural resources
- To complete the deployment of the **Europeana** digital service infrastructure platform
- To support cultural heritage institutions in making use of digital advanced technologies
- To increase the offer of 3D and extended reality (XR) cultural contents and scenarios
- To offer training and capacity building opportunities to cultural heritage institutions



# The new webpage for the common European Data Space for Cultural Heritage



The new website was launched on 30/4/2024

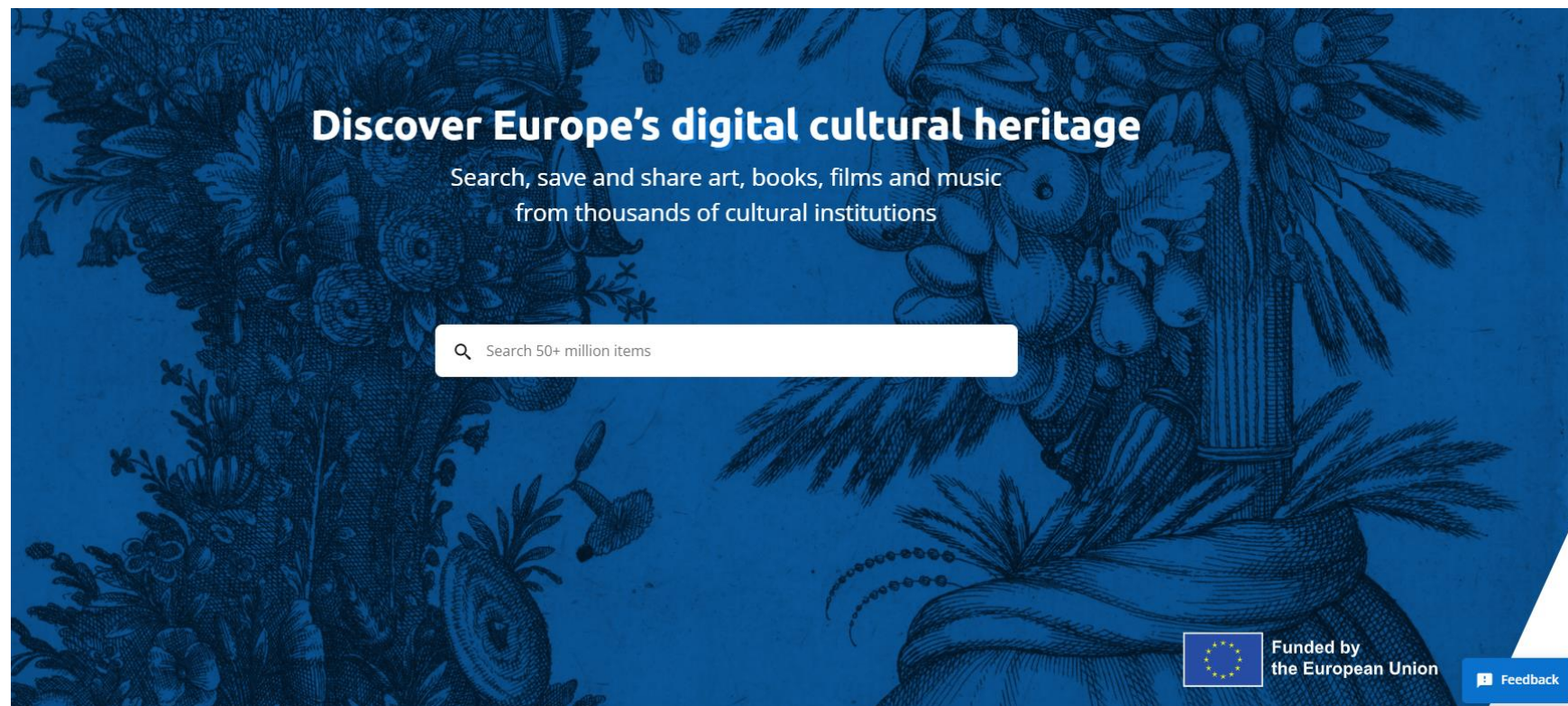
<http://www.dataspace-culturalheritage.eu/>



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# The Europeana platform



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<https://www.europeana.eu/en>



# Commission Recommendation

On 10/11/2021 the European Commission published a Recommendation addressed to the Member States of the European Union on a common European data space for cultural heritage.

The purpose of the Recommendation is to accelerate **digitisation and preservation** efforts of cultural heritage institutions and to exploit the opportunities created by the digital transformation.

All types of cultural heritage are considered: tangible, intangible, natural, born digital, with a special emphasis on cultural heritage at risk.

3 main ambits of intervention in the cultural heritage sector are taken into account:

- Digitisation
- Digital preservation
- Digital transformation







# Digital strategy for digitisation and preservation of cultural heritage

- Member States are recommended to develop a digital strategy for cultural heritage at national and regional levels
- Collaboration of all the concerned stakeholders and parties, both cultural heritage institutions and competent authorities, is foreseen to provide resources and support for the strategy's implementation
- Advanced technologies should be taken up, such as **3D**, artificial intelligence, extended reality, cloud computing, data technologies and blockchain, to enable an efficient process of digitisation, digital preservation of the digitised cultural resources, a wider access to high quality content, and their use and reuse

Holistic approach:

- Purpose of the digitisation
- Target user groups
- Highest affordable quality
- Long-term financial and staffing resources





# Key features of the digital strategy

- To establish partnerships between the cultural heritage sector, higher education and vocational training, creative industries and sustainable cultural tourism
- To laid down clear and fair conditions for using and reusing the digitised assets (rights and licenses)
- To assess digital skills gaps, to identify and to address the needs in the sector
- To take advantage of the current copyright framework, supporting cultural heritage professionals in acquiring skills and providing copyright expertise
- To showcase and promote success stories
- To encourage cross-border collaborations





# Guiding principles

- To adopt to standards (e.g. Europeana Data Model and RightsStatements.org)
- To adhere to quality frameworks (e.g. the VIGIE Study on 3D digitisation)
- To enhance the potential reuse in social sciences and humanities, sustainable cultural tourism, cultural and creative sectors
- To help identify cultural goods that are illicitly trafficked
- FAIR principles (findable, accessible, interoperable and reusable)
- To include in particular **3D digitised cultural heritage assets**





# Objectives foreseen for the national and regional strategies

Very precise targets have been set in the Recommendation for the elaboration of the national and regional strategies.

Digitisation and digital preservation (terrific) goals

By 2030:

- All monuments and sites at risk
- 50% of the most physically visited cultural and heritage monuments, buildings and sites

Intermediate goal by 2025:

- 40 % of the overall 2030 targets





# Expert Group on a common European Data Space for Cultural Heritage

The Expert Group on a common European Data Space for Cultural Heritage (CEDCHE) is a group launched by the European Commission in November 2021.

- Forum between the European Commission, Member States and UNESCO
- To review and discuss policies for digital cultural heritage and the common European data space
- To advice and help monitor the implementation of the Recommendation on a common European data space for cultural heritage adopted on 10 November 2021
- The 27 EU Member States have each appointed representatives to take part in the group, with UNESCO as observer

<https://digital-strategy.ec.europa.eu/en/news/expert-group-common-european-data-space-cultural-heritage>





# Examples of good practices

- Managing data-metadata-paradata
- Infrastructure services: storage, computing, authentication&authorisation
- Sharing collections in the virtual world

The VIGIE Study on quality in the 3D digitisation of tangible cultural heritage

EUreka3D Data Hub and 3D collections

EUreka3D-XR virtual scenarios





# The VIGIE Study

The VIGIE 2020/654 Study on quality in the 3D digitisation of tangible cultural heritage:

<https://digital-strategy.ec.europa.eu/en/library/study-quality-3d-digitisation-tangible-cultural-heritage>

Data acquisition of tangible cultural heritage comes with different degrees of complexity depending on the user scenarios and context:

- Small artifacts in controlled environments
- Sites
- Monuments
- Underwater or in caves objects
  - > Movable cultural heritage
  - > Immovable cultural heritage

Scope of the digitisation: preservation, exhibition, re-use, etc.





A Guideline based on the EU VIGIE 2020/654 Study:

- Why digitise in 3D
- Quality and complexity

A Step-by-step guide:

- Start with a project plan
- Documentation and site work
- Production and delivery
- Archive

And eventually: publication and dissemination



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# 3D Digitisation Guidelines: Steps to success

A GUIDE BASED ON THE EU VIGIE2020/654 STUDY  
ON QUALITY IN 3D DIGITISATION OF TANGIBLE  
CULTURAL HERITAGE



**EUREKA3D**  
European Union's REConstructed content in 3D





# EUreka3D: the project

European Union's reconstructed content in 3D

EU project co-funded by the Digital Europe programme

<https://eureka3d.eu/>

Start date: 1/1/2023

Duration: 2 years

Coordinator: Photoconsortium Internation Association

Partners: CRDI, Bibracte, Museo della Carta, Cyprus University of Technology, EGI, Cyfronet, IMEC, Europeana Foundation

Museums, galleries, libraries, archives and archaeological sites need to review and modernise their internal processes from digital capture to end-user access and re-use

- to review their infrastructure capacity
- to (re-)train their personnel to cope with the new digital responsibilities and roles
- to represent a novel holistic documentation of the digital objects



# EUreka3D outcomes

The solutions developed aim to cover the whole value chain of digitization:

- EUreka3D Data Hub: dedicated cloud-based services for the management and preservation of cultural contents in a safe and IP-mindful environment
- High-quality 3D digitization
- Aggregation of new contents in Europeana
- Webinars, demonstrations and guidelines



# EUreka3D latest events



## Transforming heritage: from 2D to 3D digitisation

Three sessions organised in collaboration with ICA, focusing on guidelines for digitisation, 3D digitisation for reuse and research, innovative initiatives in 3D

27/10,10/11, 1/12/2023, recording available online:

<https://eureka3d.eu/transforming-heritage/>



## Paradata, Metadata and Data for 3D acquisition in cultural heritage

- 8/4/2024, recording available online: <https://youtu.be/SdTGUXU75s0>
- 17/5/2024 at 6 pm, online, registration: <https://eureka3d.eu/webinar-paradata/>



## Preserving Values through #MemoryTwins

29/5/2024, hybrid public demo event, Lymasso, Cyprus registration:

<https://eureka3d.eu/eureka3d-preserving-values-through-memorytwins/>



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**Final event in Girona on 12-13 December 2024: STAY TUNED!**



# EUreka3D-XR: the project

A continuation of EUreka3D to develop innovative scenarios of extended reality (XR)

EU project co-funded by the Digital Europe programme

Start date: 1/1/2025

Duration: 1,5 years

Coordinator: Photoconsortium Internation Association

Partners: CRDI, Bibracte, Cyprus University of Technology, EGI, Cyfronet, IMEC, SWING, Meemo, Miralab, National Technical University of Athens, Europeana Foundation

Objectives:

- To transform cultural contents (2D, 3D, video, texts, maps, stories) into extended Reality (XR) scenarios
- To deliver the XR scenarios to the European common Data Space for Cultural Heritage





# EUreka3D-XR expected outcomes

Three showcase scenarios will be available in the Data Space as contents and documentation:

1. The virtual visualisation of the middle-ages walls of the city of Girona
2. The XR narrative of excavations in process in the Bibracte archaeological site
3. The creation of a new life of Saint Neophytos Englystra in Cyprus in the virtual space





# EUreka3D-XR: the walls of Girona

The EUreka3D-XR application will re-use 3D digitisation of what remains and 2D contents from the city archive, to reconstruct the walls as they have been.

3D contents	2D records
Models of the towers	Photographs
Models of the bastions	Maps
Remaining sections of walls of the city of Girona	Documents
Videos	Audio
Films of the walls before destruction	Interviews

The virtual scenario will not be just the geometric representation of existing heritage:

It is a “**memory twin**”.





*The demolition of mediaeval walls destroyed at the beginning of the 20th century transformed completely the urbanism of the city to offer new possibilities of expansion*





# EUreka3D-XR: the Celts of Bibracte

The EUreka3D-XR application will use the wide range of materials linked with excavation, both exhibited in the museum and kept in the archives of the research centre, to offer an interactive XR experience of the archaeological site.

<b>3D contents</b>	<b>2D contents</b>
Digital models of land	Facsimiles of old documents
Digital models of building remains	Maps
Digital models of objects	Geophysical prospecting maps
Digital models of the museum	2D and 2D+ for ground penetrating radar
<b>Videos</b>	<b>Audio</b>
Films of the Celts walls construction	Interviews

The virtual scenario will not be just the geometric representation of existing heritage:

It is a “**memory twin**”.







*Bibracte, Mont Beuvray, aerial view towards the northeast  
of Pâture du Couvent” (Bibracte/A.Meunier, 2020,  
no. 125833)*



# Eureka3D-XR: Saint Neophytos Englystra in Cyprus

3D models of the site of Saint Neophytos will be enriched by giving life to virtual people in the Monastery.

Virtual monks will be moving in the physical Englystra space, simulating the life inside the monument according to the documents available.

The virtual Saint Neophytos will tell his story, using generative AI to produce the narrative in multiple languages.

3D contents	2D contents
Digital models of the tomb	Archival documents
Digital models of the cells	Manuscripts
Digital models of the oratory	Digitisation of frescos
Videos	Audio
Films of the Hermitage	Synthetic voice of the monks and of the Saint

The virtual scenario will not be just the geometric representation of existing heritage:

It is a “**memory twin**”.





*Fresco Depicting St. Neophytos from the  
Enkleistra's Berm*



# Assessing impacts

Assessing impact means to understand if the planned and implemented activities can lead and contribute to the changes (short and long-term outcomes) that have been envisaged for stakeholders and for the society.

Problem statement:

*Which is the impact that digital transformation in the archival sector can deliver?*

- **Innovation Impact:** to move research and experimental outcomes to a larger scale
- **Operational Impact:** to improve processes internal to the organisations
- **Social Impact:** to affect stakeholders and wider society bringing changes that are beneficial to citizens







# Innovation impact

to move research and experimental outcomes to a larger scale

Innovation at the cross-road between technology and humanities

- The EUreka3D Data Hub
- Virtual 3D reconstruction of heritage that has already disappeared
- Recreate heritage objects for dissemination, in digital and physical formats (3D printing)
- Automated and standardised generation of XR/AR experiences





# Operational impact

to improve processes internal to the organisation

- Sharing of assets, contents, methodologies, and experiences among the various cultural heritage domains (archives, museums, libraries, galleries, archaeological sites, architecture, history, arts, ...)
- Setting up a ground-breaking change in integrating innovation
- Visual quality, metadata, precise and traceable paradata for preservation
- Developing new curricula in education and vocational training





# Social impact

to affect stakeholders and wider society bringing changes that are beneficial to citizens

More and better available digital cultural content will impact on:

- **Education.** The importance of historical records becomes more evident for the creation of knowledge, promoting students collaboration and critical thinking.
- **Tourism.** Physical and virtual visitors benefit from availability of information while planning the trip, enhanced experience to plunge into a past world or to have a feeling on how life was, better understanding of complex heritage.
- **Culture.** Heritage becomes more attractive to certain categories of public that are difficult to attract, e.g. teenagers and young adults, or difficult to reach, e.g. differently able and aged people.
- **Arts and creative sectors.** Access to digital contents, 3D and XR cultural scenarios represent an opportunity for artists and creators to engage with cultural artefacts.
- **Local development.** Cultural heritage institutions offer their services not only to scholars and professionals, but also to citizens, becoming centres of resources and expertise and spaces of engagement, learning and encounter.



# Gràcies!

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