

Scaling Inclusive Access to Cultural Heritage through XR, and Interactive Storytelling



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- The challenge of inclusive Heritage
- 5DCulture: Achieving "Physical-Digital" inclusion through tactile replicas and augmented audio guides
- XR culture: Eliminating geographical and physical mobility barriers through immersive VR reconstructions
- WEAVE: Democratizing cultural narratives and representation via an interactive "story-weaving" framework
- Conclusions



■ Do Not Touch

- Archival Preservation
- Passive observation
- Inaccessible to diverse sensory needs and mobility profiles



■ EXPERIENCE EVERYTHING

- Inclusion
- Active, multisensory engagement
- Technology as a systematic dismantler of physical and narrative barriers



Three Pillars of Inclusive Heritage

Sensory Inclusion

5DCulture

Moving beyond
the visual to
tactile and
auditory
engagement

Spatial Inclusion

XRCulture

Eliminating
geographical
and physical
mobility
barriers

Narrative Inclusion

WEAVE

Democratising
singular, top-
down
historical
perspectives

Beyond the Visual



The Challenge

For visually impaired audiences traditional curatorial practices rely on sight as the only valid mechanism for historical appreciation

The Goal

Translate high-quality digital data into multisensory, tactile and spatial formats that bypass the need for sight

■ STEP1: The artifact

High Quality 3D digitisation
(AI, semantic enhancement)
uploaded to the European
Data Space

■ STEP2: The Translation

The “Iberian Culture”
Scenario Pipeline

■ STEP3: The output

- Tactile 3d printed replicas for touch
- Context-aware spatial audio guides

■ STEP4: The Inclusion
Visually impaired visitors
“see”through touch and “hear”
through augmented spatial cues



Beyond the barriers of geography and mobility



XR
culture

The Challenge

Cultural heritage is often locked in dispersed locations, fragile environments or buildings lacking modern mobility infrastructure. For visitors with reduced mobility their freedom to wander and discover is taken away

The Goal

Recreate the autonomy and freedom of physical presence without the physical constraints

■ AI-based Digitisation

Using AI techniques to
render photorealistic
environments



■ **The Output: Virtual Reality and
Mixed Reality reconstructions
returning autonomous exploration
to the user**

■ XRculture Open Framework





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■ AI-based Digitisation

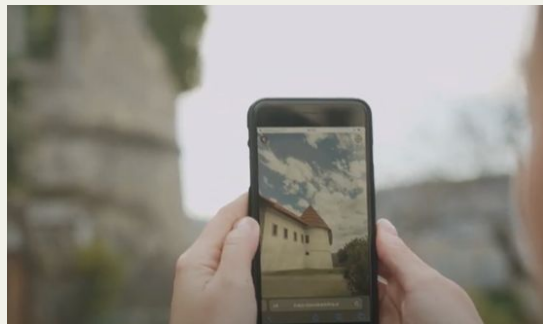
Using AI techniques to
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■ **The Output: Virtual Reality and
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Beyond the barrier of the singular narrative



Widen European Access
to Cultural Communities
Via Europeana

The Challenge

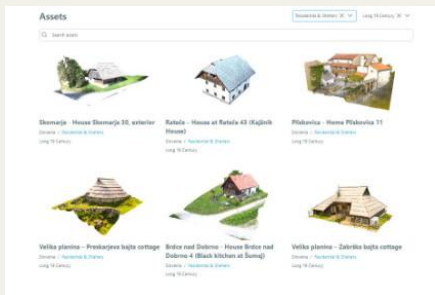
Traditional heritage spaces prioritise tangible objects and singular, top-down historical perspectives, often silencing marginalised communities and intangible cultural practices

The Goal

Build frameworks that allow communities to weave their own digital fragments and intangible heritage into the official record

■ Tangible 3D objects

Europeana Data Space



■ Intangible Movements

Dance Gestures via
MotionNotes



**The WEAVExperience Tool
Interactive web-based
framework + AI/NLP automatic
metadata enrichment**

■ Audiofiles and community photographs



A multi-vocal,
sound-rich community
curated digital narrative
interface

The Dimensions of Accessibility

	5Dculture	XRculture	WEAVE
Target Barrier	Sensory & Visual limitations	Mobility & Geographic limitations	Narrative & Representation limitations
Primary Tech Enabler	Semantic 3D mapping & spatial audio	NeRF, Gaussian Splatting, XR Middleware	WEAVEExperience UI, NLP
Primary Output	Tactile 3D prints + audio loops	1:1 scale immersive VR reconstructions	Interactive digital stories with text and audio
User Agency	The right to touch	The right to explore	The right to define

The Intersection of Universal Access

Sensory Inclusion

Spatial Inclusion

Narrative Inclusion

True Inclusion requires a multidimensional approach. It should be ensured that artefacts are touchable, spatially navigable and culturally representative

Thank You!

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