AI for Cultural Heritage Reconstruction in Ukraine

Leveraging artificial intelligence to rebuild and restore Ukraine's damaged cultural sites.
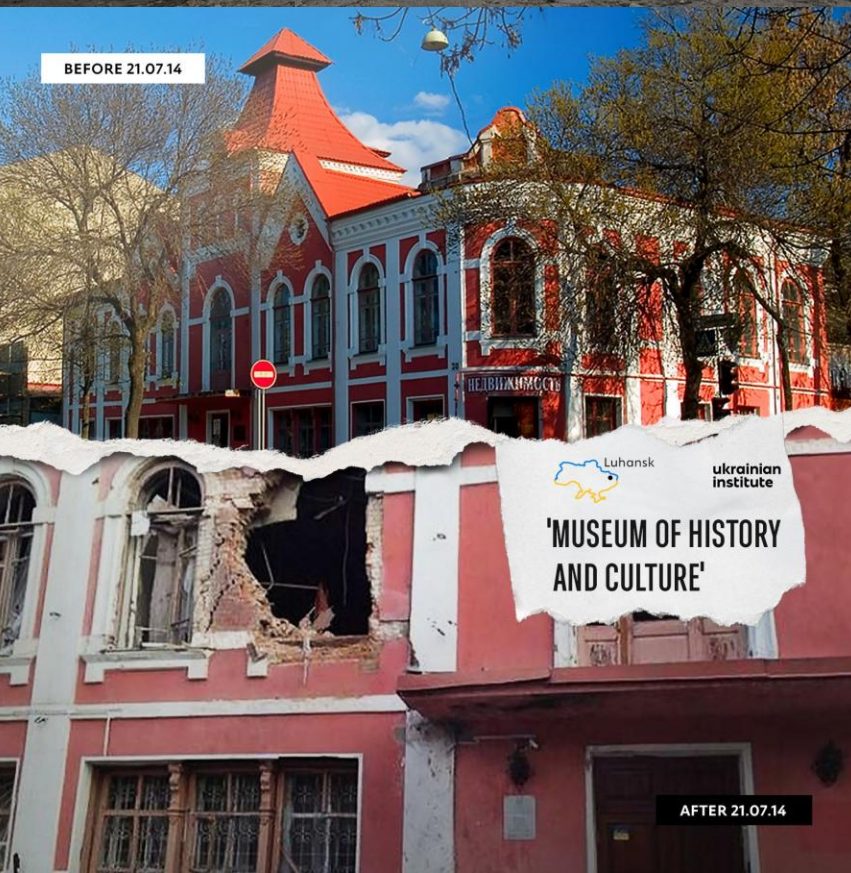
Підготував
студент спеціальності «Менеджмент»
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Науковий керівник
д. е. н., професор
Кінаш І. П.

BEFORE 19.04.2022

Mariupol
ukrainian institute
PALACE OF CULTURE 'YOUTH'

AFTER 19.04.2022

BEFORE 21.07.14

Luhansk
ukrainian institute
'MUSEUM OF HISTORY AND CULTURE'

AFTER 21.07.14

Ukrainian Cultural Losses

1599

Sites Damaged

$4,1B

Lost in
Cultural sector

$9B

Needed for
Rebuilding

*As of September 2025

Why AI Matters?

Preservation
AI helps capture and restore cultural objects when originals are damaged or inaccessible.

Identity
Digital reconstructions strengthen cultural continuity and protect national memory.
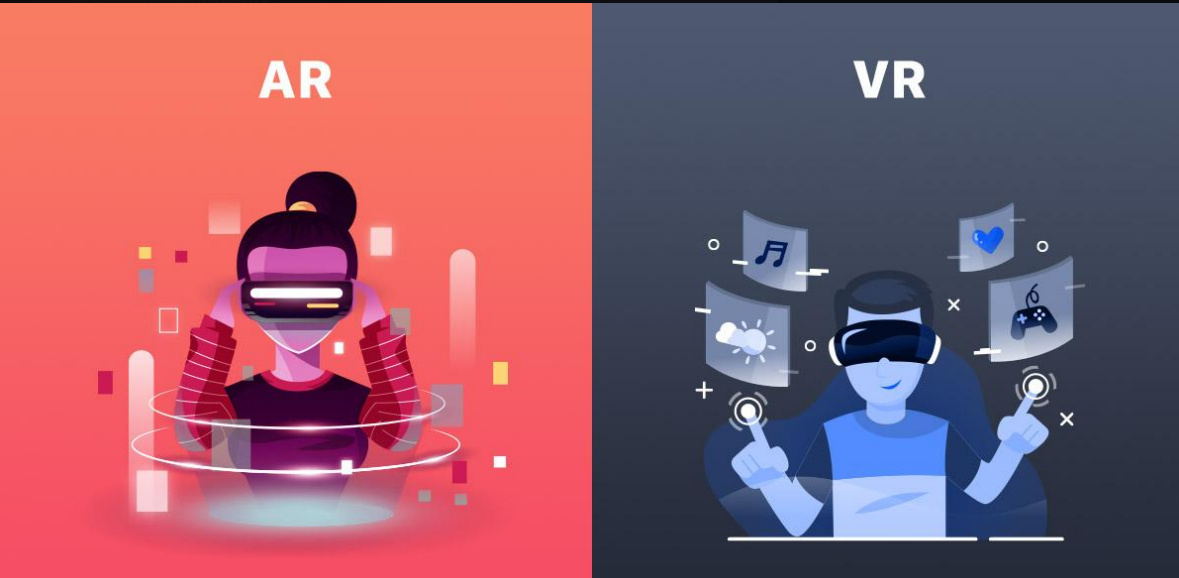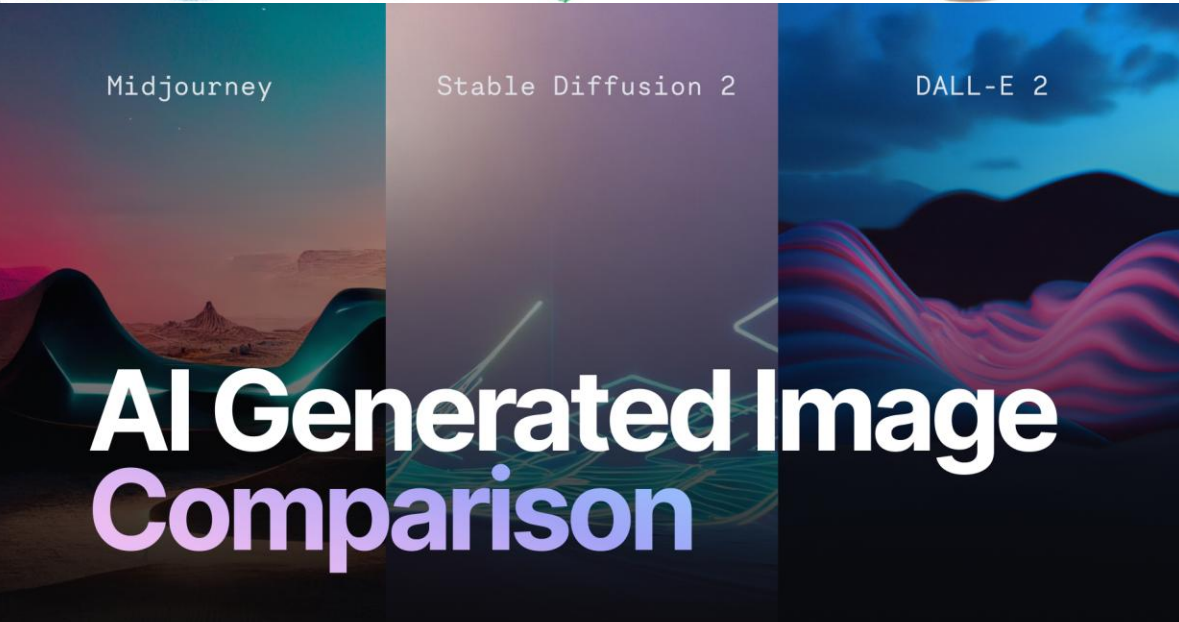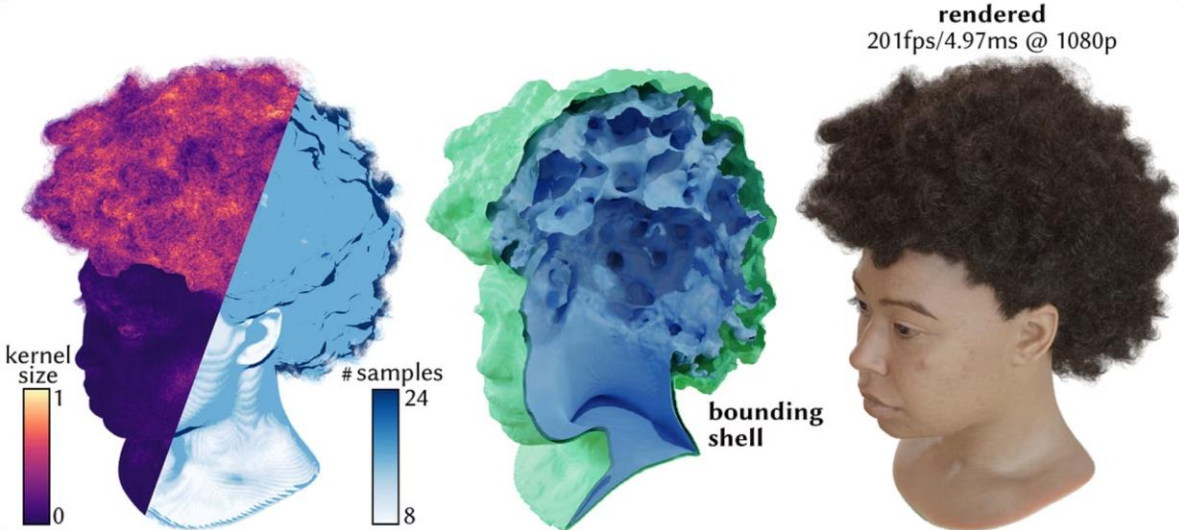
Education
Immersive technologies make learning deeper and open access to heritage for more people.

Global Visibility
AI allows Ukrainian heritage to be showcased worldwide, even during war.

Key Technologies

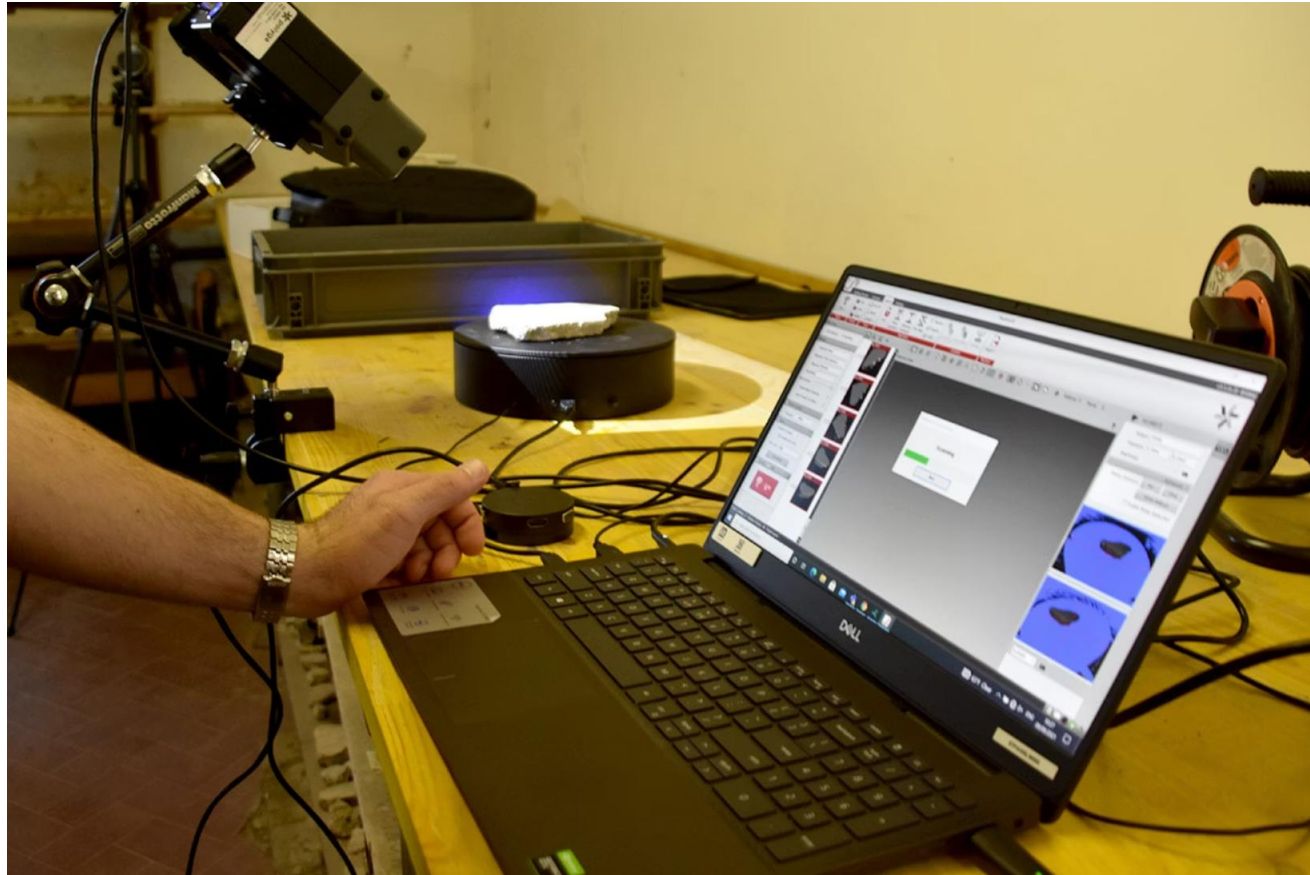**Machine Learning + 3D scanning, → Neural Radiance Fields**

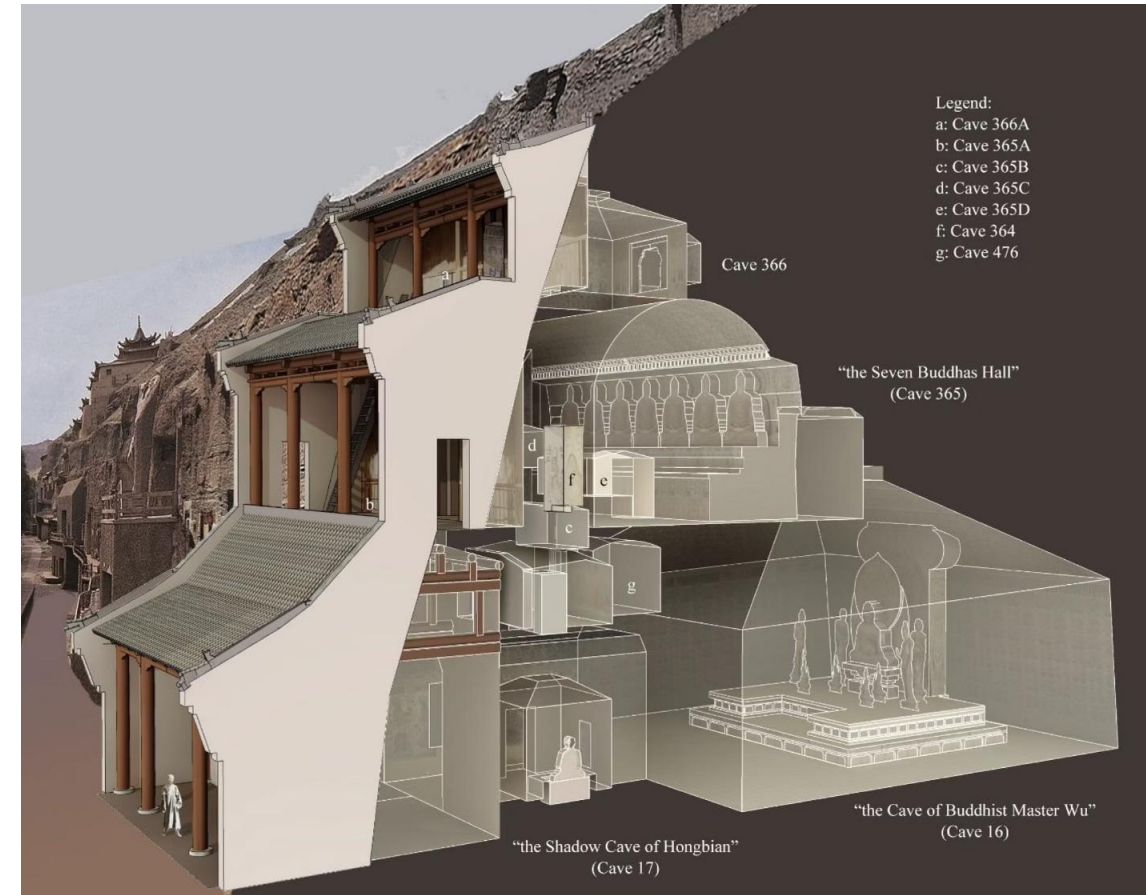**Generative AI**

Stable Diffusion, Midjourney v6+, DALL-E...

VR/AR

Scientific Accuracy

Pompeii

AI assembling artefacts with 95% accuracy

Dunhuang

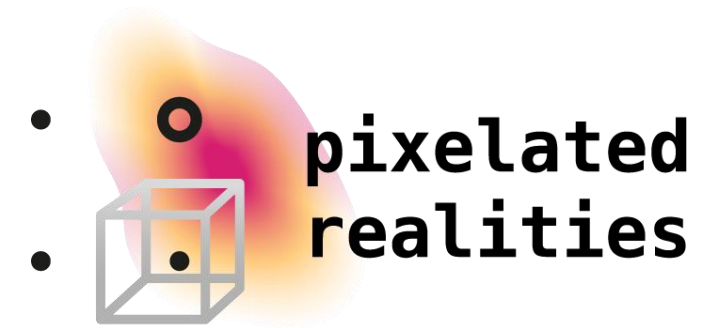Digital models with <2 mm error

Root4Dig Experience

Demonstrations at Northern University Center Baia Mare

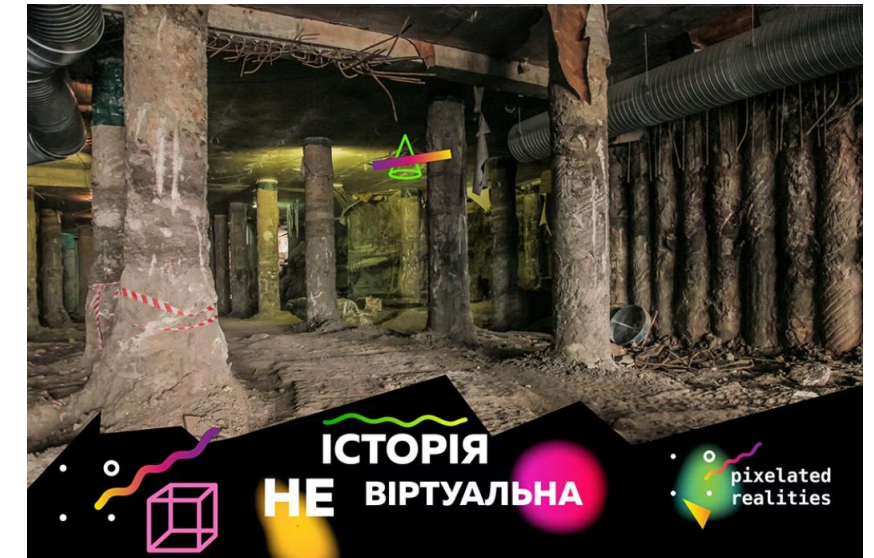**Techniques applicable for Ukrainian heritage**

Pixelated Realities — Ukranian NGO

3D models of war-damaged sites

Laser scanning, drone imagery, cross-polarisation for their work

Active use of AI for reconstruction & preservation

Education & Ethics

Learning Through VR/AR

- Interactive 3D tours of reconstructed sites

- More emotional and accessible learning

Ethical Rules

- Mark uncertainty in models

- Preserve raw scans and photos

- Expert verification required

Future Vision

1 **Digital Heritage of Ukraine**

Aiming for 1M+ digital scans of cultural sites.

2 **VR/AR tours**

Of places that are now closed because of the war; adding these tours to school and university programmes.

Conclusion

AI becomes a bridge between the past and the future.

Cooperation among government bodies, nonprofit organisations, international partners, and tech companies is essential.

With clear ethical rules, AI will not replace real history — rather, it will help preserve it for the next generations.