Scenario 1

LOST POLYCHROMY

This scenario is dedicated to **loss of polychromy**, especially in **classical sculptures**, on which only tiny traces of colours are still visible and what is left needs to be preserved carefully. PERCEIVE aims to develop a method **using AI** to reconstruct the original colours and communicate the process when data is limited, fostering **public awareness** and **sense of care** towards these artworks.

PERCEIVE aims to enhance the digital capabilities of scientists and cultural institutions through a service-based AI toolkit and new design theories for VR/AR/MR experiences, focusing on “Care,” “Accessibility,” and “Authenticity.”

Scan the QR Code and learn more!

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PERCEIVE

TOOLS & SERVICES

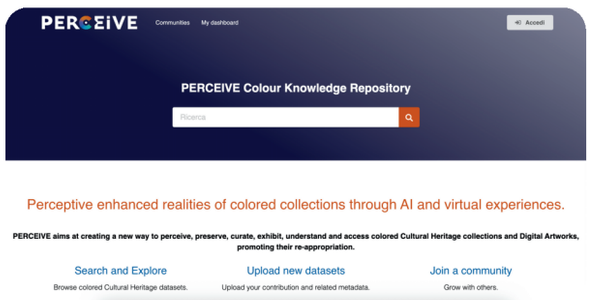
SCENARIO 1 / LOST POLYCHROMY

COLOUR KNOWLEDGE REPOSITORY

Marios Pitikakis, Sophia Sotiropoulou (FORTH)

The PERCEIVE Colour Knowledge Repository is an **open data management system** designed to **collect, structure, and openly share colour-related resources** in cultural heritage artworks.

From ancient polychrome sculptures to fragile painted surfaces, dyed textiles, and historical films, the repository enables users to **share documentation** and **simulation data on colour changes**, as well as data supporting the assessment of deterioration risks. It also supports sharing of protocols and workflows for preserving coloured collections and protecting them from further deterioration.

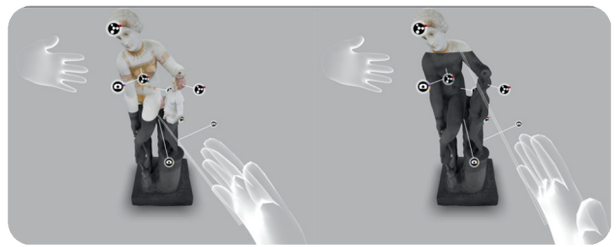


Designed for **collaborative research**, the repository brings together colour experts, scientists, museum curators, conservators, exhibition designers and education and communication professionals, working across physical and digital cultural heritage.

MULAX

Bruno Fanini, Marcello Massidda, Daniele Ferdani, Federica Bonifazi, Donata Magrini, Roberta Iannaccone, Cristiana Barandoni (CNR ISPC)

MuLaX is an innovative **Web3D tool** developed within the PERCEIVE project, enabling experts and the public to explore and analyse cultural heritage artefacts interactively. It allows to visualise **3D models** enriched with **analytical data from archaeometric surveys**, uncovering the details of the remaining ancient polychromy on the marble.



Built on the open-source **ATON framework**, MuLaX supports interactive discovery of analytical analyses, through an **annotation system for spot analyses** (e.g., microscopy, XRF and FORS), and **multi-layer visualisation** for imaging techniques like VIL and UVL. MuLaX also integrates **dynamic image-based masks**, enabling efficient annotation and semantic painting.

Through its connection with the PERCEIVE cloud, it facilitates remote data management and processing, enhancing collaboration among researchers. Additionally, WebXR support provides **immersive experiences**.

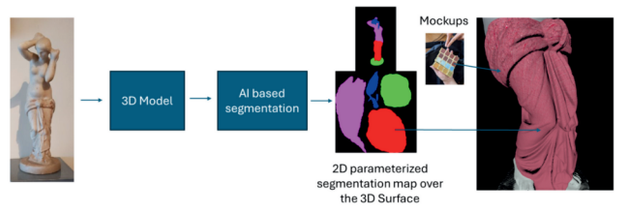
STYLESHADE3D

Saptarshi Neil Sinha, Isabel Yoko Arteaga Kiyomoto (NTNU), Andreas Zapf (Fraunhofer IGD), Donata Magrini (CRN ISPC)

The tool utilizes a hybrid approach that enhances and stylizes 3D models using deep learning techniques along with high-quality mesh and material generation.

It creates a **segmentation atlas** (2D parameterized segmentation map over the 3D surface generated using AI) to apply different styles and shading to various parts of the 3D model.

This approach combines the best of both **traditional and modern AI methods**, making it useful for creative industries and cultural heritage projects by producing high-quality results in a reduced timeframe.



We utilize **path planning, foundation models, stylization models, and advanced rendering techniques** to achieve our results as shown below for another use case.