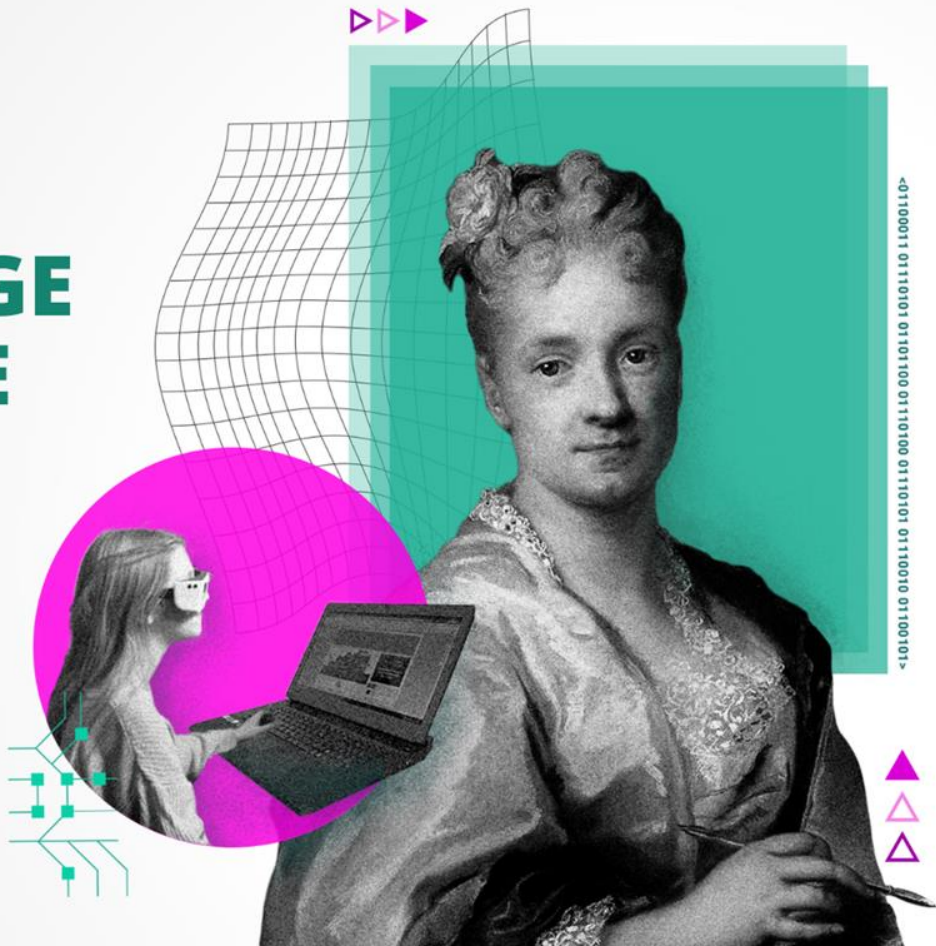


EuropeanaTech 2023

CULTURAL HERITAGE IN THE DATA SPACE AND BEYOND



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Creator: Ana Moreno Date: 2023 Institution: Europeana Foundation



Enhancing cultural heritage site exploration through object detection-driven Augmented Reality

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Augmented Reality for Digital Heritage

Immerse your audience

- Interacting with surroundings enriched with virtual elements
- Engaging attention
- Recreating conditions that are not easy to do in a non-virtual world or environments that don't exist anymore
- Experiencing concepts in novel ways
- Promoting enjoyment, engagement and even learning
- Acquiring knowledge and skills in an environment rich in sensations, perceptions and emotions



Archeological sites' specificities

Items one needs to tackle when thinking of digital heritage

- The demand of large-scale 3D reconstruction
- Lack of internet connection
- Inability to install sensors in the surroundings
- Variations in lighting and textures (i.e. flora changes)
- Visitors with smartphones of low demand in power and energy
- Very little existing information to track
- Dense archeological information

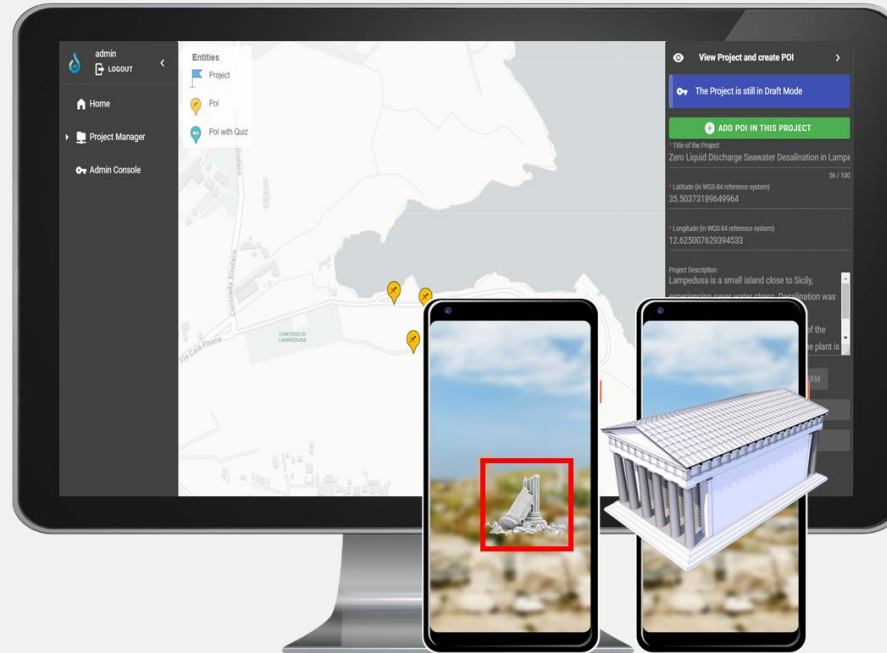


Localized simulation technology

- SLAM technology extracts the tracking information of the environment's point cloud
- Marker less and easy to use
- Performs well, especially in large-scale archeological sites to superimpose virtual reconstructions at real scale and in-place
- GPS can be used in addition to SLAM technology



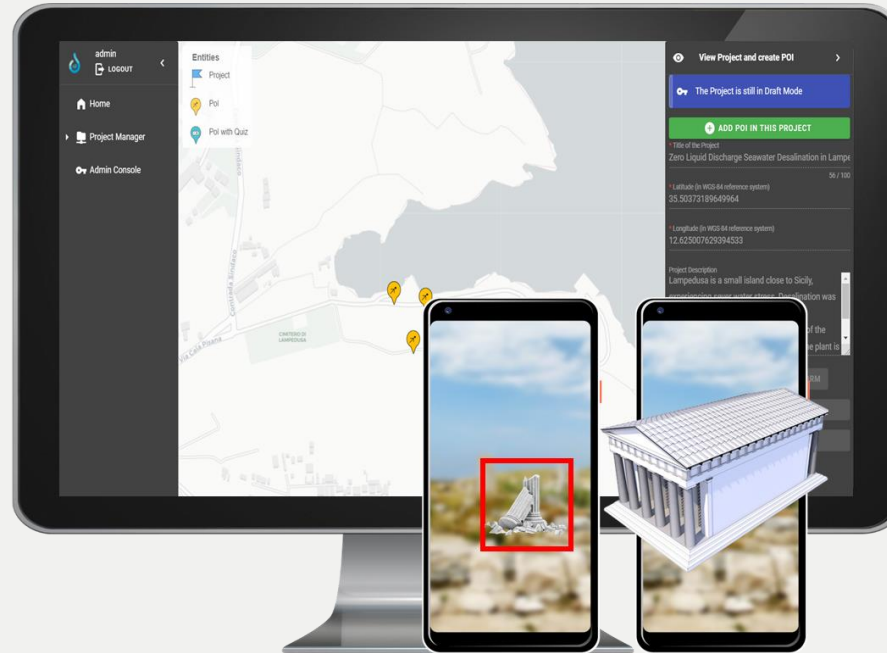
The CircularAR approach



A two-part solution

Web-based Content Management System:

- ✓ Creating an AR campaigns
- ✓ Deciding the number and location of Poles through the Pole manager
- ✓ Adding educational content through the Quiz manager
- ✓ Curating and customizing content

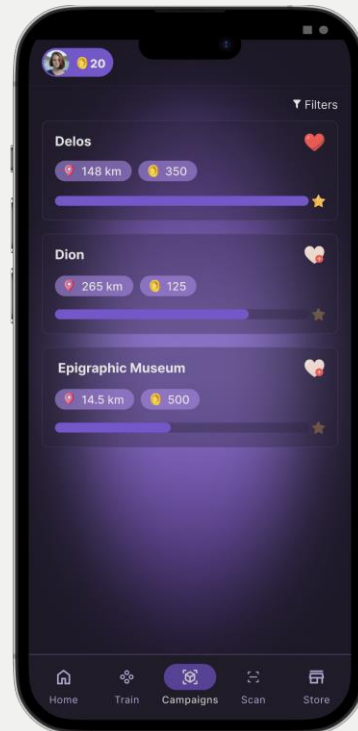


Mobile AR:

- ✓ Simple and easy to use
- ✓ Easy to customize content
- ✓ Accessible and portable
- ✓ Embedded sensors (e.g., motion, position, orientation)
- ✓ Camera functions (e.g., high resolution, depth of field)
- ✓ UI adaptability (e.g., finger interaction and manipulation)
- ✓ Gamification (e.g., social media interaction, badges, and leaderboards, virtual assistant)
- ✓ Educative mechanisms (e.g., collection of data, educational content, reports)

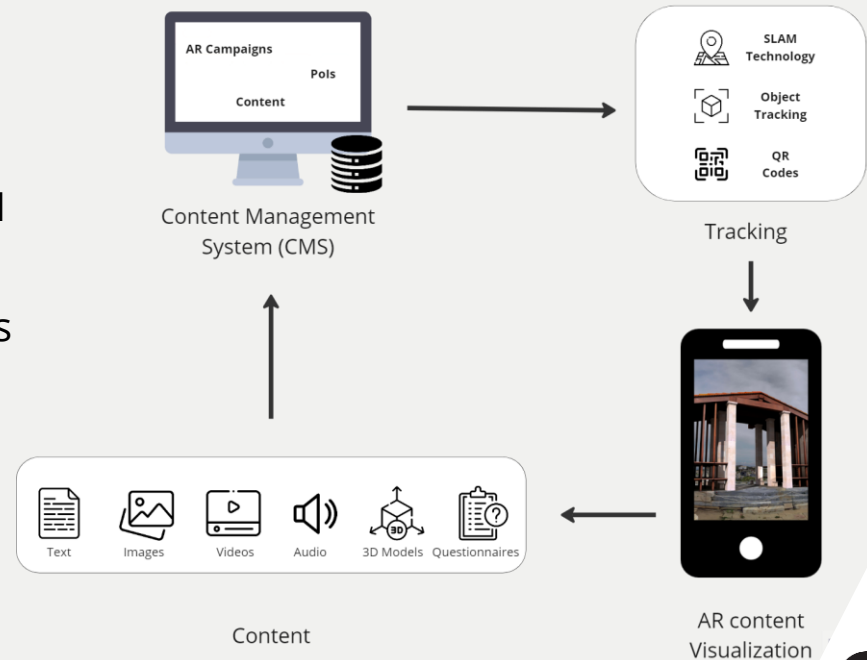
CircuAR for improving visitors' experience (1)

- Users can select a campaign stored in a Content Management System (CMS)
- Geolocated POIs with associated multimedia files appear on the map view



CircuAR for improving visitors' experience (2)

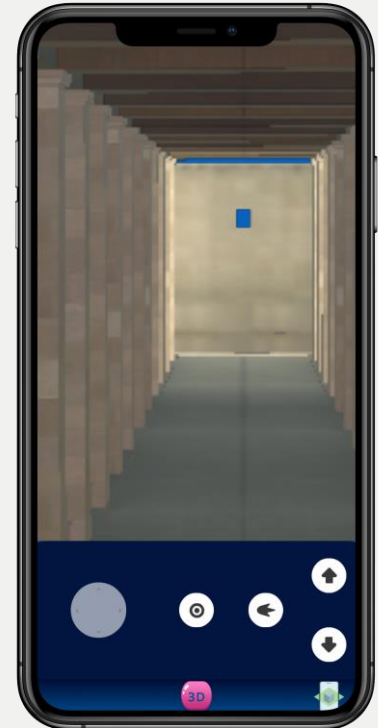
- Image and object trackers recognize precompiled targets assigned to each POI
- Upon successful registration the app depicts the corresponding augmentations
- Users can interact with AR content and complete assessments



CircuAR for improving visitors' experience (3)

More than just an AR app

- Screen 3D model viewer where user can rotate, scale and inspect the model
- VR mode allows users to navigate even in non accessible areas (first person camera)



Digitizing art for cultural heritage

- Use of physically based rendered (PBR) materials and baked shadows for photorealistic results
- Optimized data for performance and efficiency (low-poly models, 2K texture size)
- Scientific references and close collaboration with archeologists to archive historically accurate visualization



The Use Cases

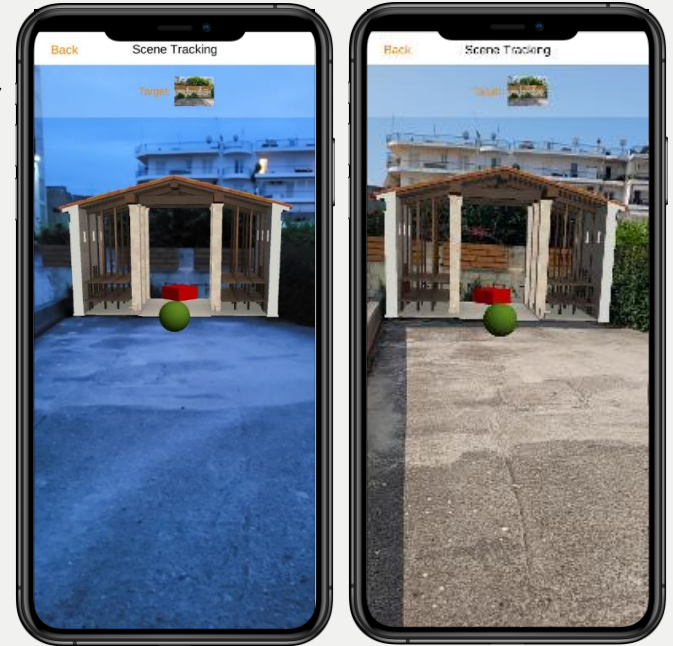
Two emblematic archaeological sites and a museum

- Islet of Delos
 - Athenian Temple of Apollo
 - Propylaea
 - House of Naxians
- Dion, Pieria
 - Episcopal Basilica
- Epigraphic Museum, Athens
 - Arsenal of Philo
 - Various objects (oars, sails, masts)



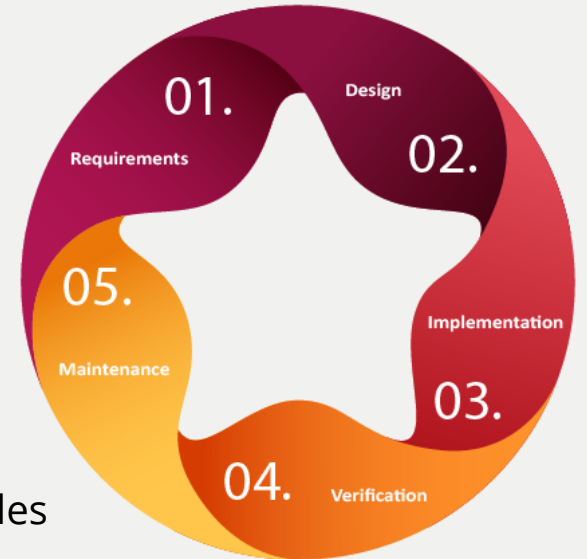
Testing and evaluation

- All functionalities have been tested against a set of pre-defined metrics by a team of beta testers (12 participants) at the Athens Epigraphic Museum
- The testers were able to assess the functionalities of object tracking
- The testers successfully finalized the AR flow and viewing in 3 different modes
- Tracking was tested in different times of the day (morning/evening)




Remarks and future studies

- Test by a team of archaeologists at the afore-mentioned use cases
- Get accurate and timely feedback
- Evaluate functionality and usability
- Assess tracking efficiency in diverse weather conditions
- Evaluate by real visitors (surveys, questionnaires, interviews, focus groups and A/B testing)
- Make improvements in several development update cycles



Thank you!



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Greece 2.0
NATIONAL RECOVERY AND RESILIENCE PLAN



Funded by the
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