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Revisit the Past: Castle of Kolossi

With Ray-Ban Meta and AI

EUROPEAN UNIVERSITY OF TECHNOLOGY

Erasmus+

Digitisation of Cultural Heritage Project for DaCaDu

CONTENTS

01. INTRODUCTION AND SCOPE

This project explores how c**ultural heritage can be strengthened through digitisation,** using Kolossi Castle as a case study. It was produced as the final project of an Erasmus course attended by multiple EUT+ partner universities, **with mixed teams formed to ensure representation across institutions.** Cyprus University of Technology hosted the programme, and our team focused on translating on-site research into a historically grounded digital story. **The work ran from 9 Feb to 23 Feb,** moving from research and prototyping into a completed media output. Our aim was to communicate not just the castle as an object, but its wider cultural role in shaping the valley during medieval peak periods.

The scope covered historical and architectural research from the on-site brochure and supporting online sources, a field visit to capture real-world reference media, **and production of a reconstructed "back in the day" prototype using AI-assisted workflows**. Teams were composed of participants from Cyprus University of Technology (host), Hochschule Darmstadt, Riga Technical University, Technical University of Sofia, and the University of Cassino and Southern Lazio.

Our group specifically was required to use the Ray-Ban Meta glasses, so we scoped the build around transforming our captured footage into a medieval re-visualisation while preserving the castle's structure and proportions. **The final deliverable was a stitched video prototype with narration and supporting visuals, produced within the course timeframe.**

To see the final Video,
scan the QR code or
click the link

https://youtube.com/shorts/u-P8XkAx-Ow?feature=share

02. BECOMING EXPERTS Research Consolidation and Shared Baseline

11 February to 12 February

2.1 Define the research goal

We set out to understand Kolossi Castle's **historical role, architectural character, and surrounding landscape** so we could represent it accurately in our experience (castle form, defensive features, and the wider production estate).

2.2 Gather sources and references

We collected information from two main inputs:

- The official brochure available on site (Department of Antiquities, Cyprus).
- Supporting online material to cross-check key claims (dates, function, architectural features, and site context).

2.3 Field visit and on-site verification (11th Feb 2026)

Fig 01: Sketch made of the castle on site

On **11th February 2026**, the team conducted a **field visit to Kolossi Castle.** During which:

- Read and documented the **site brochure** and extracted the most relevant historical and architectural details.
- **Confirmed on-site features** mentioned in the brochure (overall keep form, roof/terrace defences, entry arrangement, and nearby industrial remains).
- Collected **additional information online** to validate and complement the brochure's narrative.

2.4 Capture real-world reference media for the prototype

During the same visit, we recorded first-person videos using Ray-Ban Meta glasses. These videos were later reviewed, clipped, and referenced to support scene accuracy, and they were ultimately incorporated into the current prototype.

Fig 02: Ray-BanMeta Gen 2

2.5 Synthesize the historical timeline

Using the brochure and online research, we consolidated the core history into a clear sequence:

Fig 03: Infograpic timeline generated by Chat GPT 5.2 based on detailed timeline prompt

02. BECOMING EXPERTS Research Consolidation and Shared Baseline - Continued

3.6 Extract the architectural “rules” to guide reconstruction

We translated the research into design constraints we could apply consistently:

- **Classic Crusader keep form:** compact, square, three-storey stone complex designed primarily for defence.
- **Defensive elements:** arrow slits, machicolations, battlements, and roof parapets/ terrace for surveillance and protection.
- **Entry logic:** elevated, defensible access historically associated with a drawbridge approach.
- **Integrated complex:** the keep and bailey/courtyard relate directly to nearby aqueduct and sugar production remains, linking protection with production.

Fig 04: Castle elements generated by Chat GPT 5.2 based on a detailed timeline prompt
DISCLAIMER - The inside of the castle structure is wrong

03. PITCH AND PROTOTYPE

12 February to 13 February

3.1 Concept and intent

Since using the **Ray-Ban Meta** glasses was part of our instructional scope, we decided to repurpose the **photos and videos** we captured on-site and use **AI-based editing** to add and remove objects. The goal was to transform modern footage into a believable "back in the day" view of Kolossi Castle—without losing the authenticity of real-world perspective.

More specifically, we wanted to communicate the **cultural significance** of the site and show how the castle helped shape the **valley's economy and identity** at its medieval peak—linking military presence, estate management, and production into one cohesive story.

3.2 Prototype output

As an initial proof of concept, we produced a **prototype image (Prototype 1)** showing the castle and its surroundings altered toward a medieval setting (e.g., replacing modern background elements with period-appropriate landscape and settlement cues, and introducing small-scale human activity).

3.3 Two implementation pathways considered

We explored two possible approaches to producing the final "back in the day" visuals:

3.3.1. Approach A: 3D reconstruction + AI video generation (high complexity)

- Build a 3D model of the castle and surrounding terrain.
- Find an AI tool that can interpret a 3D layout/scene map and generate a coherent video from it.
- We identified this as technically complex and were unsure which AI tools could reliably understand 3D geometry well enough to produce consistent, historically believable output.

3.3.2. Approach B: AI video object editing (prompt-based, lower complexity)

- Use an AI tool that can take the real Ray-Ban Meta videos and, through prompting, add and remove objects (e.g., remove modern buildings, insert medieval villages, add people/knights, adjust landscape elements like vineyards).
- This felt more direct and achievable for a prototype, but we were still uncertain which AI tools would support the level of controlled, frame-consistent editing needed to produce a satisfactory medieval reconstruction video.

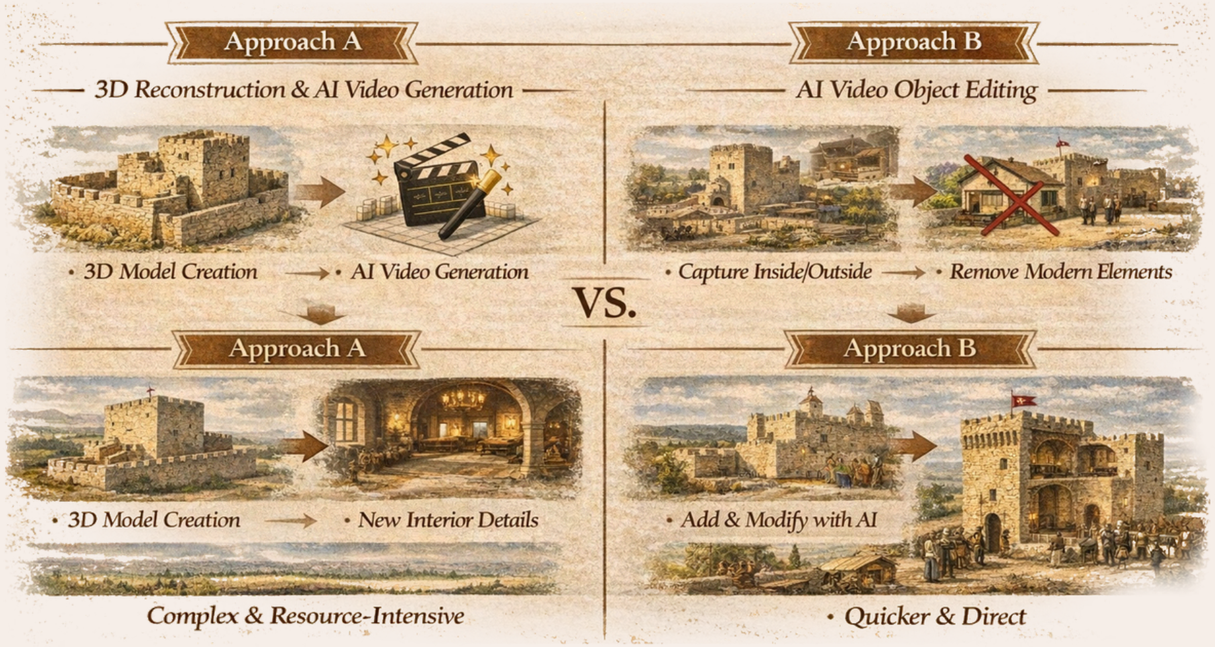


Fig 05: Comparison of Approaches A and B generated by Chat GPT 5.2 based on a detailed prompt
DISCLAIMER - The inside of the castle structure is wrong

03. PITCH AND PROTOTYPE Continued

3.4 Apply findings to the environment and storytelling

We converted the research into a historically grounded setting:

- **Immediate castle interiors populated** with small-scale period activity (knights, workers, merchants) without changing the castle's proportions.

3.5 Output to the prototype

The **combined outcome of brochure extraction, online verification, and the Ray-Ban Meta field recordings informed the current prototype**, ensuring the castle's form, defensive logic, and economic context (wine/sugar estate) are represented as a coherent "place," not just a standalone building.

Fig 06: A picture taken at the Casle of Kolossi by team

Fig 07: Prptotype 1 generated by Chat GPT 5.2 based text prompt

04. PRODUCTION PROCESS

18 February to 23 February

4.1 Initial approach decision and constraint

We initially chose to test **Approach B (prompt-based AI video object editing)**—editing the Ray-Ban Meta videos directly by adding/removing objects to reconstruct a medieval version of the site.

In practice, this proved difficult because **no free or university-provided AI tools were capable of doing this reliably.** Even if a tool was available, there was still a s**trong risk that current AI quality and consistency would not meet the standard required** for a believable historical reconstruction.

4.2 Adopted workflow (frame-based pipeline)

To overcome the limitations of direct video editing, we shifted to a frame-based workflow:

4.3.1. Break videos into frames

- We extracted the Ray-Ban Meta footage into individual frames.

4.3.2. Select keyframes

- We chose a set of keyframes that best represented the scene and camera movement.

Fig 08-12: Frames selected to edit from the Ray-Ban Meta Video

4.3.3. Add editor notes for keyframes

- Each selected keyframe received an editor note specifying what should change.

  e.g., remove modern elements, add medieval features, and preserve the castle's structure and proportions.

4.3.4. Attempt "back in the day" generation (initially unsuccessful)

- Early AI generations were not usable because the model hallucinated details and lost internal architectural structure, changing the castle geometry rather than preserving it.

Fig 13-17: Images generated by Adobe firefly (Fig 13-15) and Chat GPT 5 (Fig 16-17) with only a text prompt

4.3.5. Generate historically styled keyframes with Adobe Firefly

- We used **Adobe Firefly** with detailed composition prompts to generate improved keyframe images while **maintaining the original layout.**

  Prompt - Historically accurate medieval people standing and sitting on the windowsill, drinking wine, laughing, talking. Use Yellow area for people

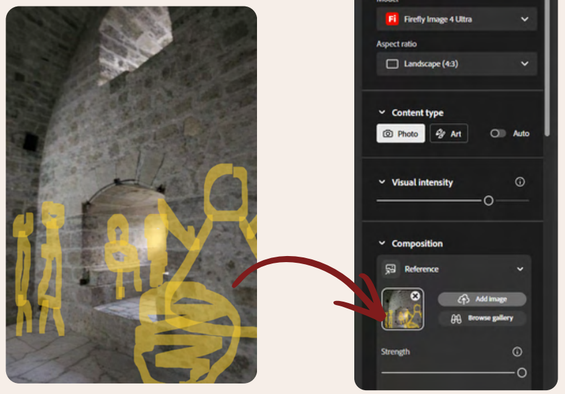


Fig 18: (Left) Image prompt given to Adobe Firefly
Fig 19: (Right) Screenshot of Adobe Firefly with Image prompting

04. PRODUCTION PROCESS Continued

4.3.6. Manual cleanup in Photoshop

- **We manually corrected larger AI errors** (major hallucinations, distorted edges, incorrect structure) to enforce the constraint: do not change the castle's shape, elements, or proportions.

4.3.7. Generate in-between frames (temporal continuity)

- **Using pairs of frames as anchors,** we generated intermediate frames to rebuild motion between keyframes while minimising structure drift. **Each pair worked as a "start" and "end" constraint for the AI,** so the model had less freedom to reshape the castle or invent new geometry.
- Tools used included: Gemini 3 (Nano Banana Pro), Google Labs Flow, Google Veo 3, and Runway Gen-4.5.

4.3 Final assembly and delivery

After producing the reconstructed clips: We,

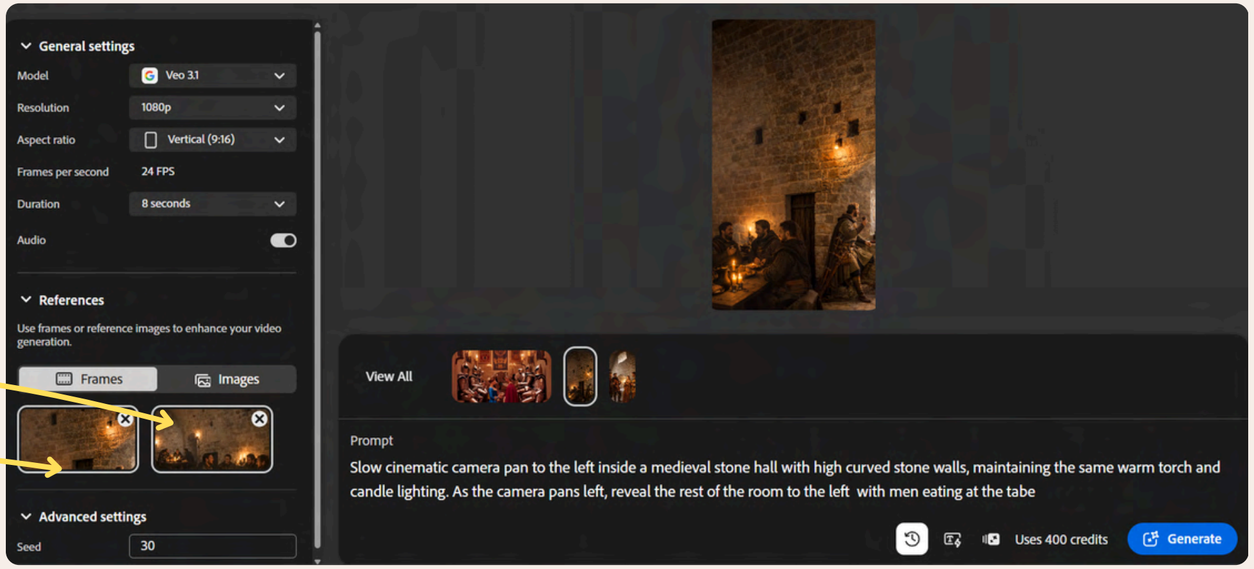
- **Stitched the videos together** (with AI-assisted generation where needed).
- Wrote a script and **generated a voiceover using ElevenLabs.**
- **Added a music** track from YouTube.
- Generated a cover page and credits page using Adobe Firefly.

With these steps completed, the video prototype reached a finished state.

Fig 20: Example "Start" frame prompt given to AI to generate a sequence in between

Fig 21: Example "End" frame prompt given to AI to generate a sequence in between

Fig 22: Screenshot of Veo 3.1 Promting page to generate a sequence of images and then a video from a "Start" and "End" frame



04. CONCLUSION

This project combined a site brochure, online cross-checking, and a field visit (11 Feb 2026) to ground our interpretation of Kolossi Castle in accurate history and defensible architectural constraints. **We used Ray-Ban Meta footage as an authentic reference and transformed it into a "back in the day"** visualisation to highlight the castle's cultural and economic significance in shaping the valley.

When direct AI video editing proved unreliable with available tools, **we shifted to a frame-based pipeline:** keyframe generation, manual correction, and anchored in-between frame synthesis to preserve structure. **Overall, the workflow shows how heritage storytelling can be rebuilt from real footage while controlling hallucination and structure drift.**

Table 01: Comparison matrix of AI tools used for this project

AI tool (rows)	Pros (for this project)	Cons (for this project)
Gemini 3 – Nano Banana Pro (image editing)	Strong for high-control image edits and iterating quickly on keyframes; good for "surgical" changes when the goal is keep composition, change details.	Primarily an image tool in this context—doesn't solve full video consistency by itself; you still need a separate pipeline for temporal continuity.
Google Labs Flow (Veo-powered filmmaking)	Useful for rapid experimentation on short clips and creative iteration; credit-based access makes it workable for prototyping.	Generation is clip-based, so long scenes require many runs; continuity across shots often needs extra anchor frames and manual selection.
Google Veo 3 (video generation)	Supports frame-specific generation (first/last frame) which helps keep scenes stable while changing details between frames.	Credit limits and per-generation cost can restrict iteration; quality varies across retries.
Runway Gen-4.5 (video generation)	High-quality short clip generation; good for in-between clips when you already have strong reference frames.	Can be costly for longer outputs; risk of structure drift (castle geometry changing) unless tightly constrained.
Adobe Firefly (image generation / extend)	Very effective for keyframe creation, background replacement, and controlled variations; integrates smoothly into Adobe workflows.	Still images are easier than video—requires separate steps to achieve consistent motion; can look "AI-clean" without manual cleanup.
Photoshop (manual cleanup)	Essential for fixing large hallucinations, restoring architectural accuracy, and enforcing "don't change castle shape" constraints.	Time-intensive and manual; becomes a bottleneck when outputs frequently contain structural errors.
ElevenLabs (voiceover)	Fast voiceover generation, useful for quickly iterating narration without studio recording.	May require multiple takes to get tone/pacing right; credit limits can constrain longer scripts depending on tier.

SOURCES

Research sources

On-site brochure (primary source)

- The actual brochure collected from the Kolossi Castle site (Department of Antiquities, Cyprus).

Online references

Cyprus Department of Antiquities. (n.d.). Kolossi Castle (Monuments entry). Ministry of Culture, Republic of Cyprus. https://www.culture.gov.cy/dmculture/DA/DA.nsf/All/715C0A5218C174DFC225719900331A09?OpenDocument=&print=

Cyprus Tourism Organisation (Visit Cyprus). (2016, March). Kolossi Castle [Brochure PDF]. https://www.visitcyprus.com/wp-content/uploads/2016/03/Kolossi_Castle_afigisi_en.pdf

Edbury, P. W. (1991). The kingdom of Cyprus and the Crusades, 1191–1374. Cambridge University Press.

White, P. (2024, June 18). Commandaria: Revival of the ancient ways. The World of Fine Wine. https://worldoffinewine.com/travel/commandaria-ancient-sweet-cyprus-wine

(Optional) Cyprus Tourism Organisation (Visit Cyprus). (n.d.). Kolossi medieval castle. https://www.visitcyprus.com/discover-cyprus/culture/sites-and-monuments/kolossi-medieval-castle/

Research sources

- Audio generated from an original script using ElevenLabs AI.
- The Vault of Ambience. (n.d.). Cozy Tavern – Music & Ambience [YouTube video]. YouTube. https://www.youtube.com/watch?v=O738AtAwacI

Research sources

- Ray-Ban Meta (capture device for first-person photos/video)
- Adobe Firefly (image generation, image extend)
- Adobe Photoshop (manual cleanup and correction)
- Gemini 3 (Nano Banana Pro) (keyframe / image edits)
- Google Labs Flow (clip experimentation / Veo-powered workflow)
- Google Veo 3 (video generation, including anchored frame workflows)
- Runway Gen-4.5 (video generation / in-between clips)
- ElevenLabs (voiceover generation)

PROJECT DETAILS

Course: Digitisation of Cultural Heritage Project for DaCaDu

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