Summary
This course will engage novel approaches for visualizing and interacting with cultural heritage archives in immersive virtual environments.

Content
Today we mine data: tomorrow we will sculpt it*
‘Cultural Data Sculpting’ at the intersection of two dynamic phenomena, the ever-expanding heterogeneous digital archives, in conjunction with their visualization in immersive, interactive display systems. This course will engage novel approaches (with computational challenges) to creating innovative applications for visualizing and interacting with these cultural heritage archives.

This course is located at a new laboratory researching the forefront of experimentation in galleries, libraries, archives and museums. This lab contains a wide scale immersive, interactive virtual reality and augmented reality systems including a 360-degree 3D panoramic projection screen and a 4K fulldome. Students will have access to these state-of-the-art systems to design and build their applications. Emphasis is on the development of a new approach to digital cultural archives in these omnidirectional and hemispheric systems.

Students will have access to already existing digital cultural archives including structured and unstructured data. These include the CERN archives, a Leonardo Da Vinci image archive and a subset of the Montreaux Jazz Festival archive. Students will work together in small teams to focus on specific aspects of the application design and programming, culminating in an interactive installation.

The race will use a unity 3D platform, running across a powerful PC cluster and / or single IG as required. Aspects of signal processing, machine learning and data analysis are useful but not mandatory prerequisites.

Course outline:
1. Introduction to cultural data sculpting / Introduction to eM+ / Introduction to Unity engine
2. History of media art & Theorization of Digital Cultural Heritage
3. Fieldwork trip (TBC)
4. Introduction to datasets (CERN; MJA & more)
5. Introduction to visualization frameworks at eM+ with case studies
6. Project team /data structuring / HCI / software requirements
7. Project design I
8. Project design presentations / Project development I
9. Project development II
10. Project development III
11. Project development III / Project integration I
12. Project integration II
13. Project integration III
14. Evaluative frameworks for immersive systems (I Sho U) / Final presentation

No mandatory prerequisites

**Recommended courses**
- Applied Data Analysis
- Signal Processing and Machine Learning for Digital Humanities
- Introduction to Digital Humanities

**Important concepts to start the course**
- Working knowledge of Unity 3D
- Interactive Computer Graphics
- Interaction Design

**Learning Outcomes**
By the end of the course, the student must be able to:

- Assess / Evaluate key methodological concepts for displaying and interacting with cultural archives in museum settings.
- Decide the potential of different digital archives for immersive and interactive visualization
- Explain the design of omnidirectional or hemispheric real time interaction with cultural archives
- Create omnidirectional or hemispheric real time applications for cultural archives
- Apply practical programming knowledge to omnidirectional visualization in immersive virtual reality

**Transversal skills**

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Demonstrate a capacity for creativity.
- Manage priorities.
- Communicate effectively with professionals from other disciplines.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Make an oral presentation.
- Write a literature review which assesses the state of the art.
- Write a scientific or technical report.

**Teaching methods**
- Theoretical lectures
- Exhibitions and installation experiences and critiques
- Applied project design, development and delivery

**Expected student activities**
- Two short essays
- Design concept (as part of a group of 3-4 - written)
- Final project (as part of a group of 3-4 - practical)
- Group work
- Design critiques
- Evaluation

**Assessment methods**
- Short essay 1 (written) - 10%
- Short essay 2 (written) - 10%
- Design concept (written / group work) - 50%
- Final project (practical / group work) - 30%
Supervision

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