

AI FOR CH: ENABLING A PARADIGM SHIFT IN THE ERA OF CLIMATE CHANGE? Artificial Intelligence for Monitoring, Analyzing, and Reacting to the Climate Change impact on Cultural Heritage

Session

This session focuses on the potential of Artificial Intelligence (AI) in addressing the challenges posed by climate change to Cultural Heritage (CH). We welcome interdisciplinary research and innovative case studies showcasing AI-based solutions in various aspects of CH, tangible and intangible, including real-time surveying and assessment, predictive modelling and Digital Twins, management and decision-making, public engagement also for a sustainable and symbiotic development based on CH resources, as well as in education.

Topics of interest include, but are not limited to:

1. **MONITORING.** Real-time remote sensing and monitoring to assess the vulnerability of CH sites to climate change-related phenomena and the foreseeable risks
2. **MODELLING.** Predictive and causal modelling and Digital Twin focussing on climate change impacts on CH sites and assets, also in view of decision-making based on scenarios
3. **REACTING.** Risk assessment and mitigation, and disaster management, in the context of climate change and CH
4. **PLANNING.** AI-assisted conservation and restoration strategies informed by climate change predictions as well as local community awareness
5. **ENGAGING AND EDUCATING.** AI-driven public engagement and education to enhance understanding of climate change impacts on CH, fostering collaboration and community involvement in the preservation process, also through affective computing, personalized communication and contents, and Human-In-The-Loop approach. AI-powered virtual and augmented reality experiences for CH aiming at community feedback, consensus and decision making
6. **RESEARCHING.** Multimodal tools and natural language processing for the analysis of historical climate data and its effects on cultural heritage. Self-driven research direction towards knowledge gaps in the available materials
7. **DISCOVERING.** AI-driven discoveries based on multimodal knowledge accrual. Multimodal brainstorming with AI to help solving Cultural Heritage "puzzles" in the reconstruction of hidden data layers.

We encourage interdisciplinary approaches and collaborations between CH professionals, AI-researchers, conservators, archaeologists, climate change scientists, policymakers, and alike

Motivation

The threat to CH by climate change – with the ever-extreme weather and climatic conditions spreading across the globe – are challenging specialists with unexplored issues, which seem to

require very innovative and fast actions to secure the preservation as well as the proper experience thereof.

The convergence of multiple digital technologies with emerging AI tools and approaches may hopefully counterbalance the accelerated pace at which climate change is threatening CH, allowing for widespread monitoring, preservation and fruition of sites and artifacts, yet with limited human resources and affordable tools.

Among others, AI methods seem particularly well-suited to:

- "make sense" of overflowing data, also real-time and multimodal, managing to make educated guesses based on ever changing real-time data flows, allowing for predictive or even causal modelling (e.g. using Bayesian causal networks) and cross-domain fertilization (see C);
- "register" models with the real world, thus allowing for reliable scenario evaluation (e.g. through AI-powered Digital Twins. See D);
- explain itself, along the paradigm of the explainable AI (XAI), thus allowing for uses where accountability and explainability are key (see A);
- allow humans – both researchers and communities – to cooperate among themselves and with AI (e.g. through the Human-in-the-Loop paradigm, as well as common symbolic "languages" such as graph databases and shared ontologies. See E).

Multidisciplinary could and should then be fostered in view of such new approaches, which will – in turn – allow for a potentially much wider cooperation across knowledge realms and expertises, and even include the public at large.

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Target Audience

Cultural heritage professionals, AI and machine learning researchers, conservators, archaeologists, climate change scientists, policymakers, and disaster management experts.

Keywords

#Cultural Heritage #Artificial Intelligence #Climate Change #Digital Twin #Disaster Management