Title: Beyond Retrieval: An Epistemic AI Architecture for Accountable Cultural Heritage Research

Abstract:

Current AI systems for cultural heritage prioritise retrieval and synthesis, yet rarely account for the epistemic conditions under which heritage knowledge is produced. This paper introduces Heritage Lens Agent, a multi-agent research system designed to make those conditions explicit.

The system was developed from a multimodal Retrieval-Augmented Generation prototype built around doctoral research on Olmec urbanisation within the *Ruta de la Obsidiana* project. The Olmec case is not incidental: it is a civilisation whose record is structurally incomplete, filtered through colonial documentation, and subject to ongoing interpretive contest. Working with this material made clear that surfacing what a system cannot find or cannot verify matters as much as what it can retrieve. Heritage Lens Agent operationalises this principle through a coordinated architecture comprising a Retrieval Agent, Synthesis Agent, Critical Agent, and a structurally distinct Epistemic Agent, which explicitly reports absence, bias, interpretive limits, and confidence levels alongside each response.

The paper advances three contributions. First, it proposes an architectural shift from retrieval-based pipelines to epistemically explicit systems. Second, it reframes AI in cultural heritage not as an information tool but as interpretive infrastructure, one responsible for making the construction of knowledge visible rather than concealing it behind apparently authoritative output. Third, it positions epistemic transparency as a structural requirement, not an optional feature, when working with culturally sensitive and underrepresented materials, responding directly to digital colonialism critiques of heritage digitisation.

The project was selected for the final evaluation round of the HackXelerator AR26 competition (Ethics, Agency and Societal Impact track; 37 submissions), recognised for conceptual clarity and innovation in responsible AI. The system is presented as a working prototype, and this paper maintains that transparency as a methodological commitment in itself.

Submission type: Paper

Keywords: epistemic AI, multi-agent systems, cultural heritage, RAG, digital colonialism, interpretive transparency