

POESIS: A New Tool for Aiding Human-Centered, Computational Art History (PLOS One, Forthcoming).

In this paper, we study visual patterns within a set of Roman wall paintings using computational modelling methods. These include 1) the automatic processing of images using computer vision methods; 2) the recognition of complex patterns within the data using spectral methods; and 3) visualizing the results in an interactive, web-based interface. This project's primary audience(s) include computational scientists, digital humanities scholars, classicists, art historians, and archaeologists. We hypothesize that the workflow developed for the initial case study in the project can aid in detecting new patterns within a set of images. Such an approach could, in turn, allow scholars to collect, search, and visualize a given set of images from a different perspective. We demonstrate the value of this approach using a set of Roman wall paintings dating from the 2nd century BCE and the 2nd century CE. The geographic distribution of the images is concentrated in the Bay of Naples. It includes images from Ostia, Ephesus, and Rome.

That the present study concentrates on this material is a combination of practical and methodological reasoning. At the core of our approach is the notion that expert interpretation is central to analysing works of art. Art historical specialists use a compendium of knowledge developed over a lifetime to interpret relationships between things in the visual and material record. Consequently, we pursue a "Human in the Loop" approach that enables the automatic generation of interactive graphs in a web-based framework. These graphs specifically show that advanced application of methods such as Singular Value Decomposition analysis can enhance a typical workflow for finding related images. We demonstrate the value of this approach with a set of Roman wall paintings. To conclude, we discuss how the workflow that we present here might be generalized and used on additional image-based datasets, such as visualizing the concentrations of specific iconographic themes across various sites in antiquity.