

## **S32. From artificial intelligence to stratigraphic reality. Dynamics of an inverse process for AI applications in archaeology (Standard)**

Convenor(s):

*Luigi Magnini, University of Sassari*

*Cinzia Bettineschi, University of Padova*

Recently, artificial intelligence (AI) has become increasingly important in many archaeological fields, as testified by the growing number of publications, dedicated workshops, and sessions at international conferences (Schneider et alii 2015; Sevara et alii 2016; Ortengo, Garcia-Molsosa 2019; Davis 2019; Caspari, Crespo 2019; Dolejš et alii 2019; Fiorucci et alii 2020). Object-Pattern-Scenery Recognition, Machine Learning, Convolutional Neural Networks and ArchaeOBIA constitute some of the most widespread methods. These approaches are driving renewed innovation and experimentation in archaeological image analysis at the multi-scale level, further encouraging the shift from qualitative classification and interpretation to a truly quantitative and reproducible approach (Bennet, Cowley, De Laet 2014).

The initial burst of blind enthusiasm for AI derived from its numerous accomplishments is now being followed by a more reasoned reflection on the limits imposed by the very nature of archaeological sites and materials. In fact, the intrinsic incompleteness of the available data, especially the problems of equifinality and multifinality, rarely allow for a comprehensive and univocal classification of the archaeological objects even within the same or very similar case studies (Magnini, Bettineschi 2019; Casana 2020).

This session welcomes theoretical reflections, but also successful and not-so-successful case studies which highlight the synergy between artificial intelligence and the study of formation/transformation/postdepositional processes. The focus is multi-scalar, encompassing landscape-level, but also object-level and microscopic-level applications and their peculiar issues (e.g. partial obliteration, fragmentation, alteration, weathering and so on). This session is particularly interested in contributions focused on special assessment methods, from remote cross-validation, to classic fieldwork, to statistical and mathematical approaches.

Our aim is to stimulate a profitable discussion on the limits, potential, and the future directions of automated image analysis in archaeology, stressing possible new directions for overcoming the uniqueness and incompleteness of the archaeological record. Ideally, the session aims to bridge the gap between the shovelless computer-archaeologists working from their couches and the 'old trowels', who claim the primacy of fieldwork and look with suspicion at new practices involving a fully digital, analytical protocol.

We particularly encourage authors to submit papers related to the following research questions:

- What are the strengths and weaknesses the different AI methods (OPSR/CNN/ML/OBIA) in coping with the incompleteness of the archaeological record?
- What can we learn from a theoretical reflection on stratigraphy, formation processes and objects biographies in order to improve (semi)automated classifications?
- How can we integrate the diachronic evolution of materials and landscapes into automated classification protocols?

- What can we learn from modeling and comparing the efficiency of digital and field-based assessment strategies?
- Is a real integration of field archaeology and automated detection possible? And if so, which is the expected impact of this interaction?

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