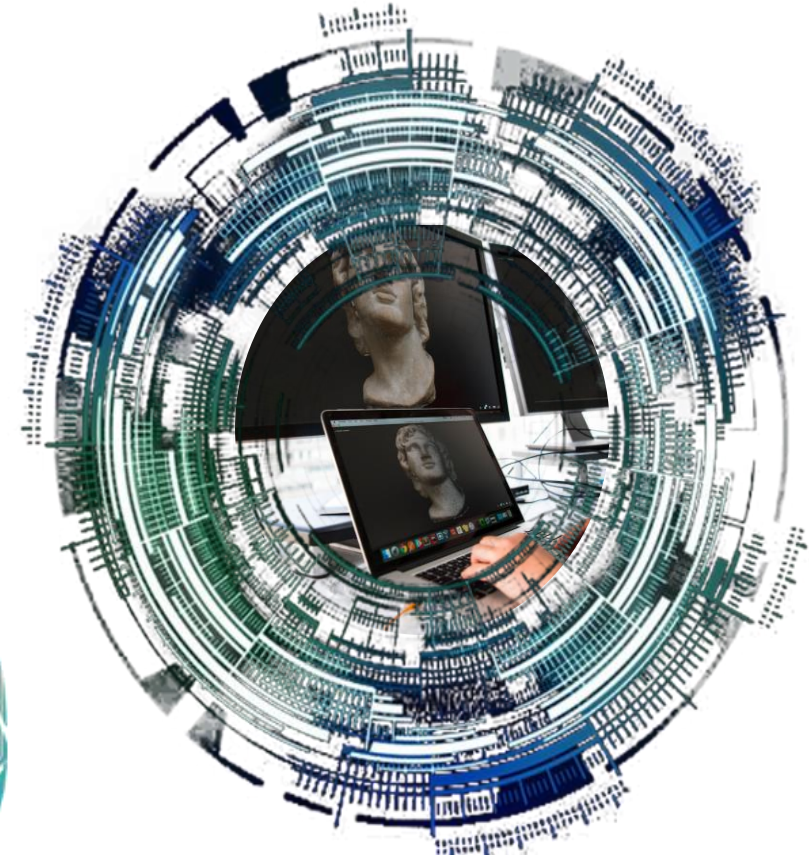
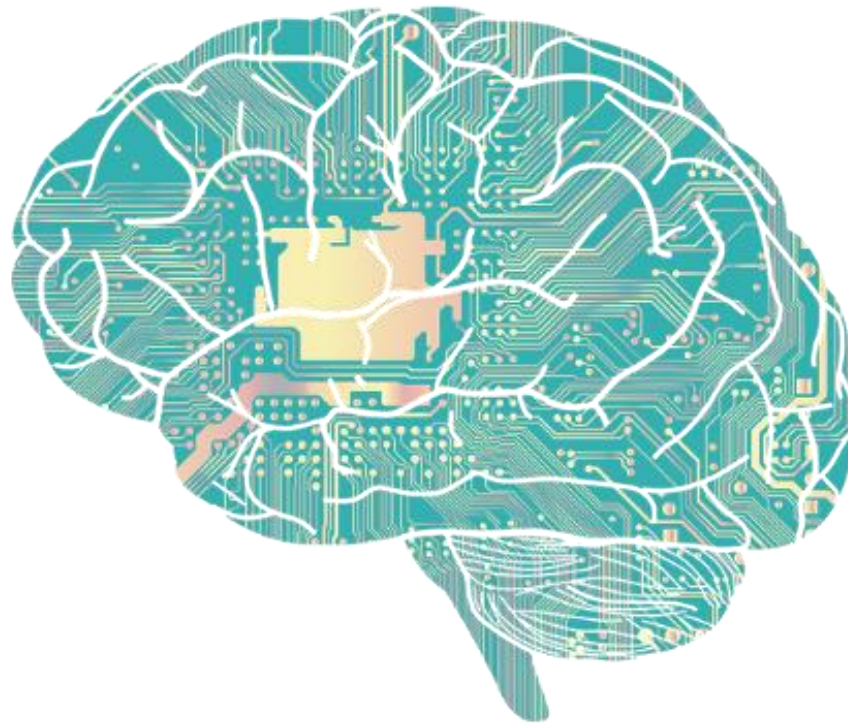
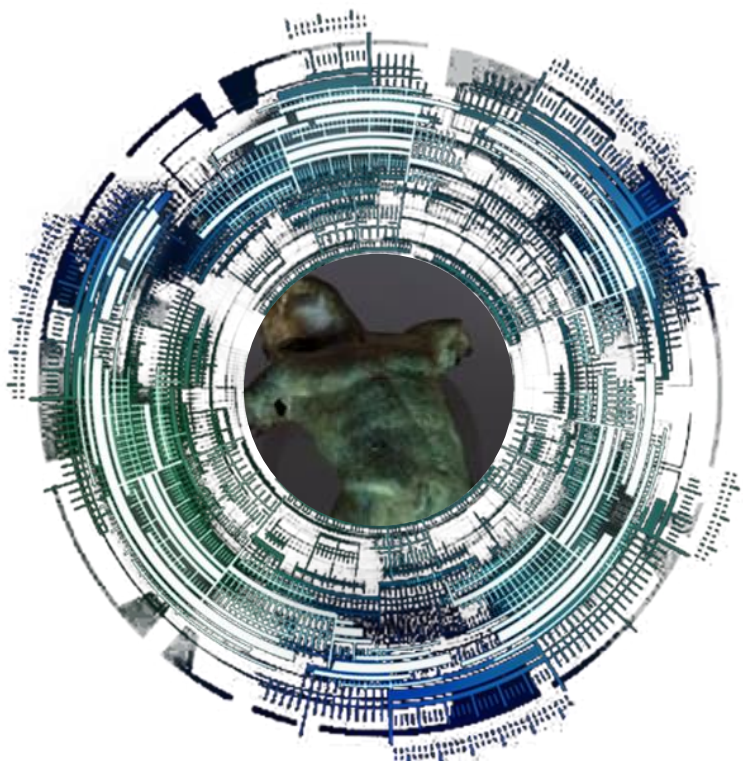


9<sup>th</sup> Plenary session (online) of the Steering Committee for  
Culture, Heritage and Landscape (CDCPP)

# Artificial Intelligence applications to Cultural Heritage

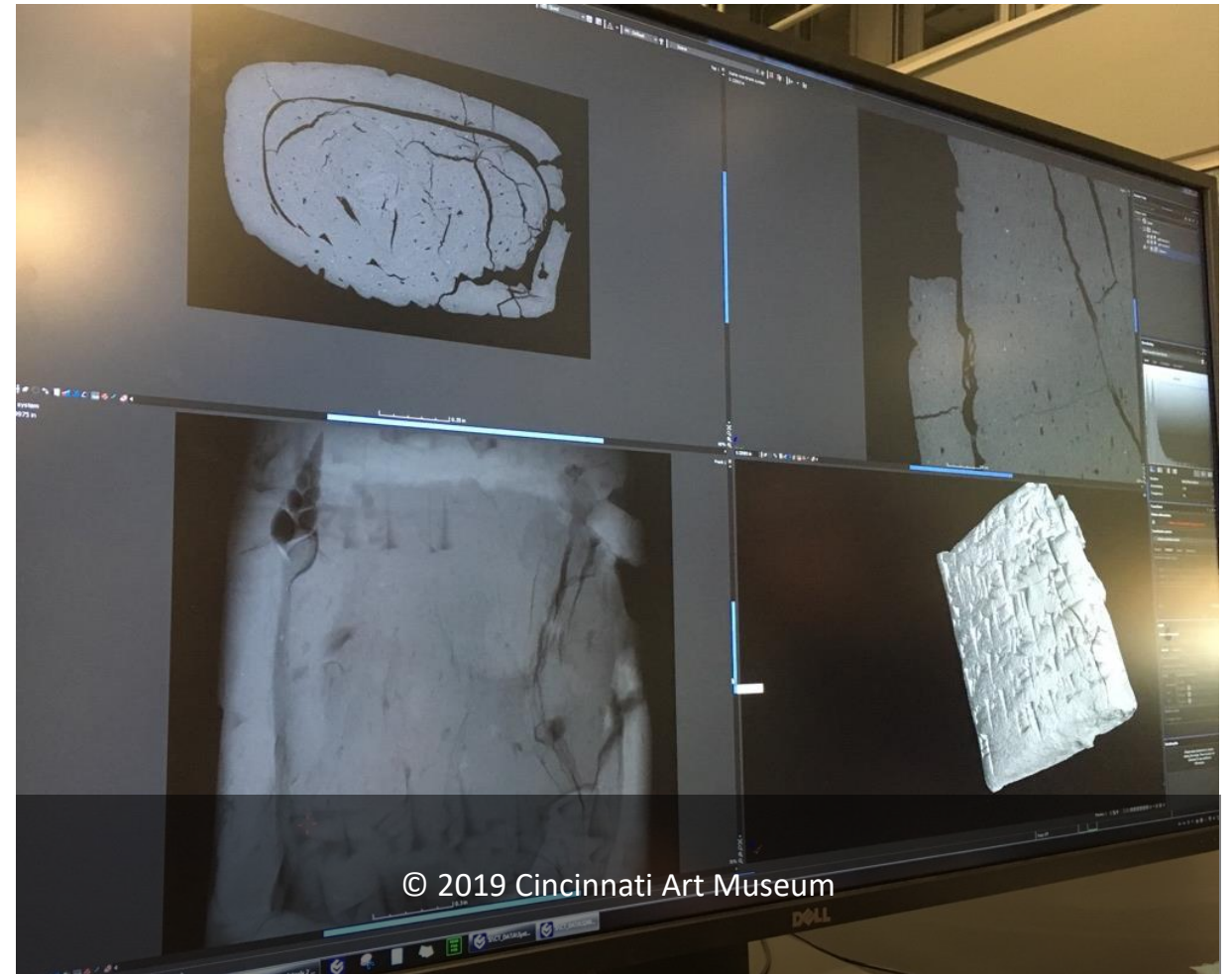
Arianna Traviglia  
Italian Institute of Technology

Propelling us to the  
future of the Past





CDLI Cuneiform Digital Library Initiative

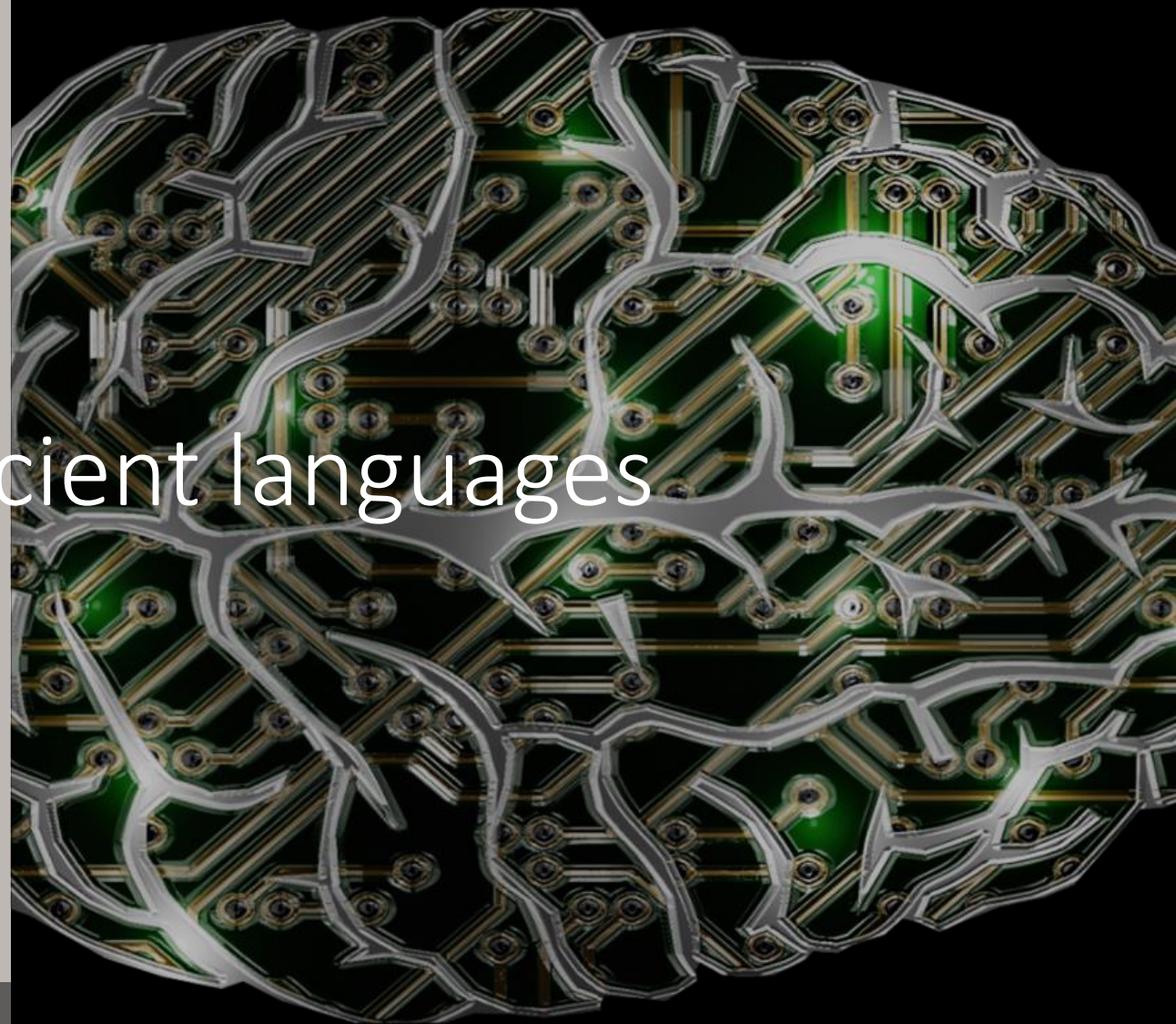


© 2019 Cincinnati Art Museum

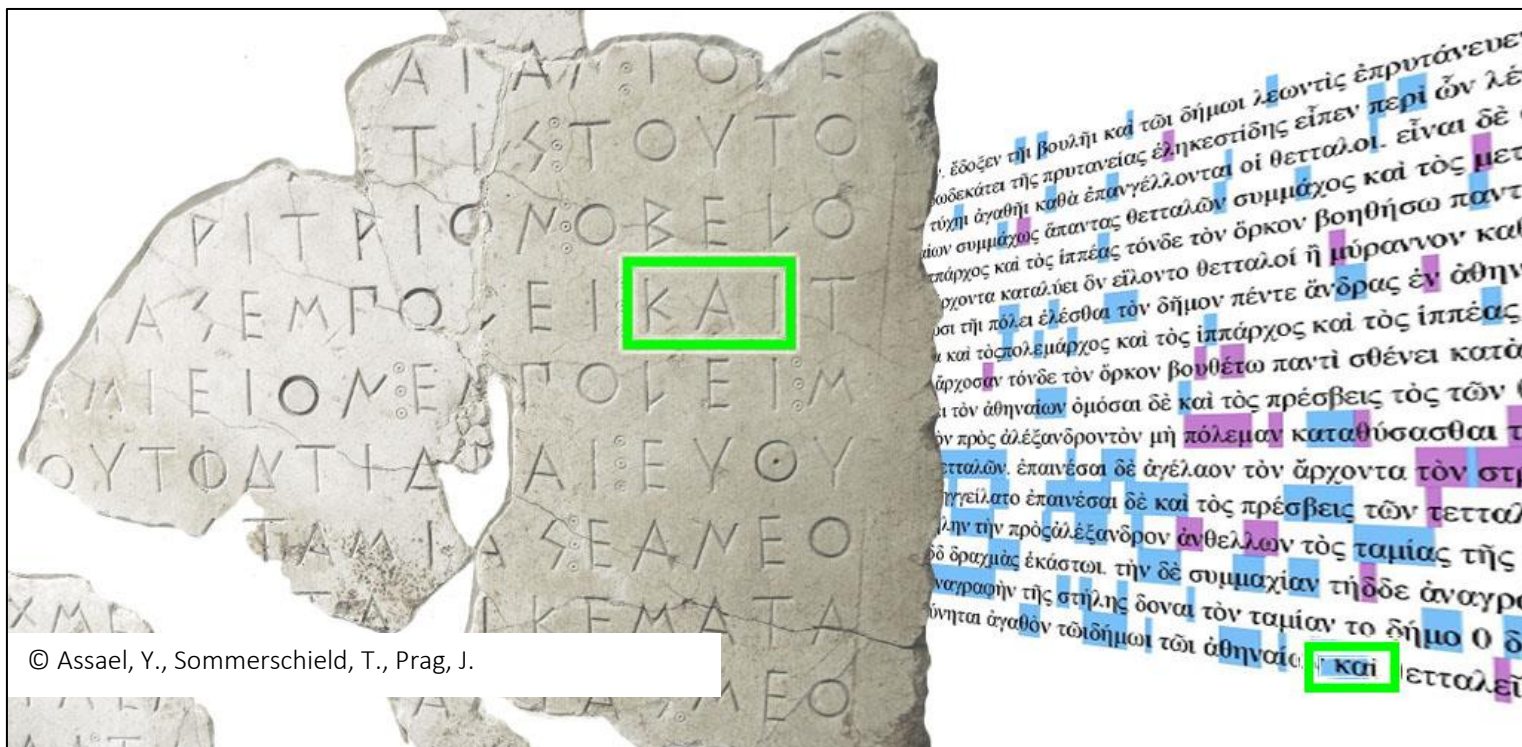
# Deciphering ancient languages



# Deciphering ancient languages



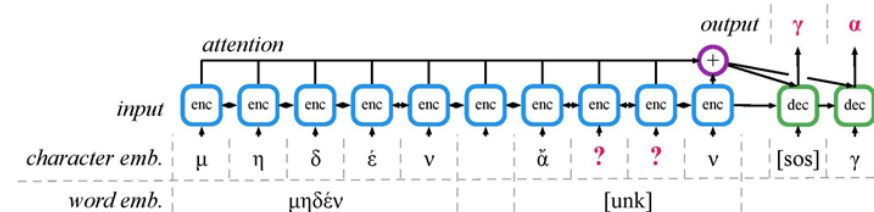
# Restoring Ancient Text Using Deep Learning



© Assael, Y., Sommerschild, T., Prag, J.

Sample restoration of the inscription IG II 2 116. Restorations are in blue when correct, purple when incorrect.

Model architecture:



Restoration performance:

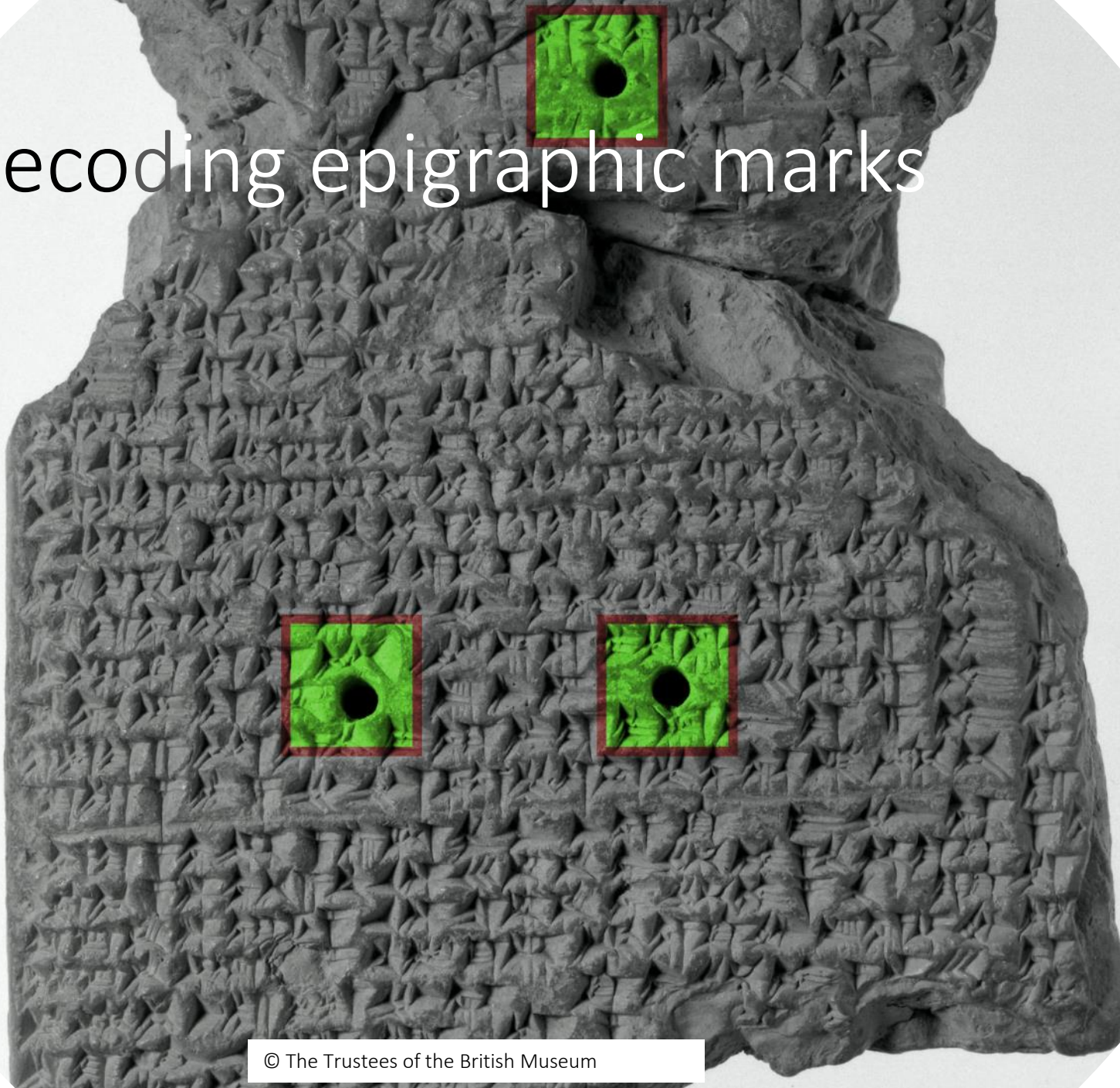
Method	CER	Top-20
Ancient Historian	57.3%	—
<b>PYTHIA-BI-WORD</b>	<b>30.1%</b>	<b>73.5%</b>

Lower is better

70% restoration accuracy

Top-20 predictions were correct 73% of the times

# Decoding epigraphic marks



© The Trustees of the British Museum

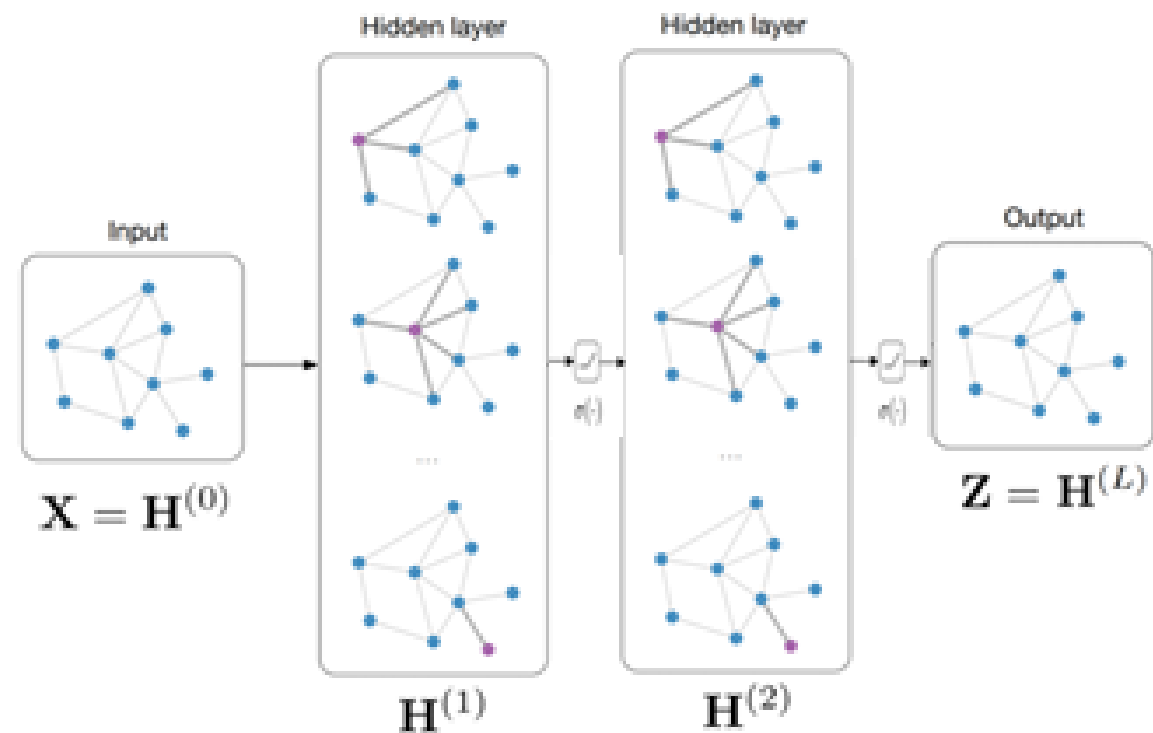
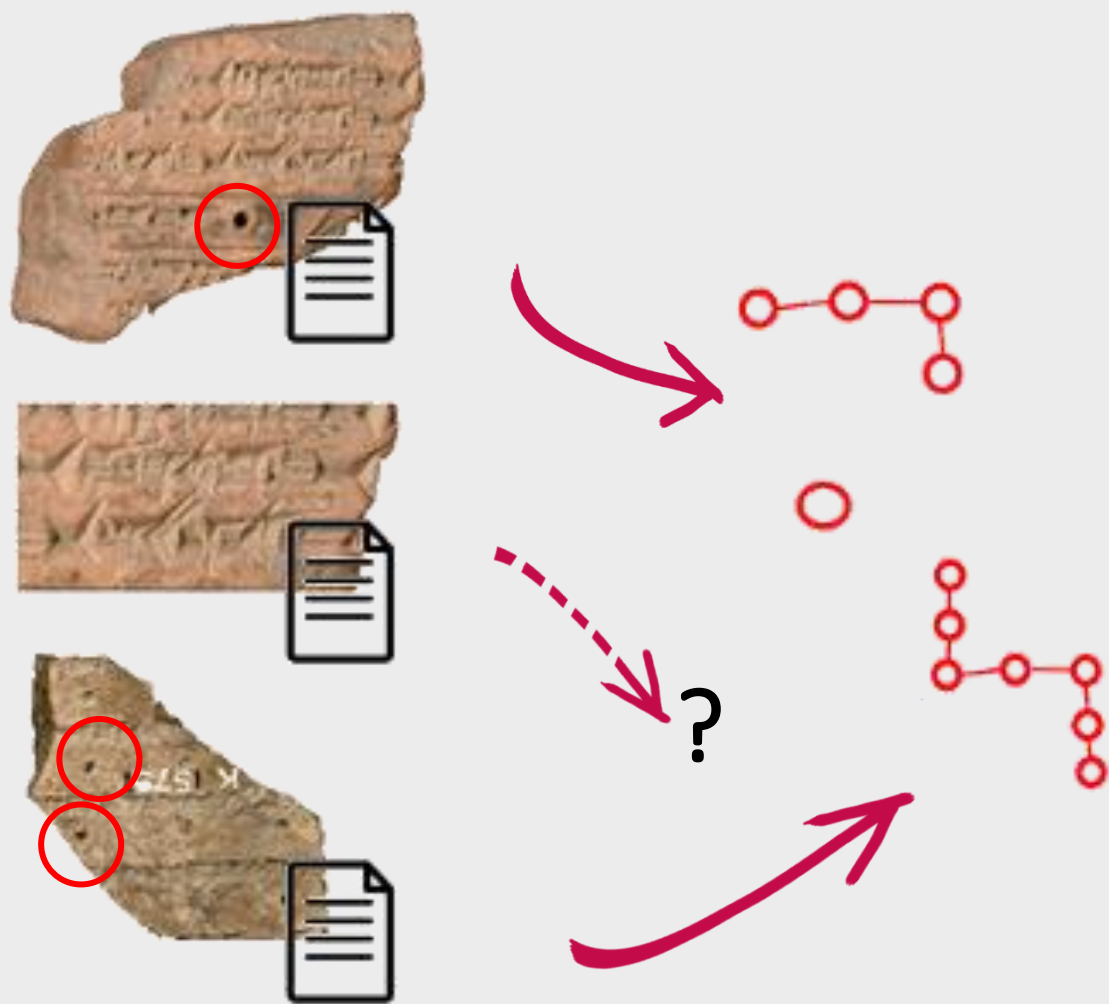


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Ca' Foscari  
Venezia



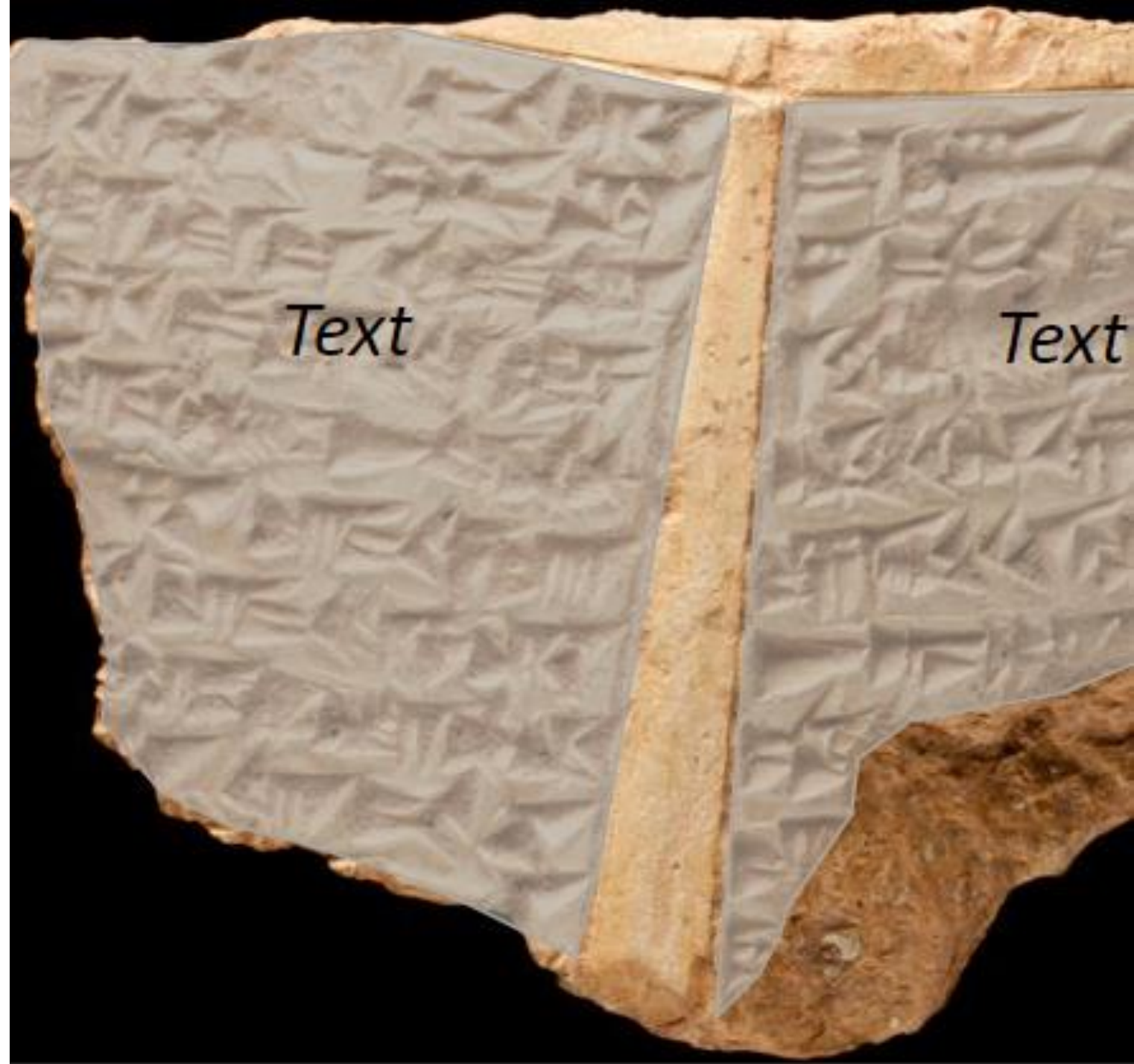
ISTITUTO ITALIANO  
DI TECNOLOGIA

# Decoding epigraphic marks



# Extracting layout from Cuneiform tablets

Segmentation of 2D tablet images:  
text part, degraded part, etc.

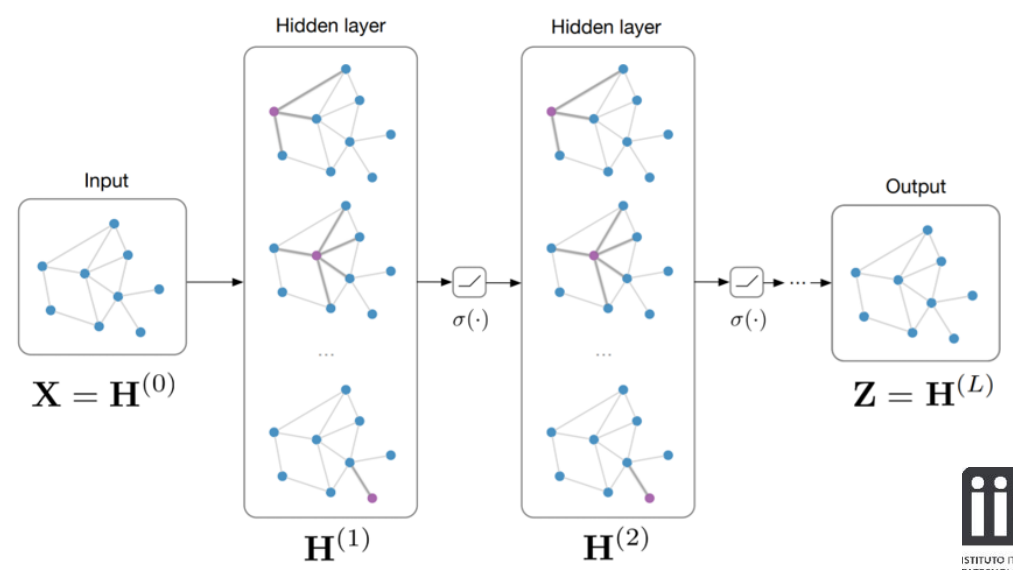
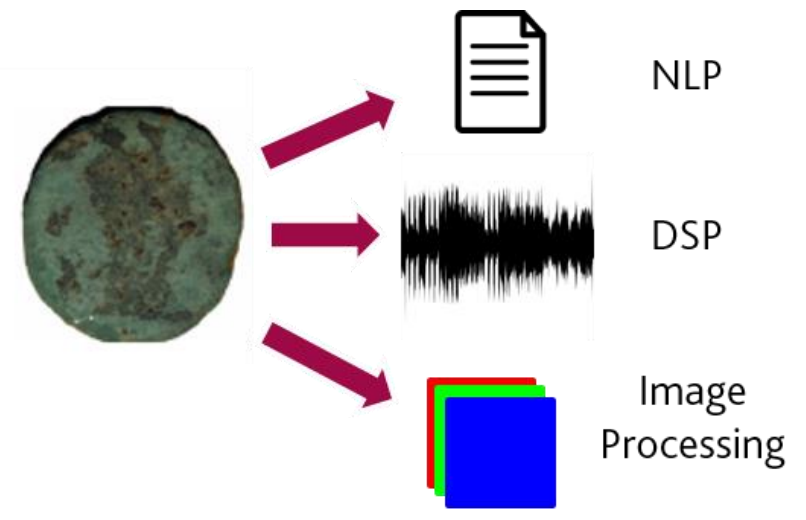
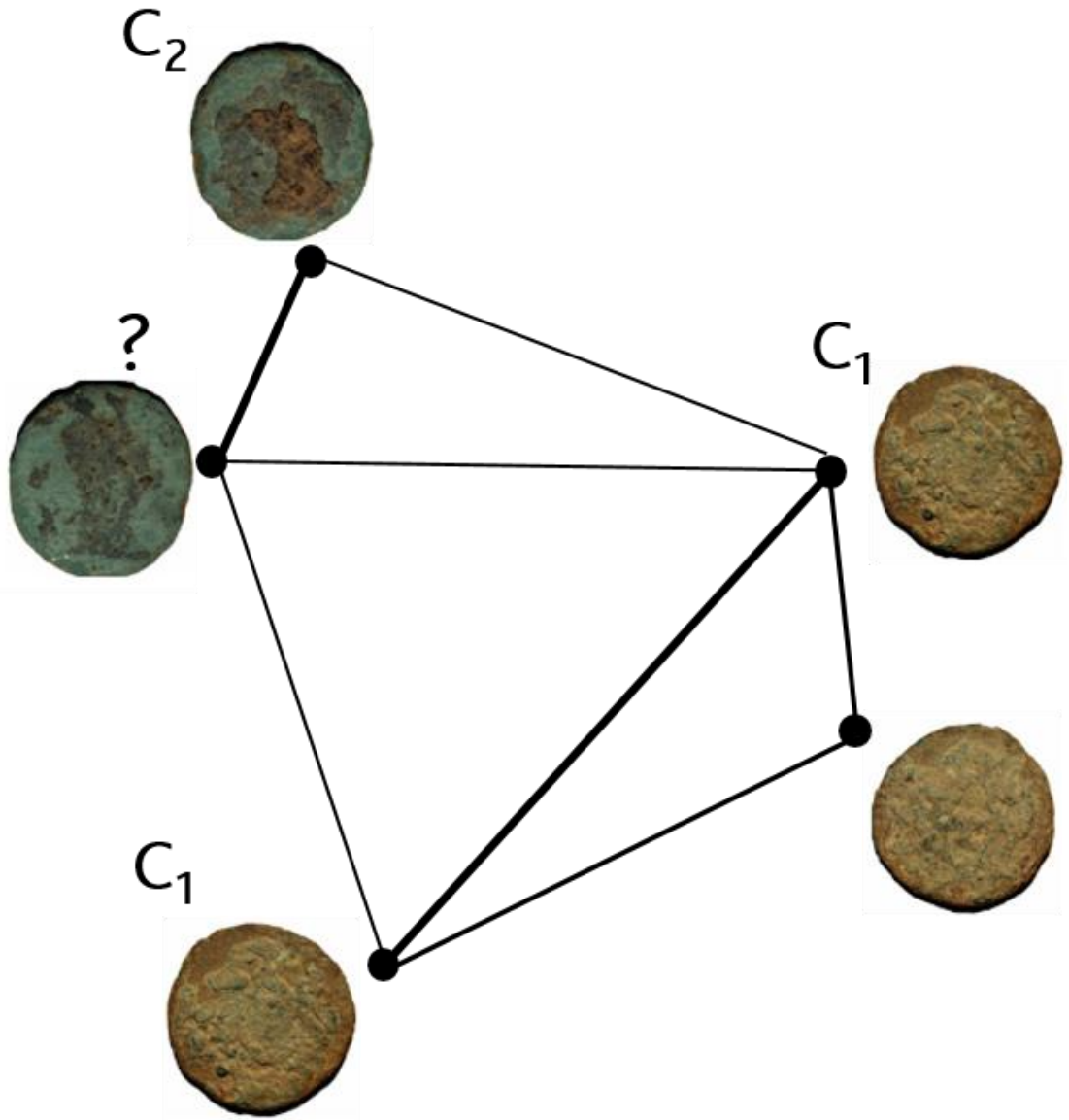


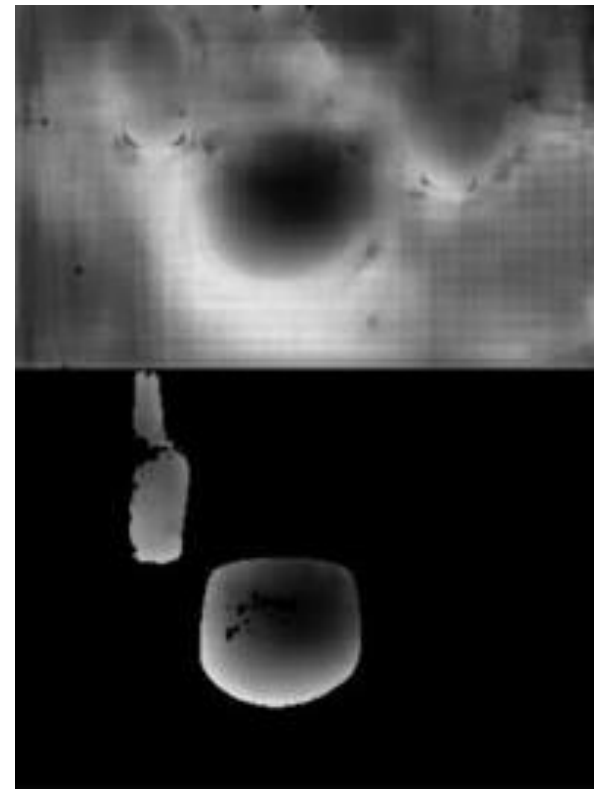
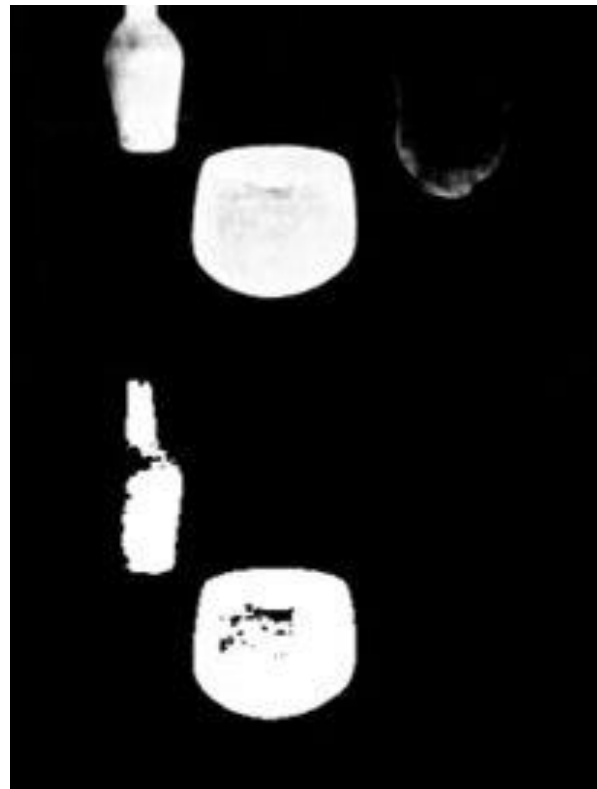
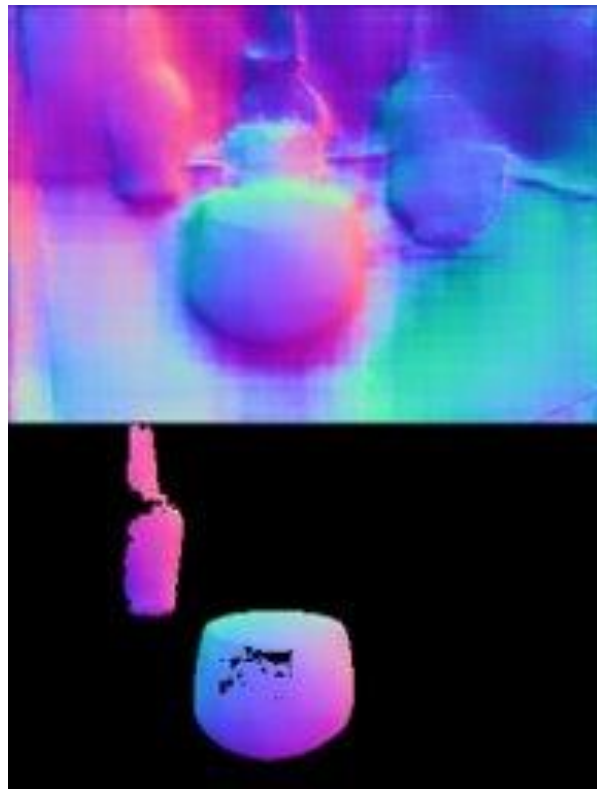




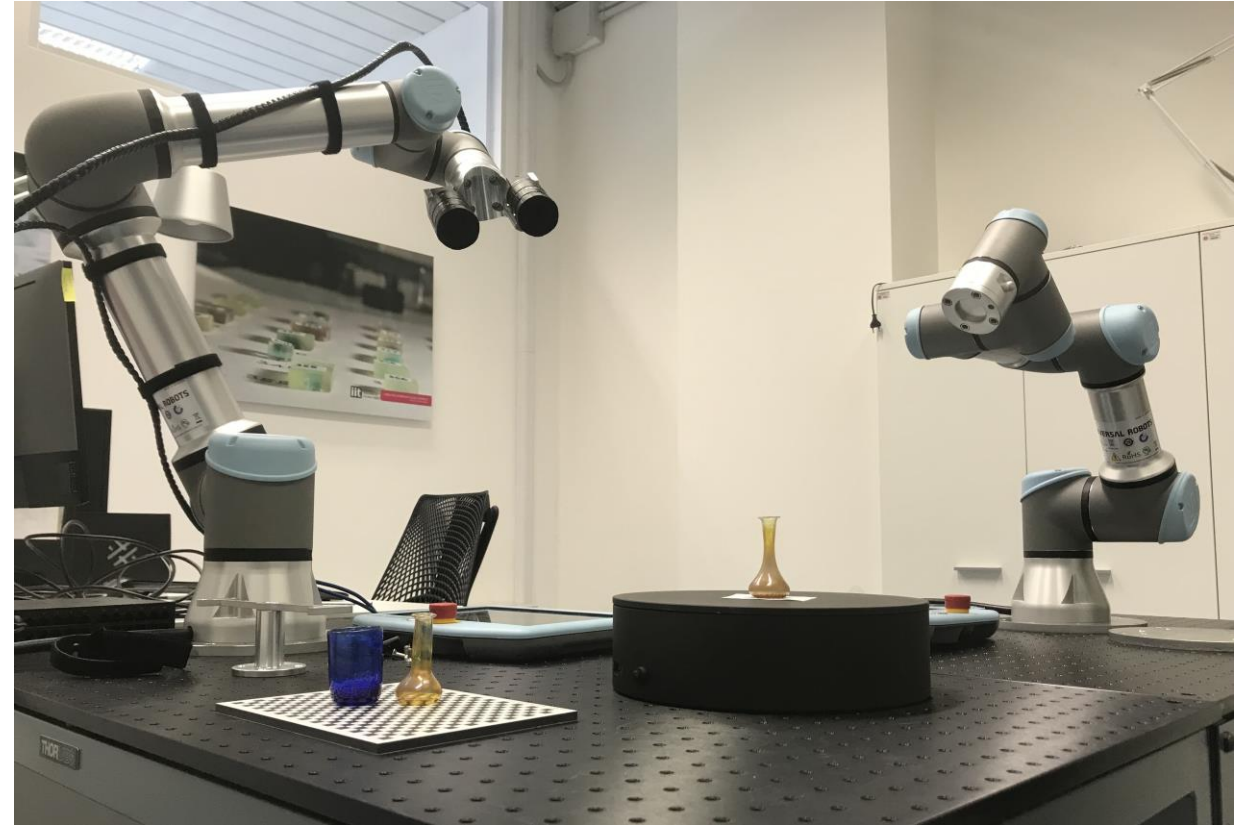
Automatic identification



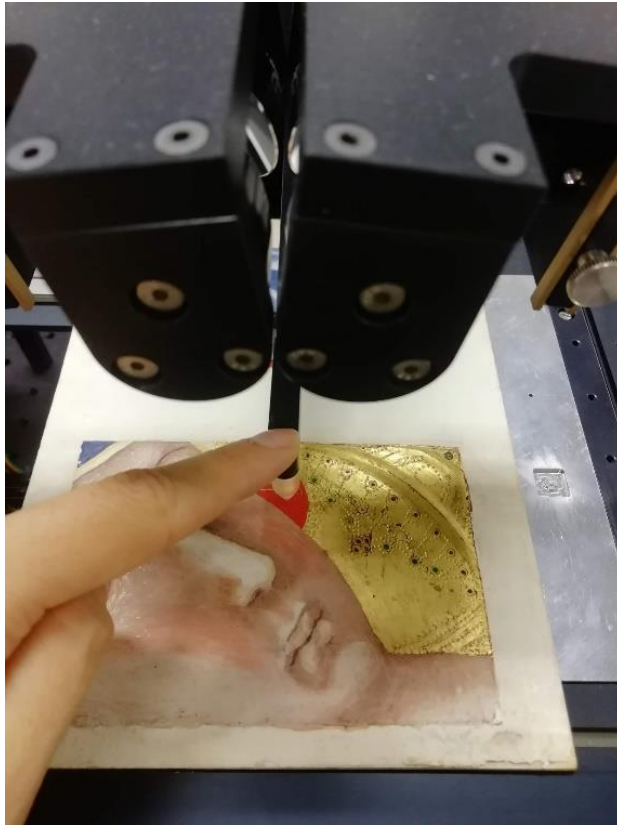




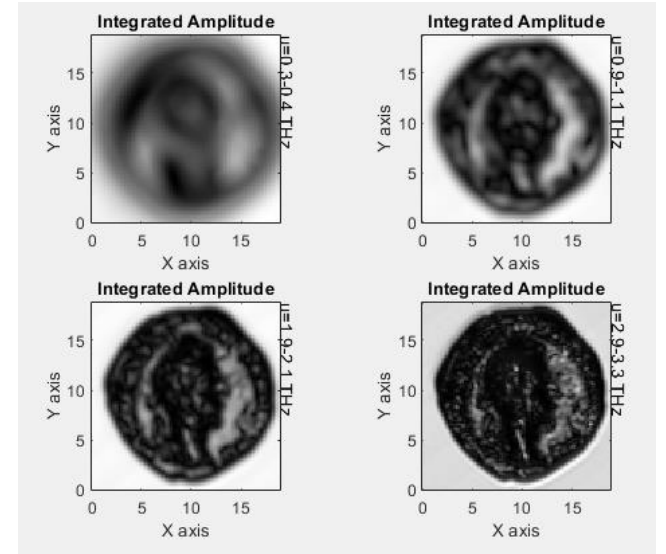
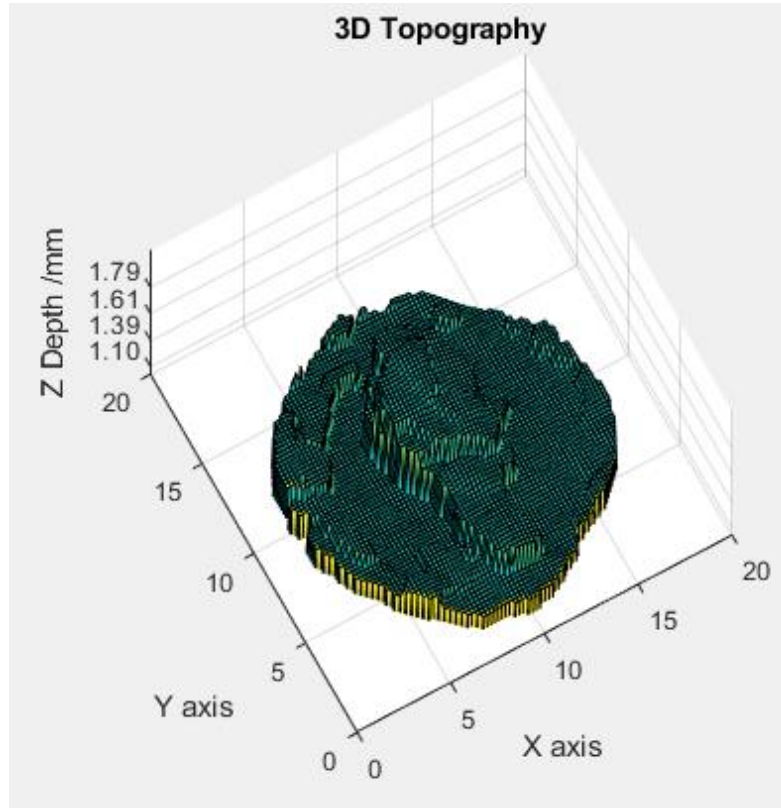
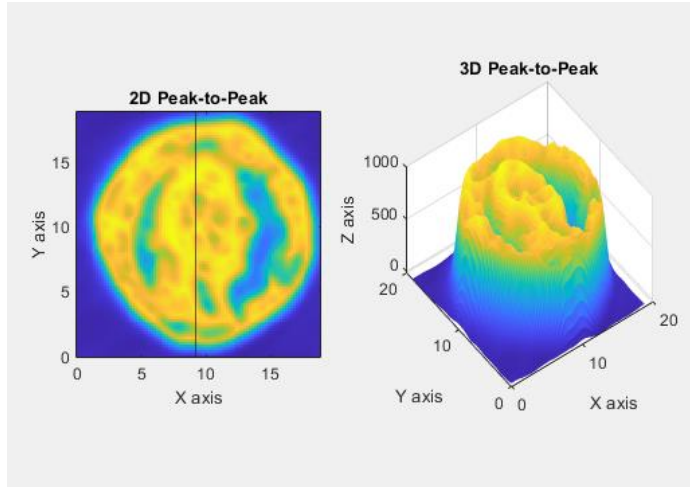
Automating 3D digitisation procedures



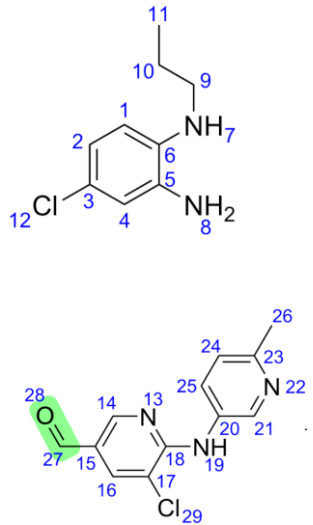
# AI and Robotics



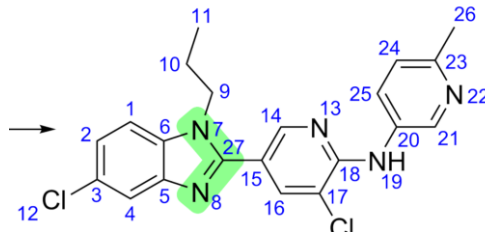
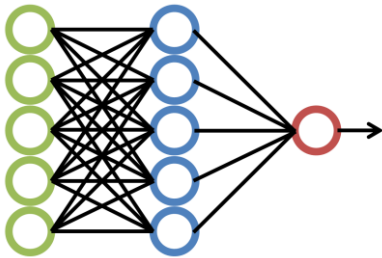
# Chemical-physical analysis



Input



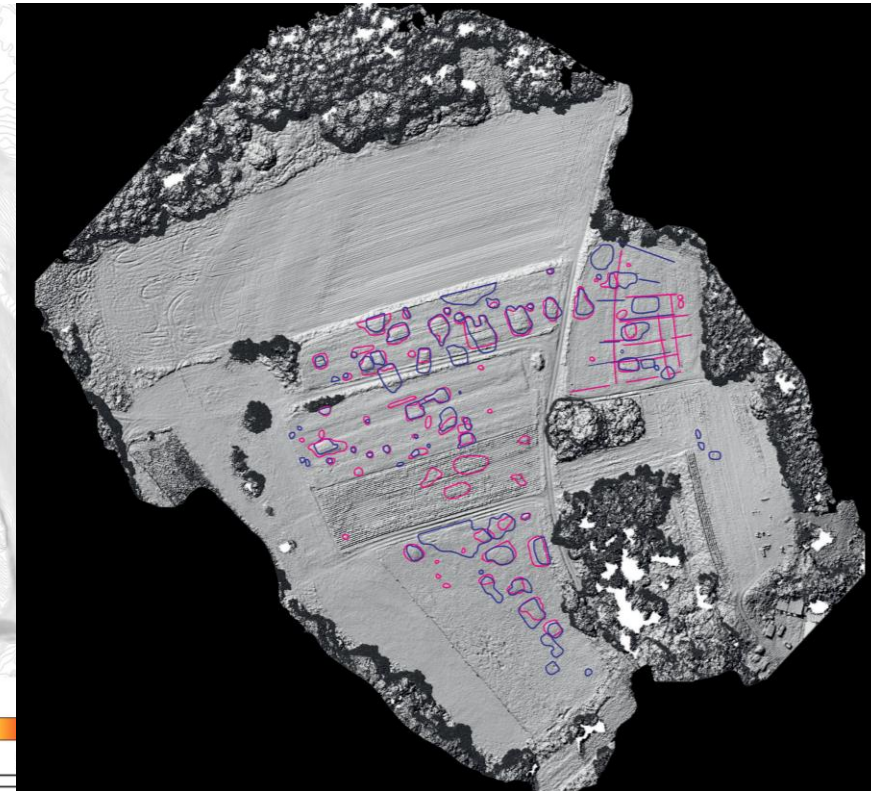
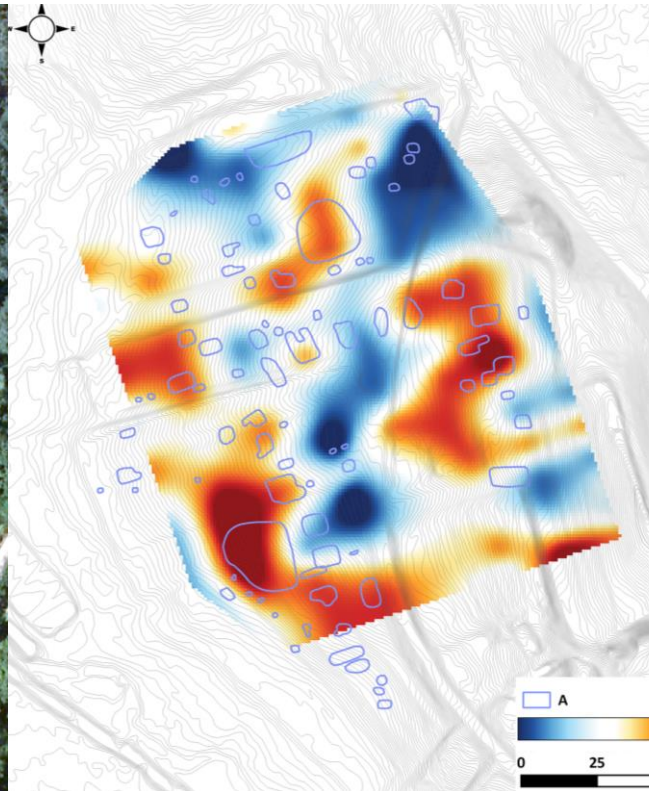
AI



Output



# Detecting unknown Cultural Heritage through AI



Dzwonowo (Poland) © Marcin Krzekopwski, Marcin Moeglich, Kasper Hanus, et al.

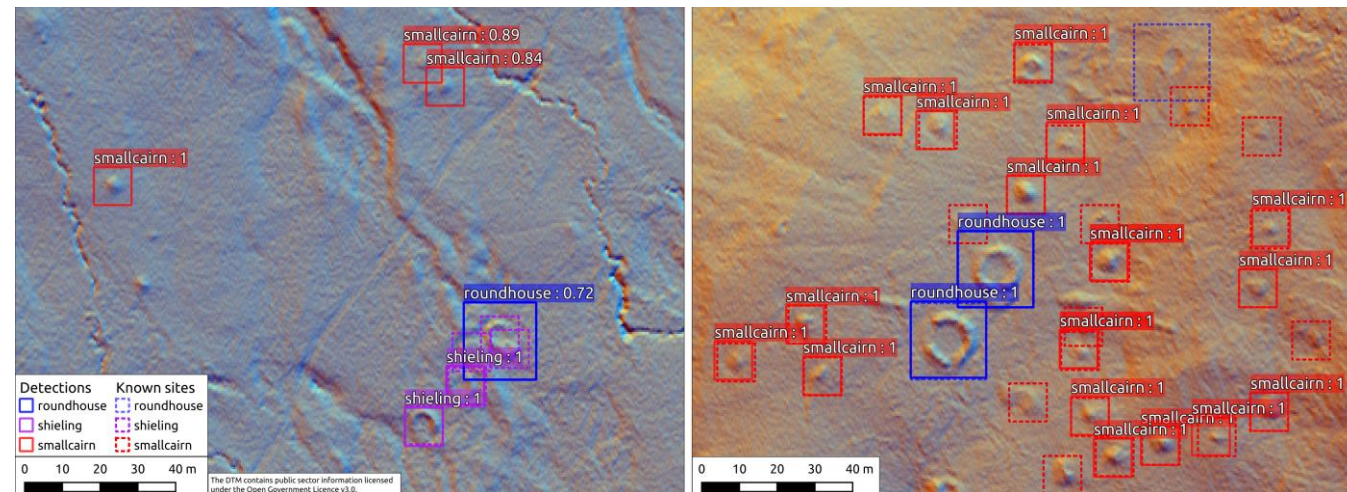
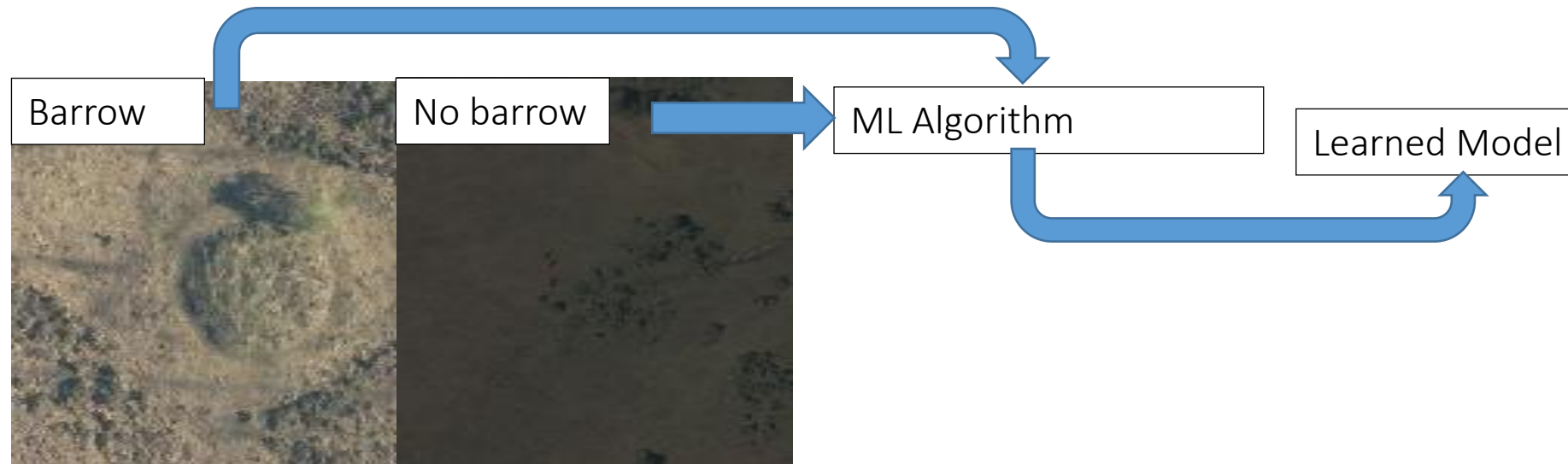
# Detecting

Soil and vegetation act as 'markers' of underground archaeological deposits

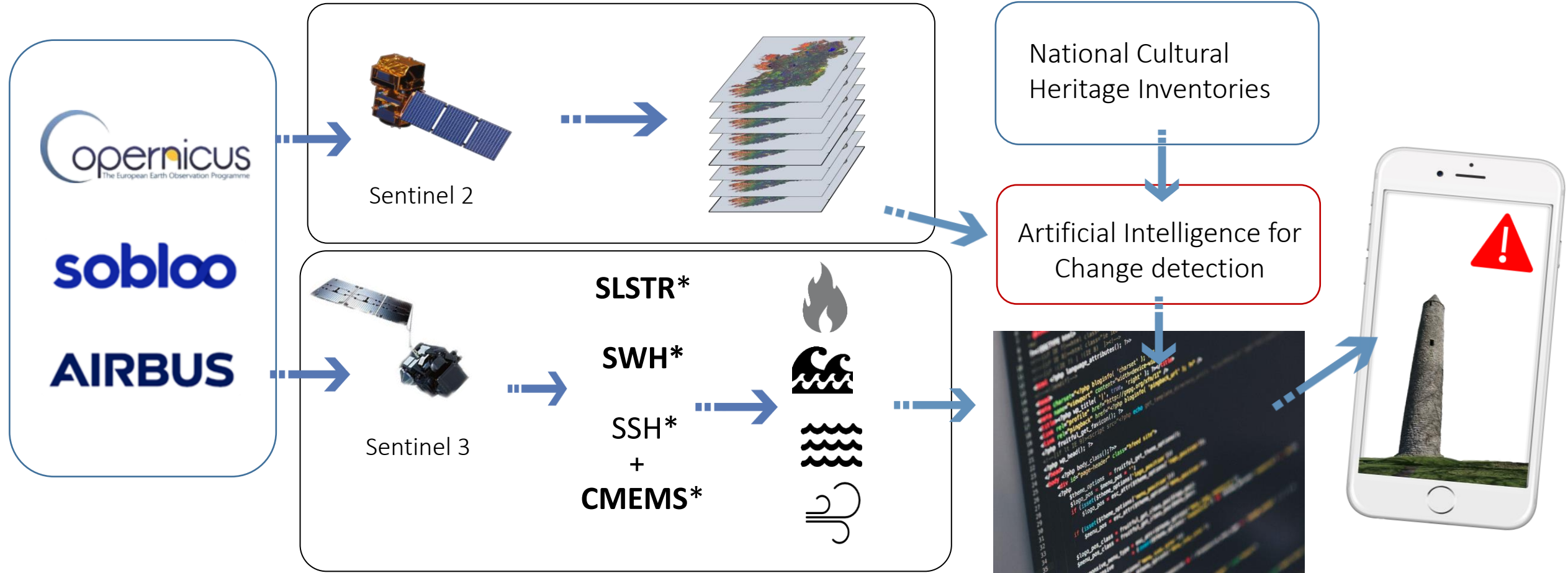




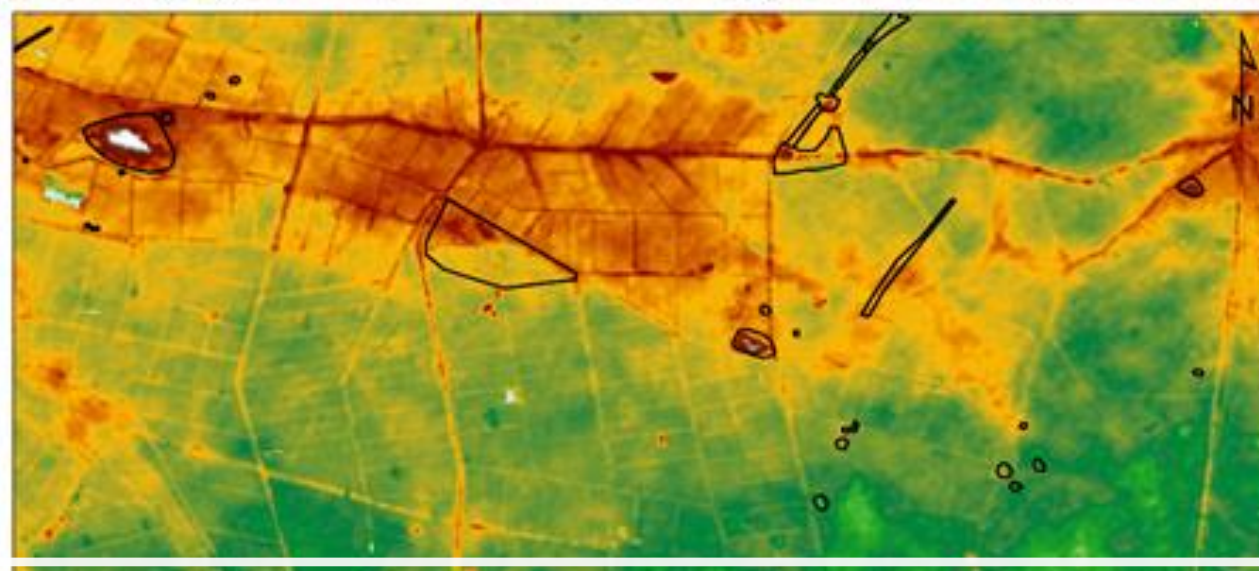
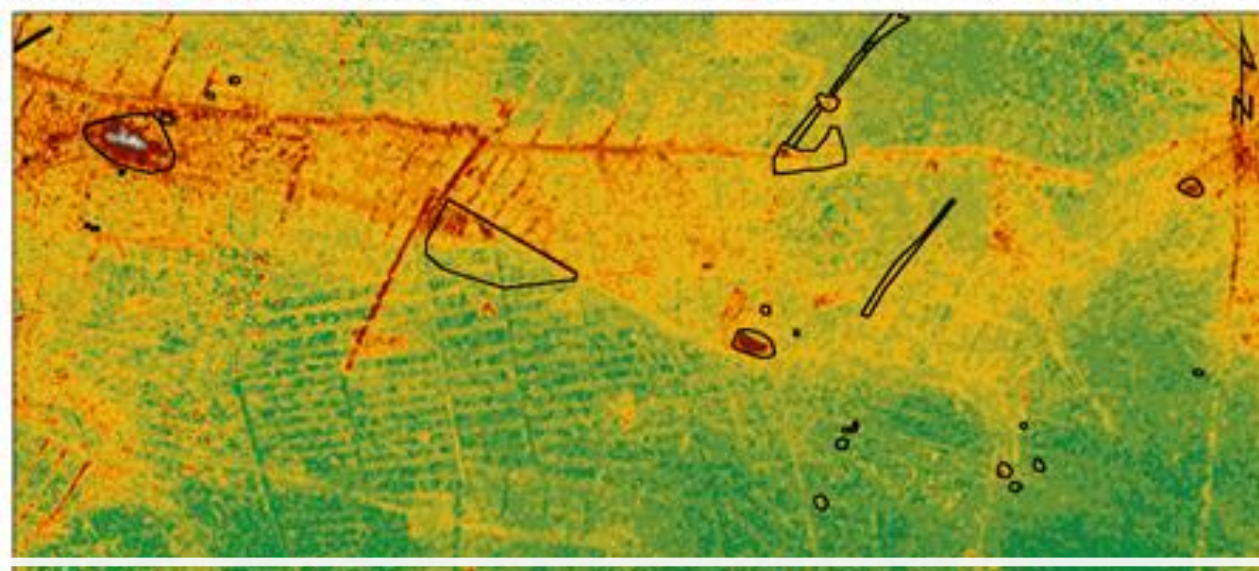
# Detecting Cultural Heritage through AI



# Climate change, Cultural Heritage and AI

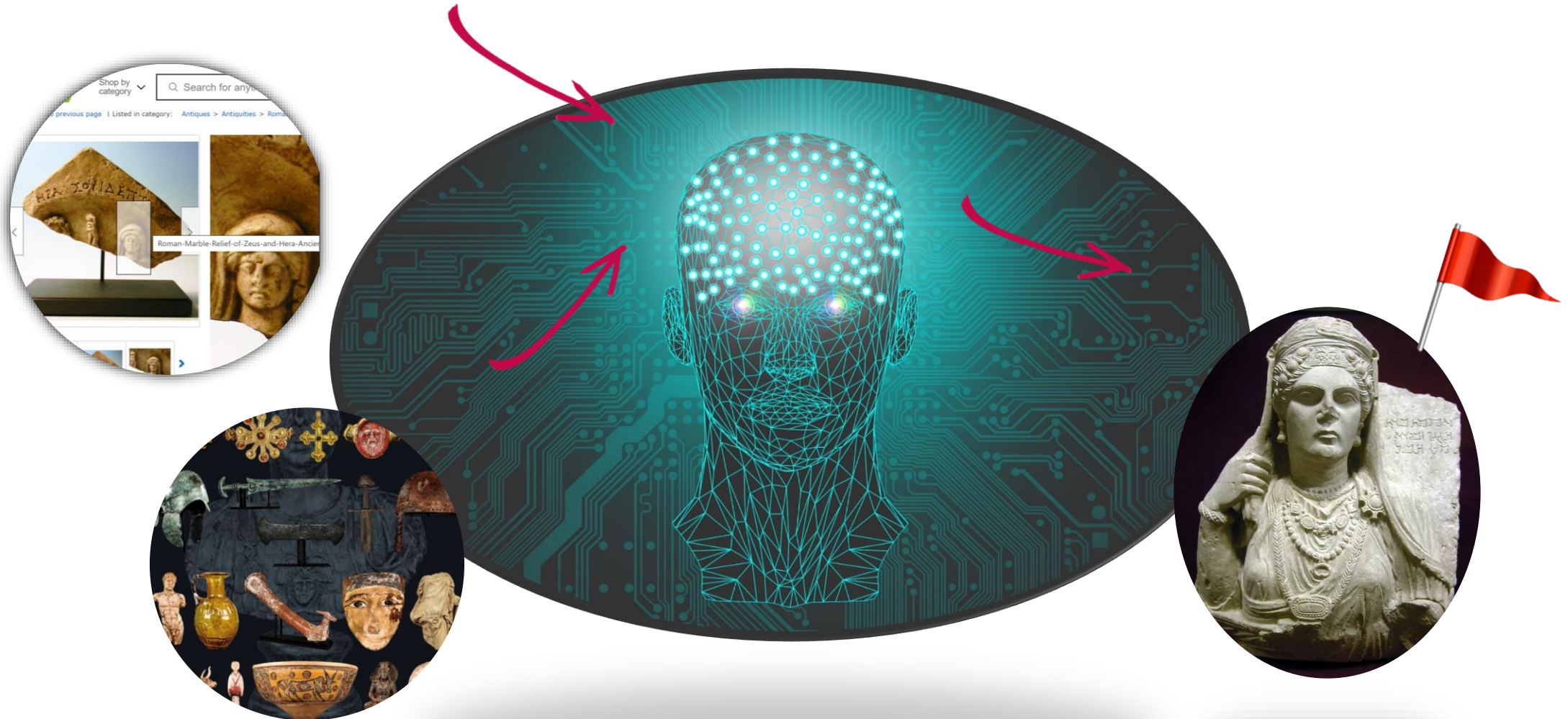


Indices related to climate



# Crime detection from space

# Crime detection on the Internet



# Art crime detection



Art Recognition AG



Collage of artworks by German expressionist painter Max Pechstein. The images within red rectangles are fakes and have been identified as such by the Art Recognition algorithm.

Courtesy of: ArtRecognition (Zurich, Switzerland) [www.art-recognition.com](http://www.art-recognition.com)



# Exponential technologies and their pervasiveness

3D  
prints

Drones

VR &  
AR

Massive  
digitisation

Robotics

Blockchain



# Credits

## THINK EXPONENTIALLY

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- ArtRecognition

