Pose and Pathosformel in Aby Warburg's Bilderatlas

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Leonardo Impett and Sabine Süsstrunk
School of Computer and Communication Sciences
Image & Visual Representation Lab
EPFL

I - Digital Art History

Aby Warburg

- 1866-1929
- Worked on Bilderatlas from 1926
- *Kulturwissenschaftliche Bibliothek Warburg*
- Memory of the Classical in the Western world

Image: Kunstkritic.no

Pathos**formel**

A repeatable formula

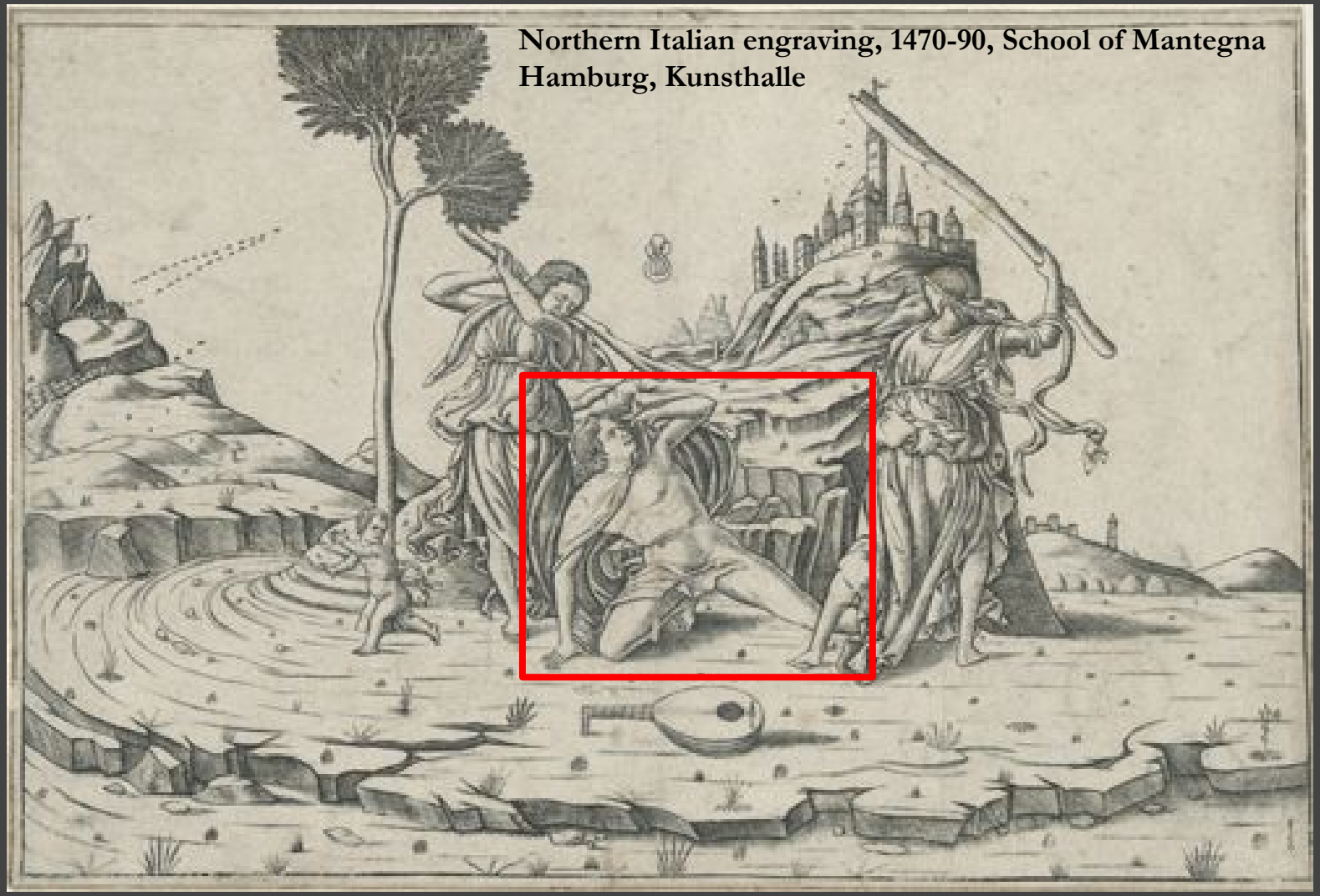
Pathos**formel**

The expression of pathos; pathetic emotions; passion

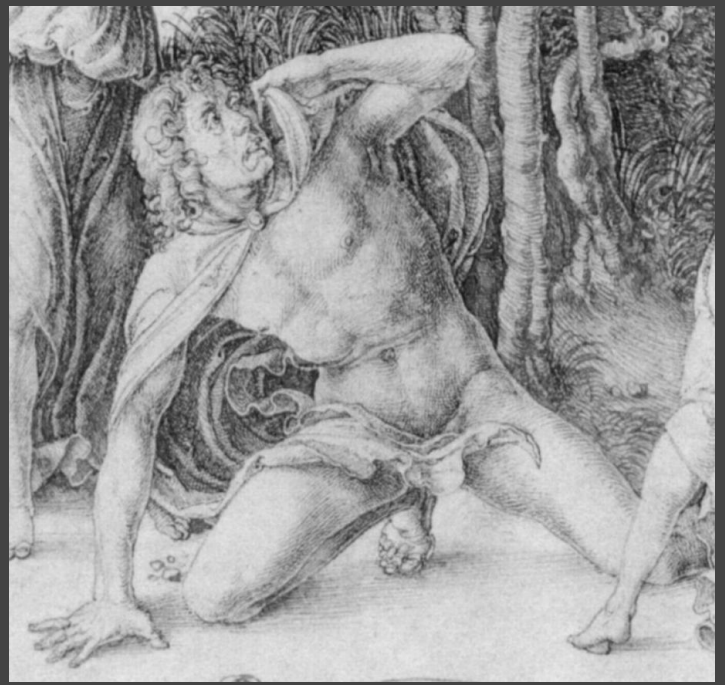
Detail of vase from Nola. Paris, Louvre

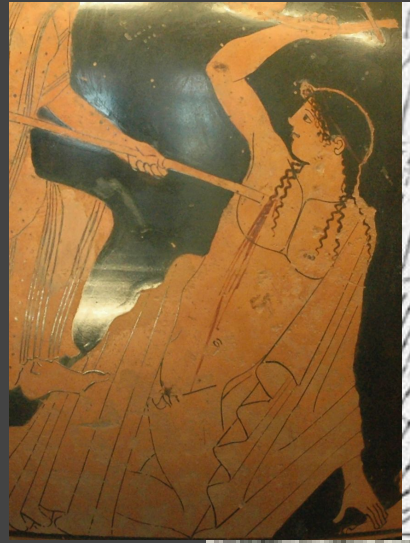
After vase from Chiusi, from *Annali*, 1871

Woodcut from Ovid, *Metamorphoses*, Venice 1497


Northern Italian engraving, 1470-90, School of Mantegna
Hamburg, Kunsthalle

Albrecht Dürer, *Death of Orpheus*, 1494
Hamburg, Kunsthalle





Nachleben der Antike

The afterlife of classical antiquity - **resurgence** and **persistance**

“In a number of ways, the Death of Orpheus serves to clarify this emotive, rhetorical current within the reawakening of antiquity…

[this method] lays bare certain phenomena, hitherto unnoticed, that cast a more general light on the circulation and exchange of expressive forms in art”

Aby Warburg's Bilderatlas

10^3-10^4 bodies?

1230 paintings

63 panels

II - Operationalisating the Pathosformel

Pathos?

Phobic impressions - Expressive values - Interior emotion - Passionate experience - Pagan exaltation - Orgiastic experience - Boundless unleashing - Expressive manifestations - Phobias - Interior abandon - Murderous drunkenness - Paroxystic fervour - Nouvelle gestuelle pathetique

Operationalisation

The conversion of **pathos** into **pose**. Operationalisation forces us:

- Remain conscious of what we lose - movement of hair, wind, limbs, hands
- Look **more closely** but also **more critically** at the concept itself

First digital encoding of pose in an art database:

Da Silva, Nuno Pinho, et al. "Explaining scene composition using kinematic chains of humans: application to Portuguese tiles history." *Computer Vision and Image Analysis of Art II*, SPIE, 2011.

Collecting a Dataset

- Bilderatlas is of art-historical interest but also an excellent **training set for computer-vision** (stylistically heterogeneous)
- The scale of the problem:
  - **10^3-10^4** bodies in 1,200 images (and annotate each body thrice!)
- Which bodies to annotate?
- Crowdsourcing annotations

Aby Warburg's Bilderatlas

10^3-10^4 bodies?

1230 paintings

63 panels

Aby Warburg's Bilderatlas

10^3-10^4 bodies?

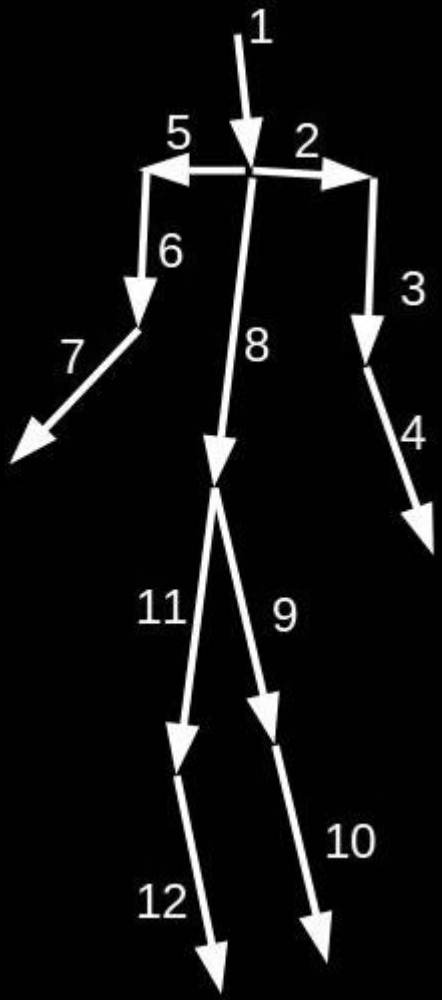
1,665 bodies

1230 paintings

313 paintings

63 panels

21 panels


1
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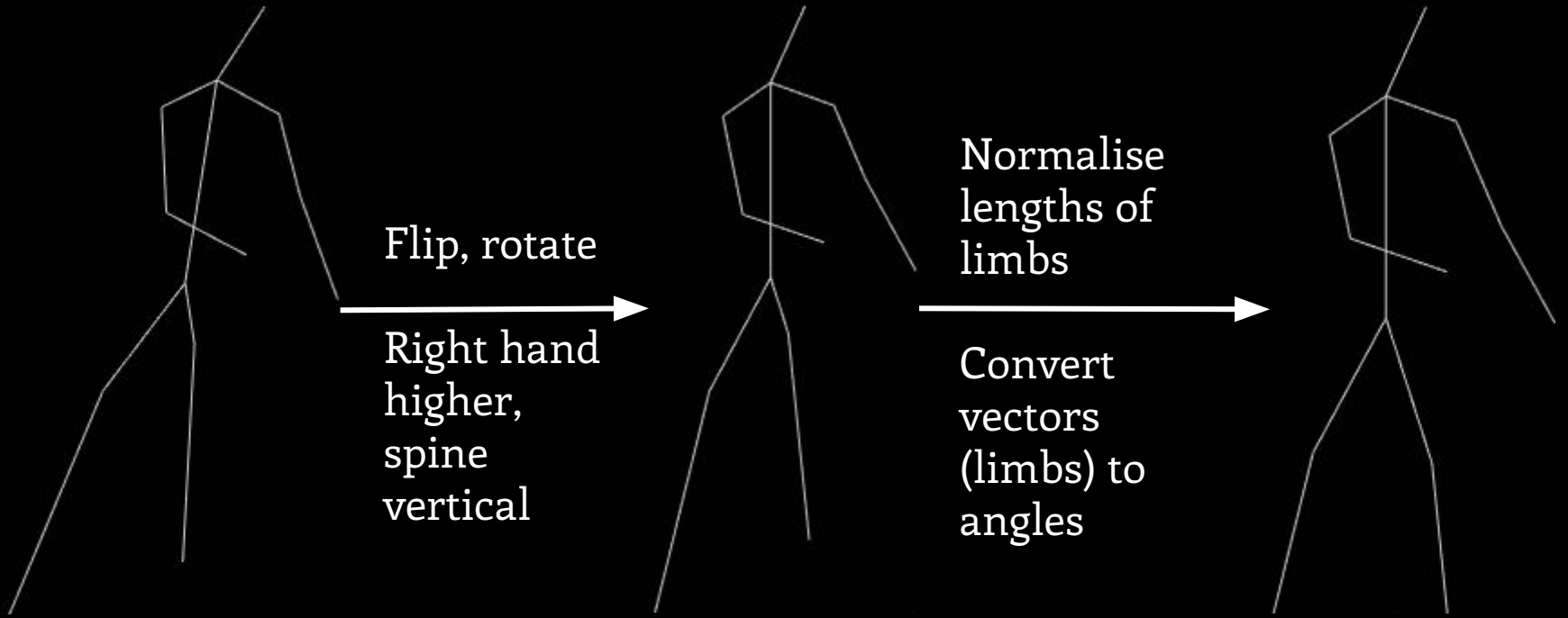
III - Analysis

Normalising body poses



24-D (x,y)-coordinates

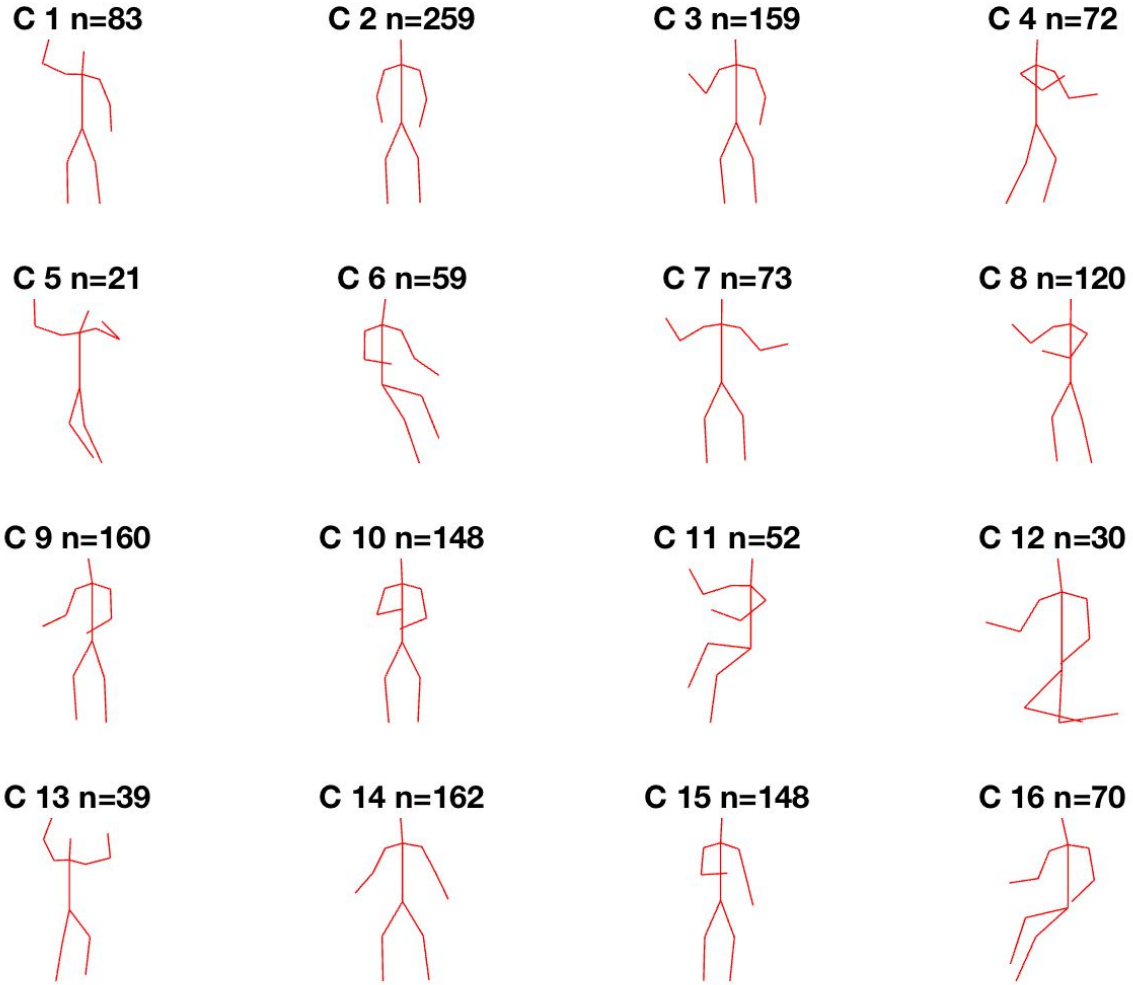
11-D angles

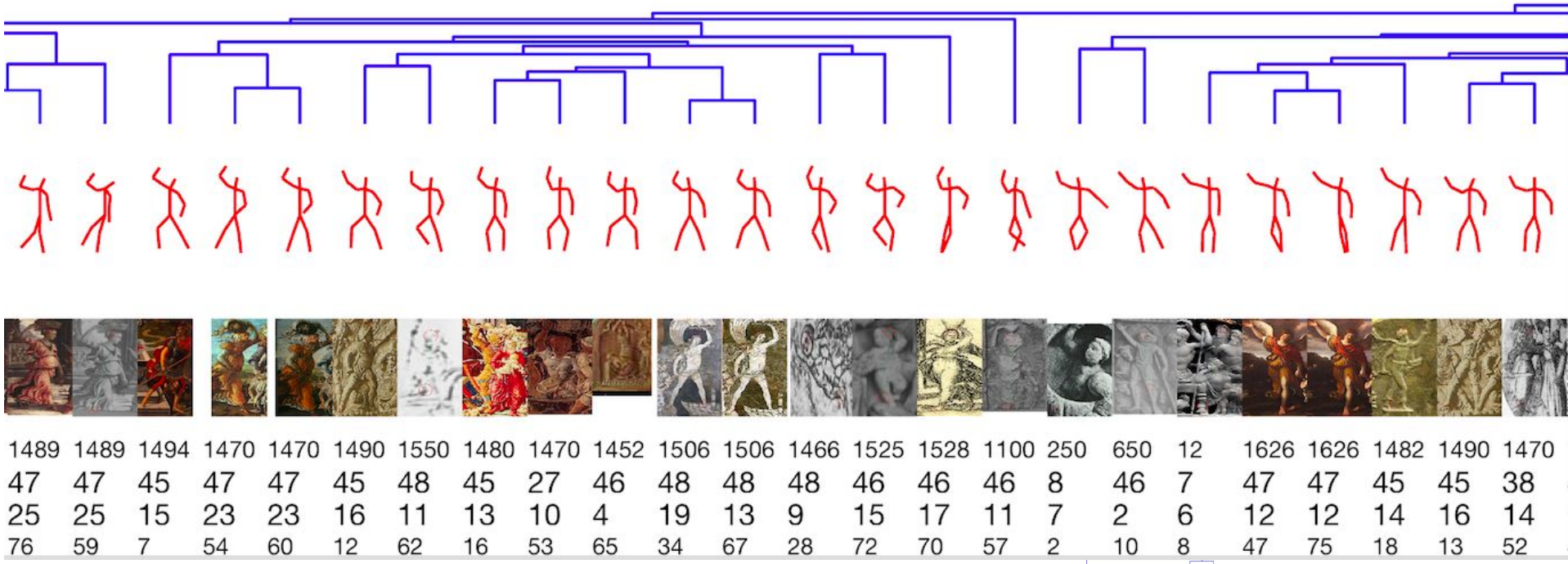
Two-stage Clustering

Morphological similarity is meaningless over large differences (but useful over small ones).

Two-stage clustering:

1. **Rotational K-means:** 1,665 poses into K stable clusters
2. **Rotational Hierarchical Clustering:** phylogenetic tree of the morphological structure within each cluster

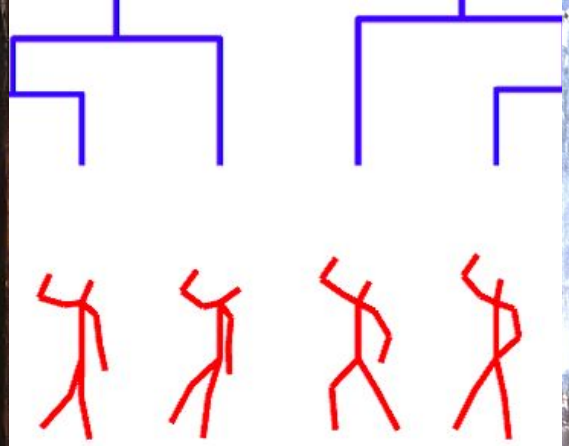

C 1 n=83
C 2 n=259
C 3 n=159
C 4 n=72
C 5 n=21
C 6 n=59
C 7 n=73
C 8 n=120
C 9 n=160
C 10 n=148
C 11 n=52
C 12 n=30
C 13 n=39
C 14 n=162
C 15 n=148
C 16 n=70


1489 1489 1494 1470 1470 1490 1550 1480 1470 1452 1506 1506 1466 1525 1528 1100 250 650 12 1626 1626 1482 1490 1470
47 47 45 47 47 45 48 45 27 46 48 48 48 46 46 46 8 46 7 47 47 45 45 38
25 25 15 23 23 16 11 13 10 4 19 13 9 15 17 11 7 2 6 12 12 14 16 14
76 59 7 54 60 12 62 16 53 65 34 67 28 72 70 57 2 10 8 47 75 18 13 52

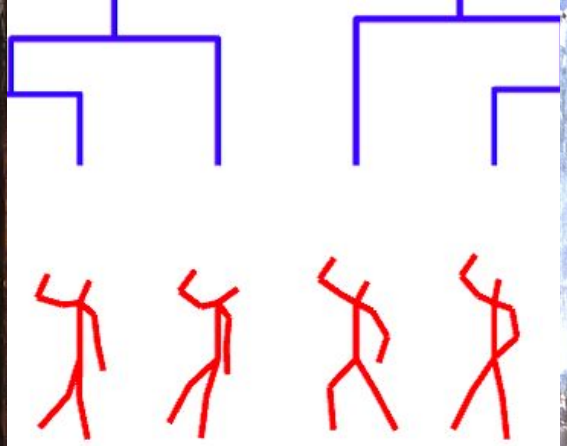
Identifying Pathosformeln

Pathosformeln identified in the literature:

Nymph / Perseus / Proserpina / Orpheus / Menead / Fortuna / Laocoön



1489	1489	1494	1470
47	47	45	47
25	25	15	23
76	59	7	54



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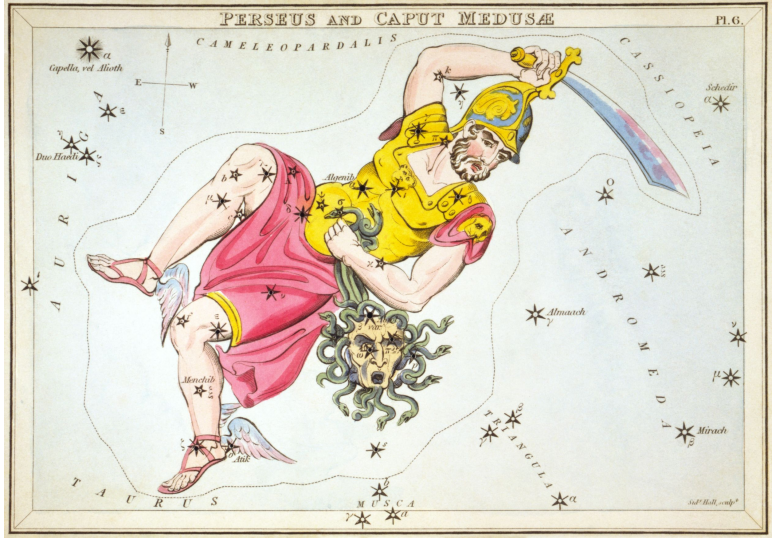
PERSEUS AND CAPUT MEDUSÆ
Pl. 6.
CAMELEOPARDALIS
CASSIOPEIA
AURIGA
ANDROMEDA
TRIANGULA
TAURUS
MUSCA
Capella, vel Alioth
Duo Haedi
Algenib
Schedir
Almaach
Mirach
Menchib
Auk
Sid. Hall, sculp.

Identifying Pathosformeln

Pathosformeln identified in the literature:

Nymph / Perseus / Pentheus / Proserpina / Orpheus / Menead / Fortuna / Laocoön

Clustered almost exclusively together.

Strong morphological similarity between *different* formulae for the representation of (different) emotions.

Nachleben der Antike

The Rebirth of Classical Antiquity: different clusters have different classical membership (20-50%).

Our strongest (preliminary) results: the *exiled Nymph* has (almost) **no antique presence**.

Conclusions

Our *operationalisation* gives us surprising results even with a small dataset:

- Evidence to support the existence of Pathsoformeln and their renewal from antiquity.
- Pathosformeln can be characterised by body-pose: they're all similar in pose-space
- The figure of the Nymph has no classical referent in the Bilderatlas
- Limitations on the reduction itself; the principle of **Antithesis**, and motion.

Current and Future Work

- Full annotation of the Bilderatlas to take place in the next ~6 months (public data release). Large-scale pose dataset for computer-vision in paintings.
- From ‘% Antique’ to *Nachleben*
- 3D pose estimation and encoding - *bodies in motion*
- **Automatic recognition of pose in paintings**
- Automatic identification of Pathosformeln

Questions

Leonardo Impett, Sabine Süsstrunk
leonardo.impett@epfl.ch
ivrl.epfl.ch

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John Robb & Robin Osborne, University of Cambridge
Isabella di Lenardo, EPFL

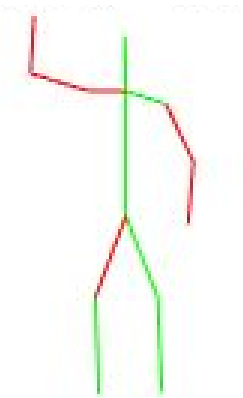
Two-stage annotation

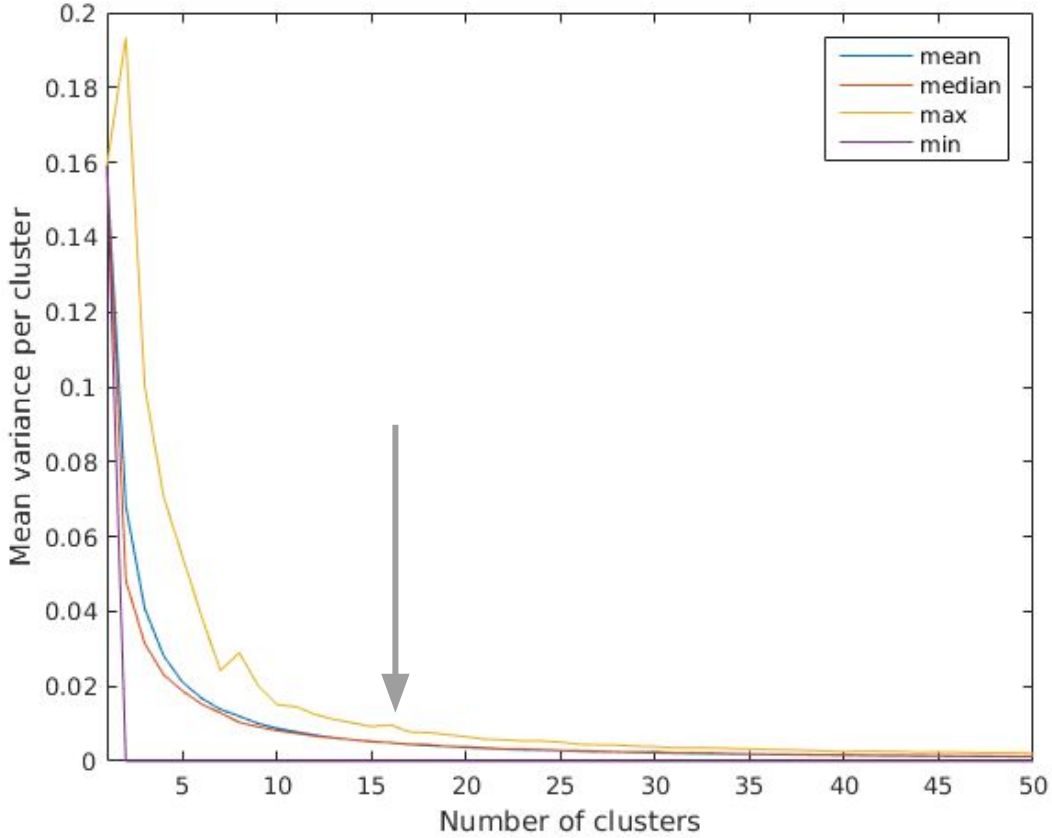
1: Separate bodies

2: Annotate poses

10 Samples (Gaussian)

Ideal-type



Insignificant
Significant

Two-stage Clustering