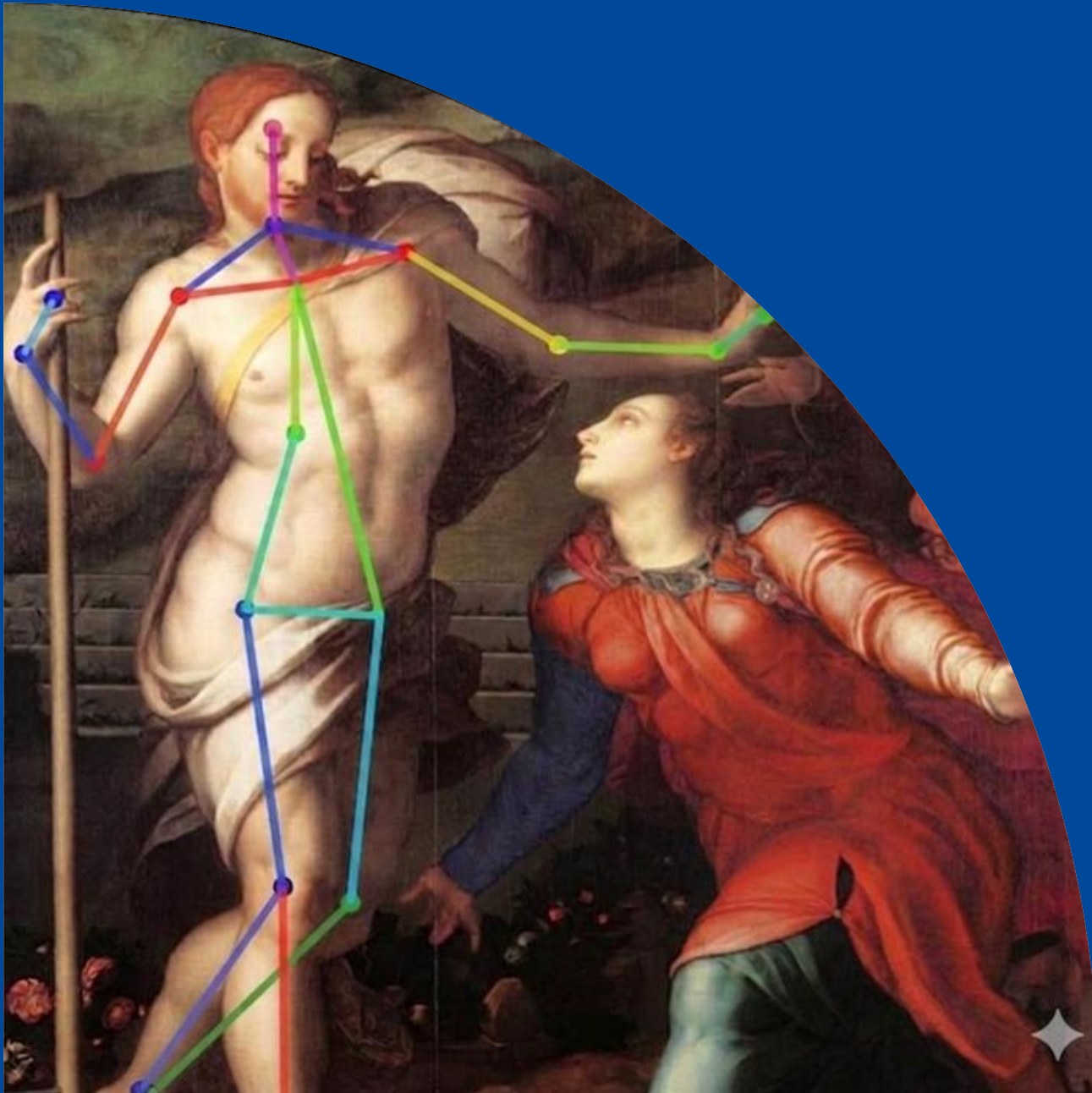




Universität
Marburg



Attributes, Objects, Poses, Scenes and Bias.

A Retrospective and Future Challenges
of Art History and Computer Vision

Peter Bell

Kunstgeschichte und Digital Humanities

“No, it’s impossible for machines. Specialists said recently that even in a thousand years a computer will not be able to recognize the chair painted by Vincent van Gogh as a chair.”

Horst Bredekamp, 2012

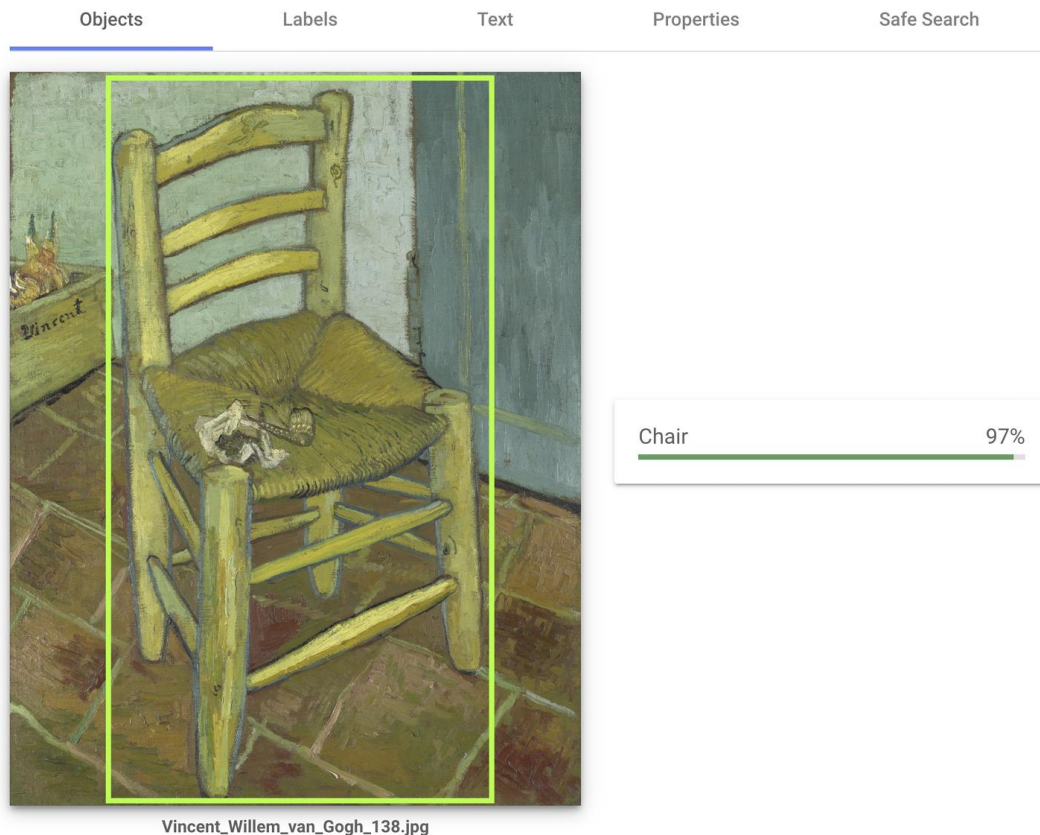
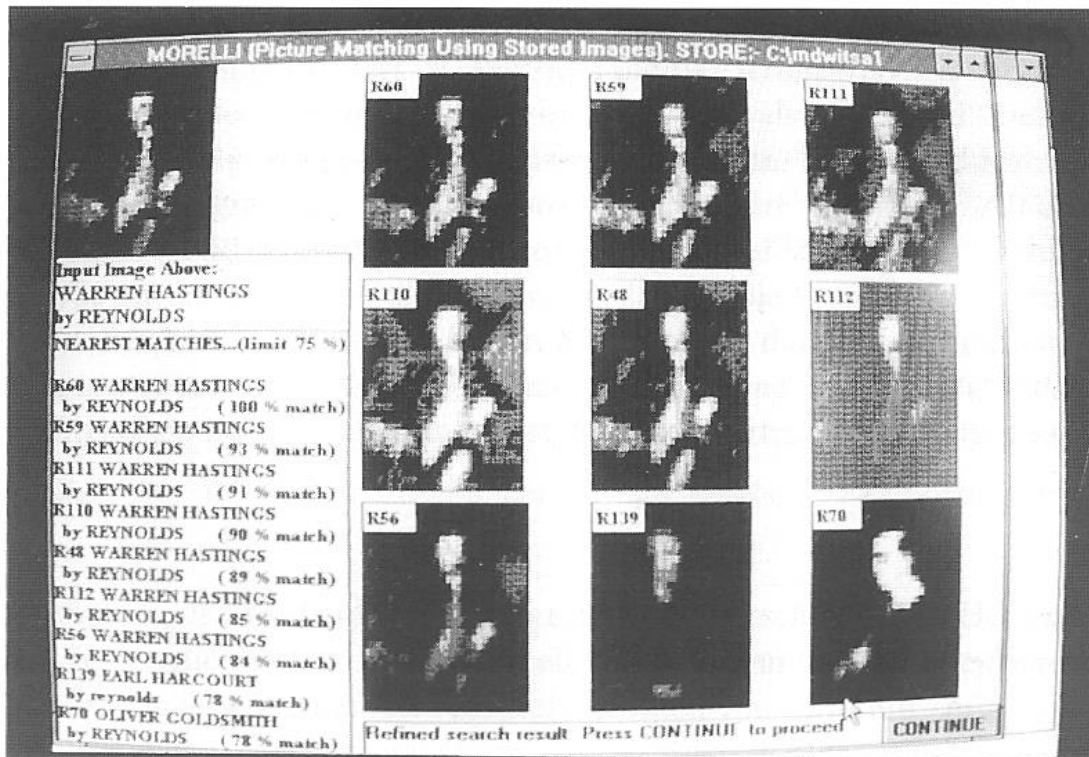


Figure 1.: Van Gogh’s chair detected by computer vision. We use the Google cloud vision API as an example of a widely used object recognition model.

“We tried that already in the 80s – it doesn’t work!”

other prominent art historian, 2011



William Vaughan, MORELLI tool



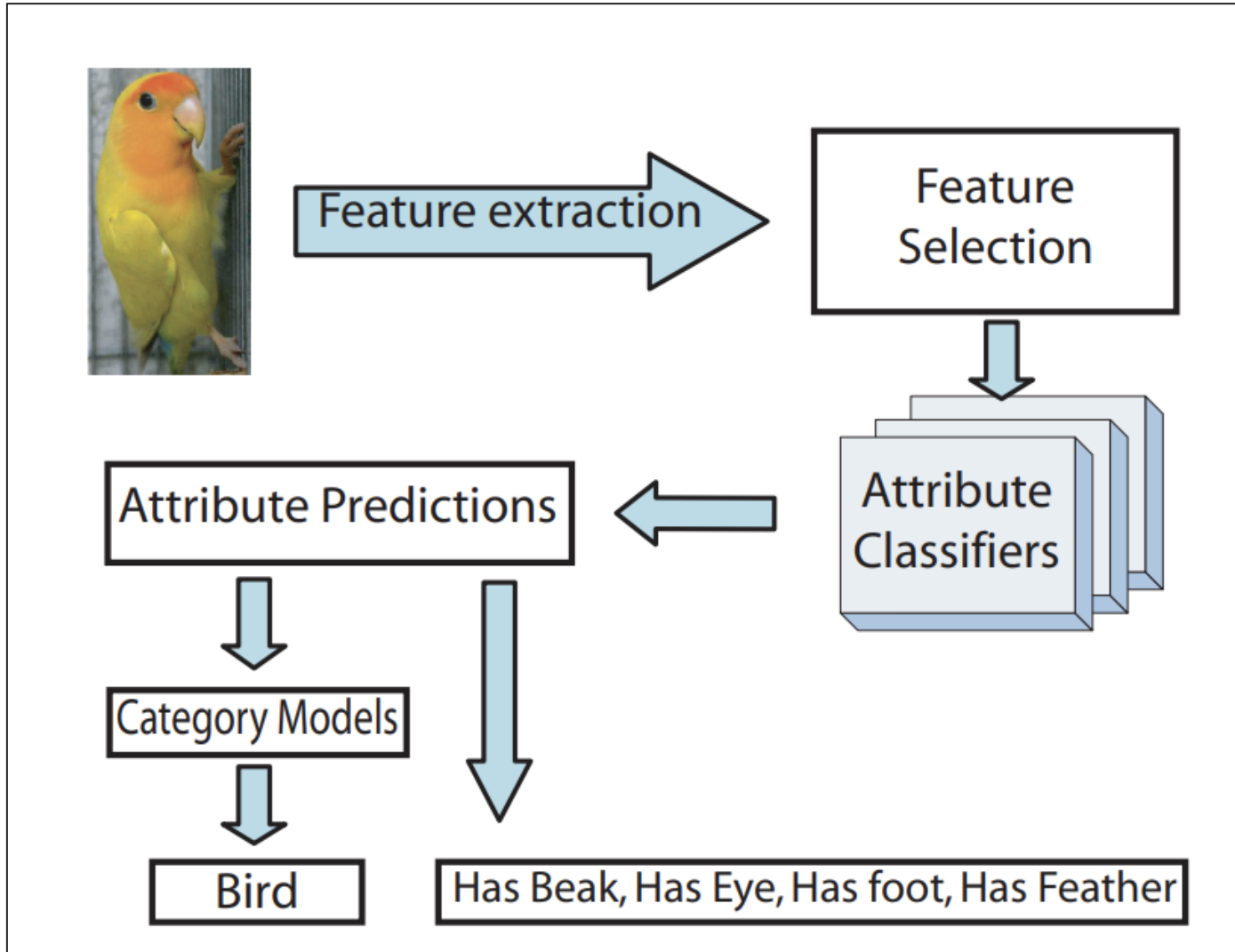
Not only detection of object but also style, culture, technique and artist attribution

- 1: A black statue of a seated cat in the Egyptian style (Bastet), featuring a smooth surface and an upright posture.
- 2: A medieval illustration of a light-colored, four-legged creature with almost human-like facial features, standing on its hind legs.
- 3: A classical oil painting of a tabby house cat crouching on a table next to a dead fish or pieces of meat. => Chardin
- 4: An expressionist painting of an animal (cat) with bold brushstrokes and high-contrast colors (shades of yellow and white).
- 5: A black-and-white graphic (woodcut style) showing a person holding a patterned animal in their arms.
- 6: A bronze sculpture of an extremely thin, elongated animal on a pedestal, characteristic of the style of Alberto Giacometti.

Gemini, fast, 16.04.26

Computer Vision and Art History

Zwei Bildwissenschaften or False Friends



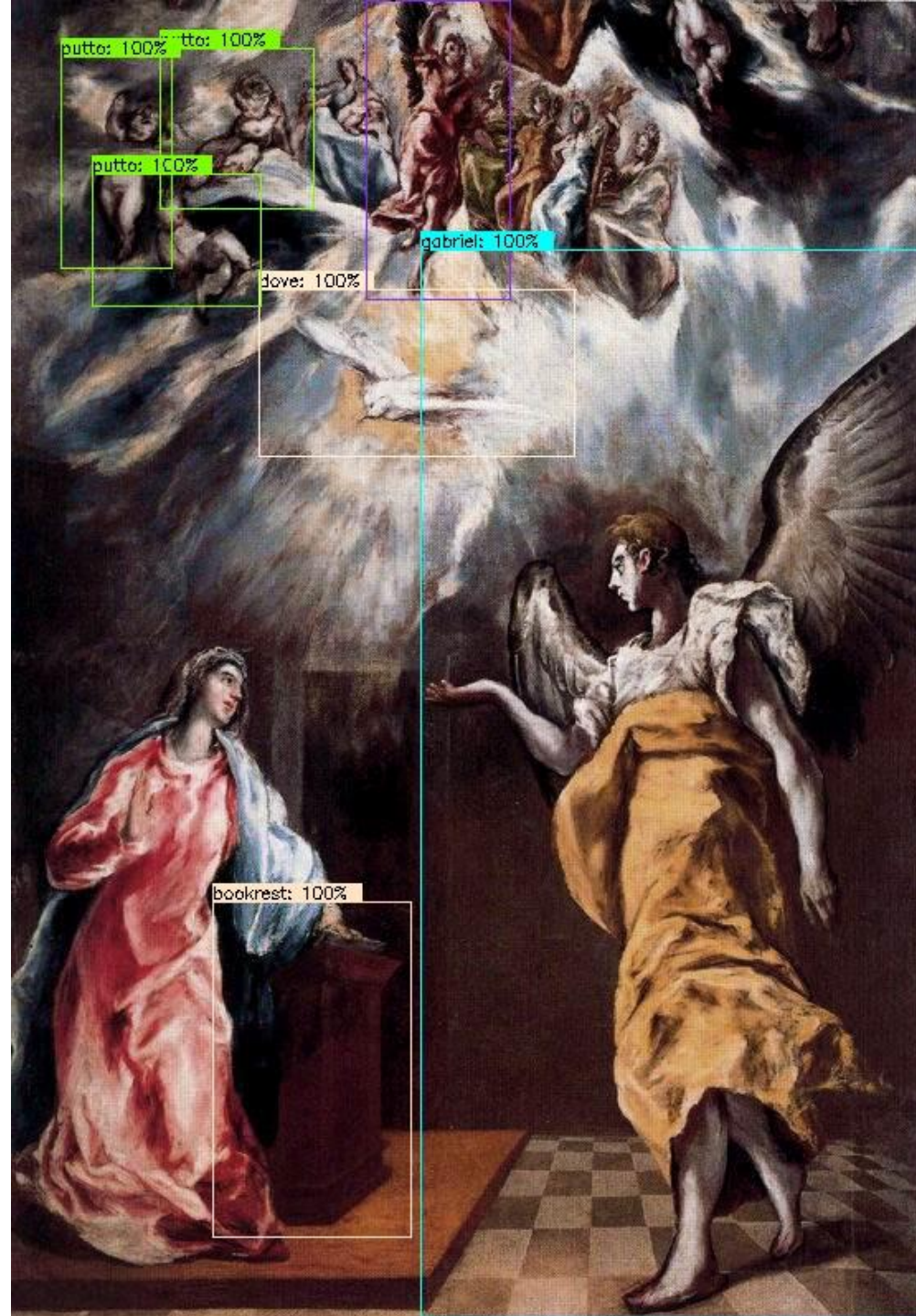
Ali Farhadi et al., Describing Objects by their Attributes (2009)



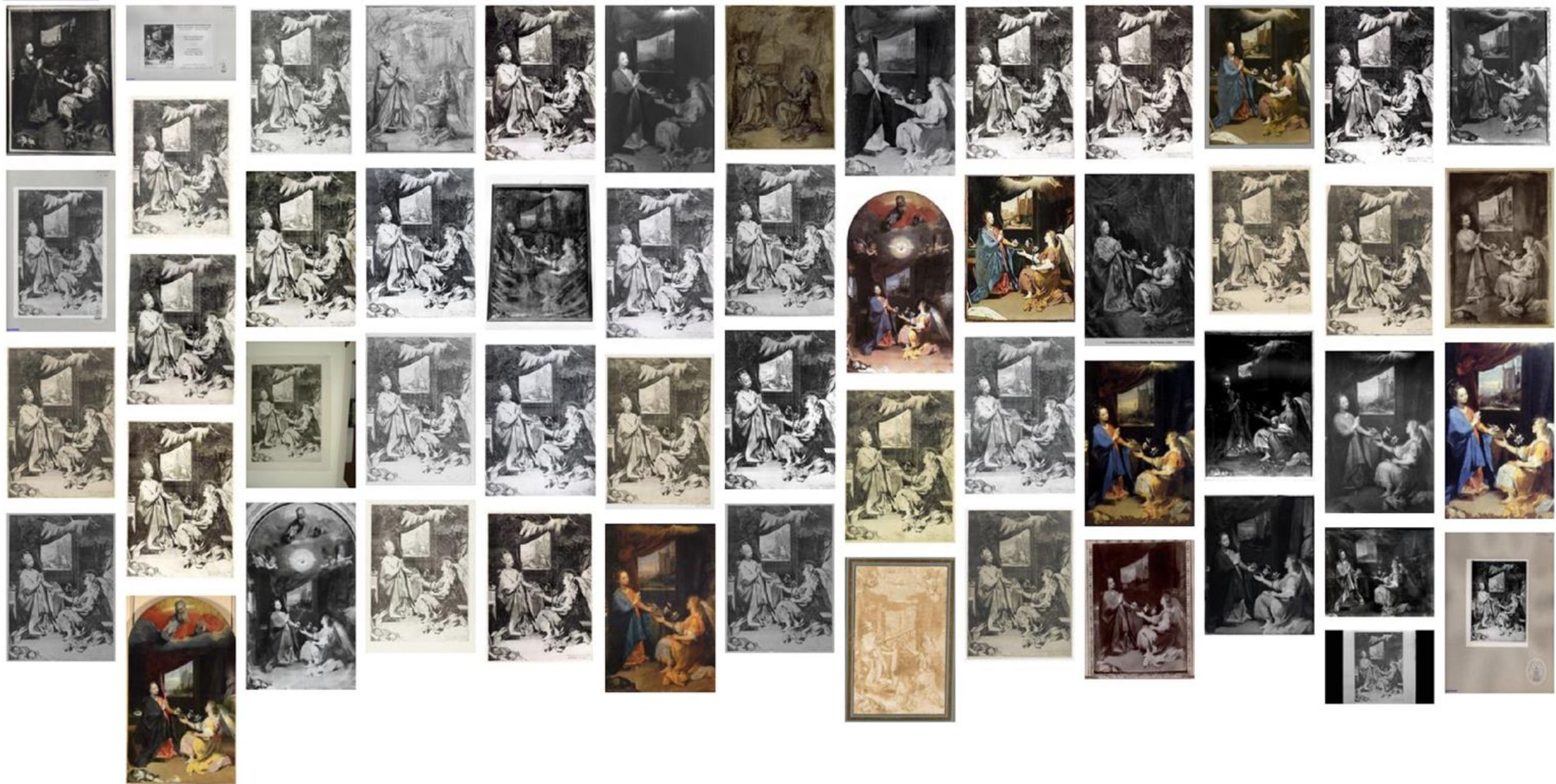
AI ~ ML { Computer Vision {

- **Image Similarity**
- Segmentation
- Style Transfer
- **Object Recognition**
- Character Detection
- **Pose Estimation** (& pose, fac. expr.)
- Composition
- Scene Understanding
- Description / Generating Metadata
- Image generation / Reconstruction
- Clustering / Visualization

Exploring possibilities







Cluster 1 166 Objects [men](#) [women](#) [gold](#) [virgin mary](#)



Cluster 2 125 Objects [women](#) [men](#) [french](#) [virgin mary](#)



Cluster 3 84 Objects [men](#) [women](#) [tin-glazed earthenware](#) [trees](#)



Cluster 4 99 Objects [men](#) [women](#) [saints](#) [engraving](#)



Cluster 5 193 Objects [tin](#) [silver](#) [rome](#) [bronze](#)

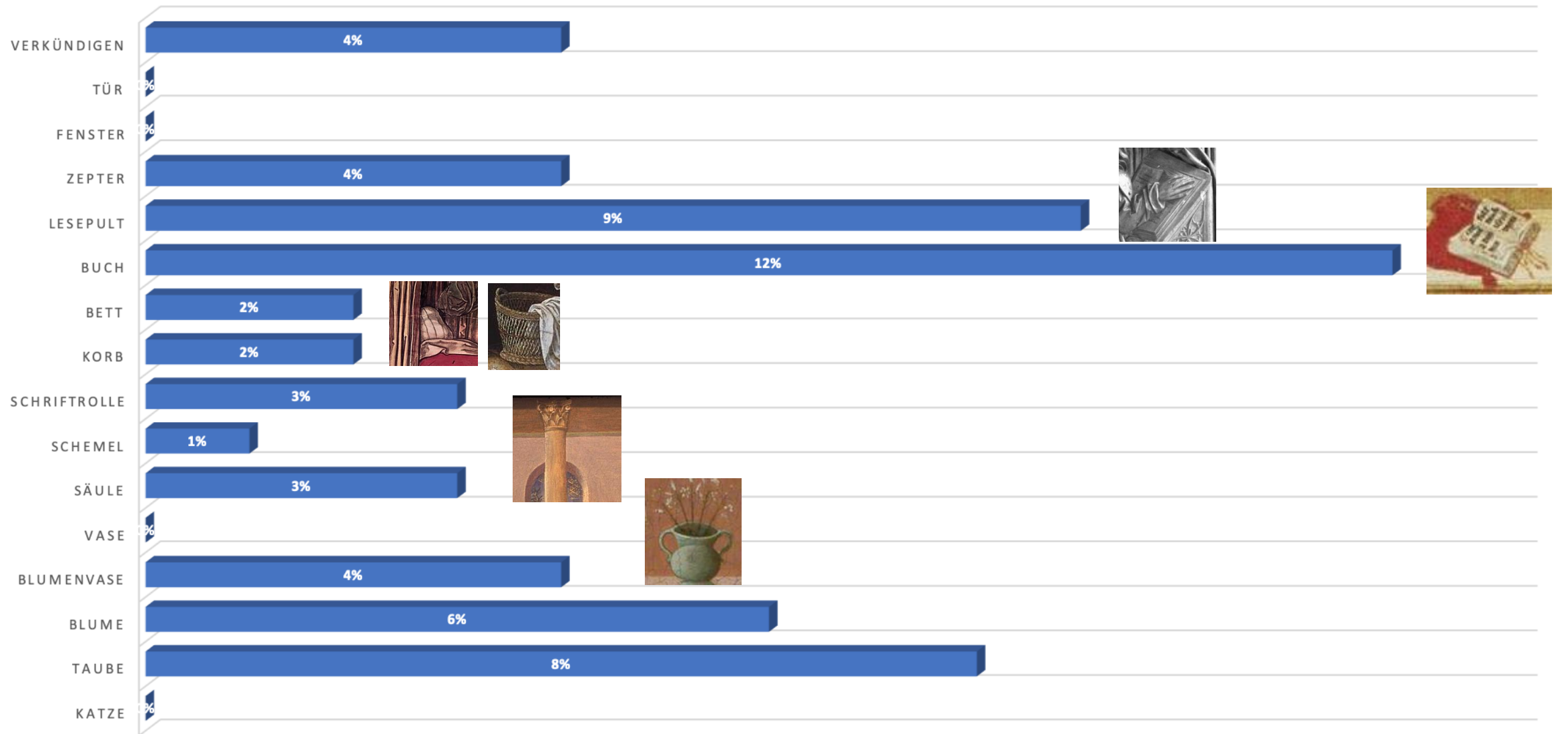


Cluster 6 193 Objects [men](#) [women](#) [books](#) [book jacket, dust cov...](#)

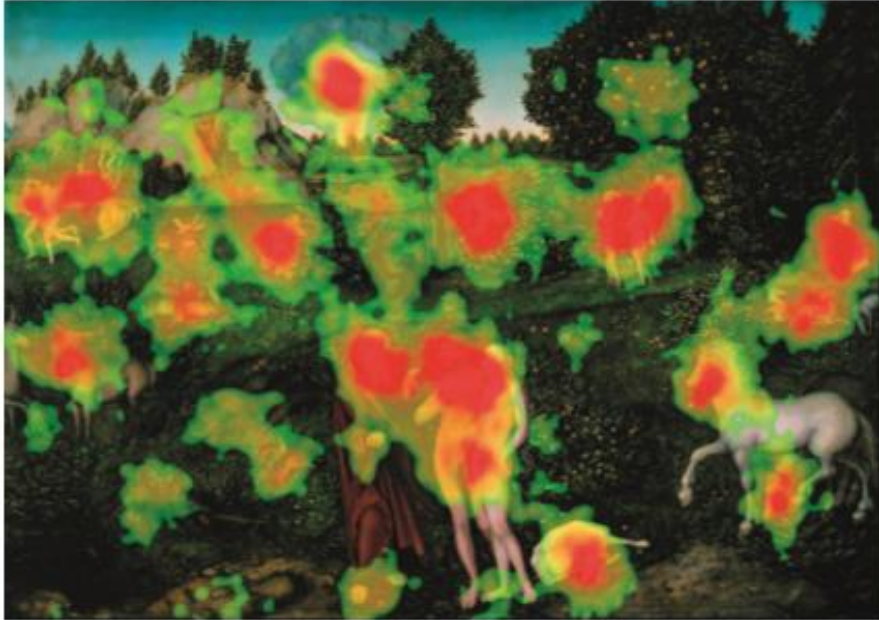


Cluster 7 141 Objects [women](#) [men](#) [oil on canvas](#) [religious painting](#)

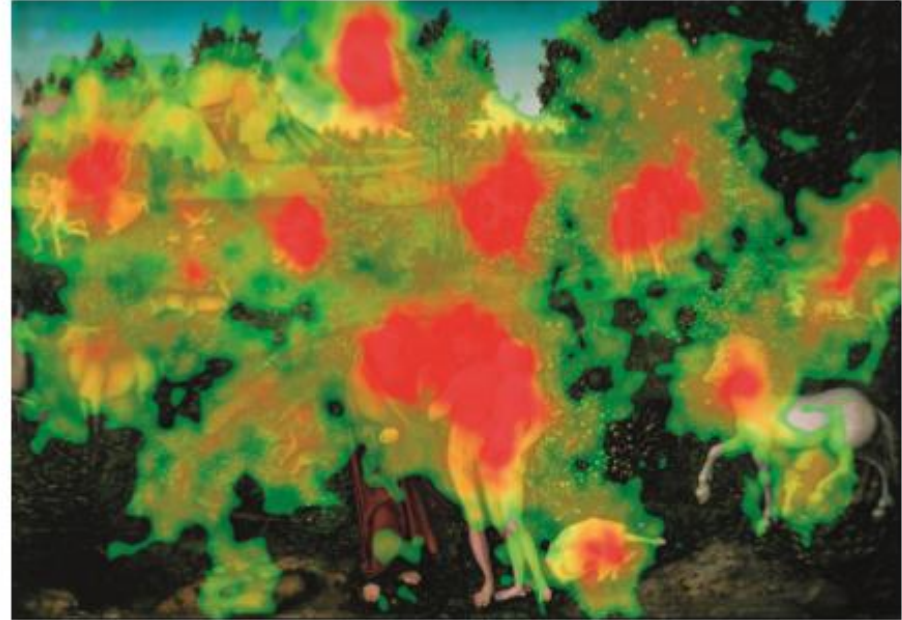




Händische Annotationen *Iconographics*



1 Heatmap of the fixations of fifty Austrian subjects viewing Cranach's *Paradise* for two minutes each



2 Heatmap of the fixations of fifty Japanese subjects viewing Cranach's *Paradise* for two minutes each



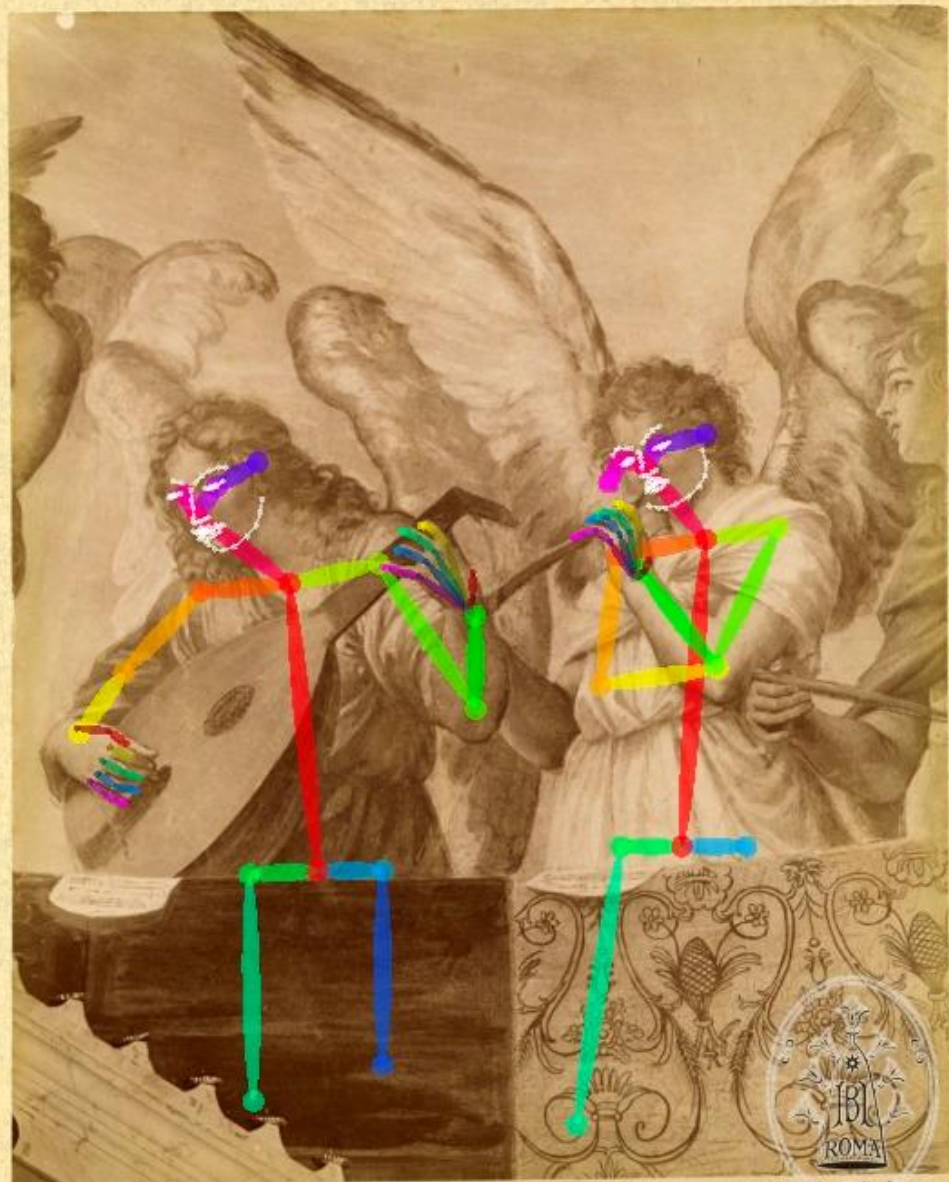
Pretrained



Domain training

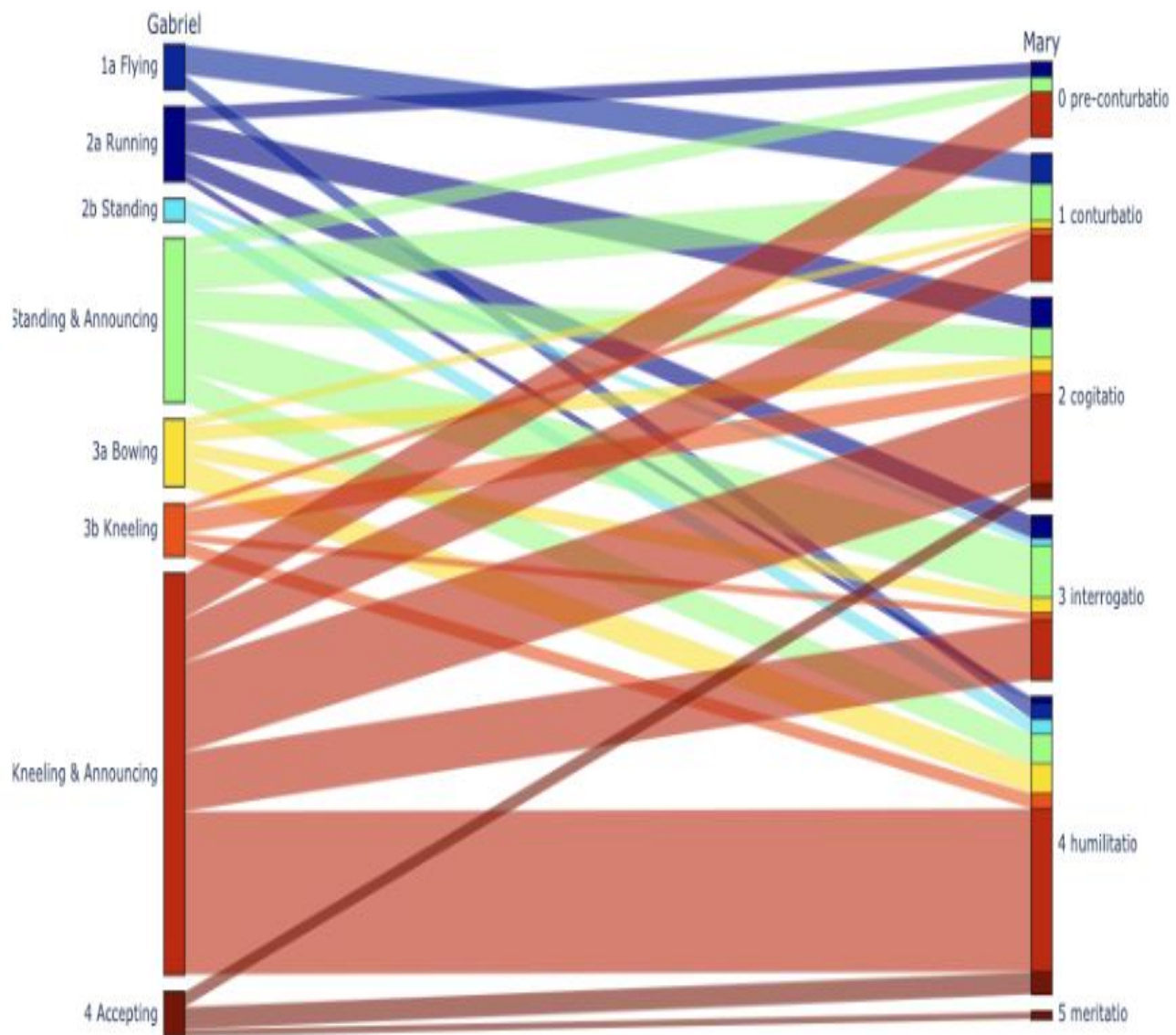
ArtDL, 10 Christian saints → Iconography recognition (SSL Trained ResNet50)
18.637 images = 14.912 (train) + 1.861 (valid) + 1.864 (test)

11/11/20
ROMA CHIESA



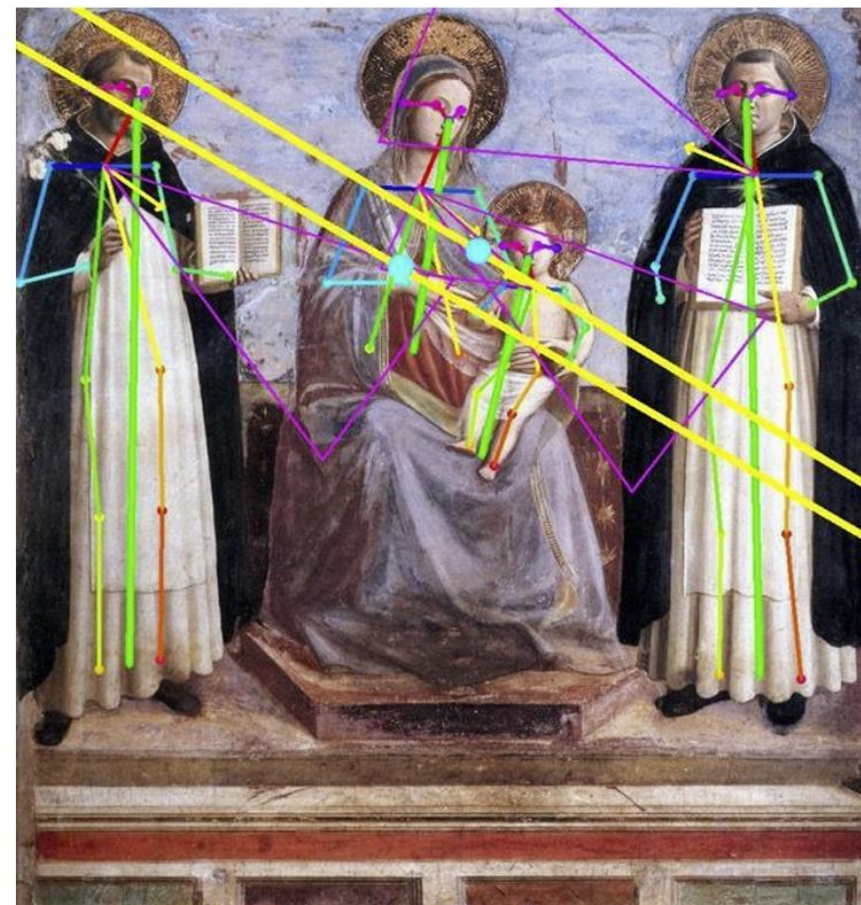
2314 - ROMA - Dettaglio: Affresco - Guido Reni - Chiesa di S. Gregorio - n. Anderson

CAPP. DI S. SILVIA



Understanding interaction

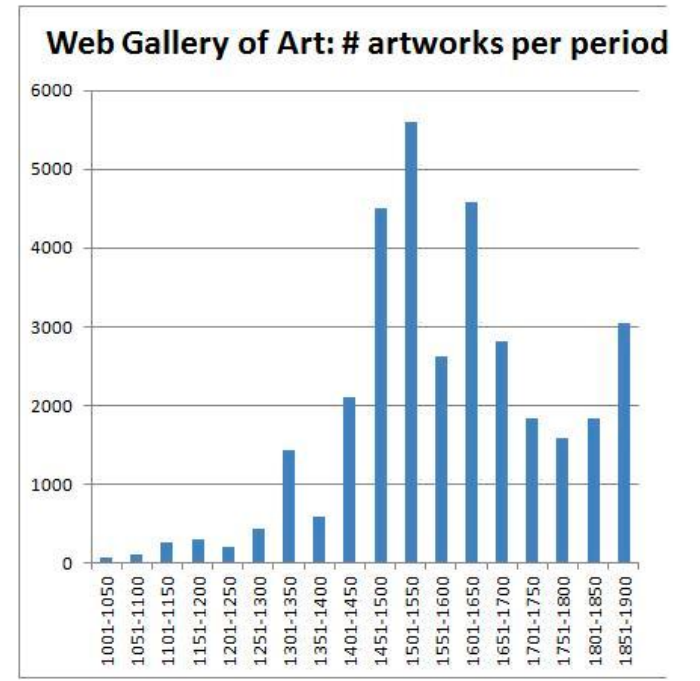
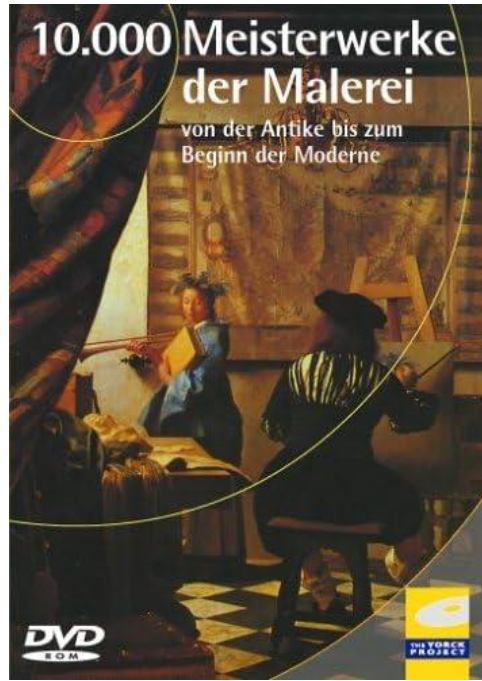
Codes and gender roles



Construction of composition (Madhu 2022, ICC++)

Challenges: Bias, Accessibility, Explainability

Bias



22

Donnerstag
Mai

Mary Cassatt
Zwei sitzende Frauen



14. Jh.

15. Jh.

16. Jh.

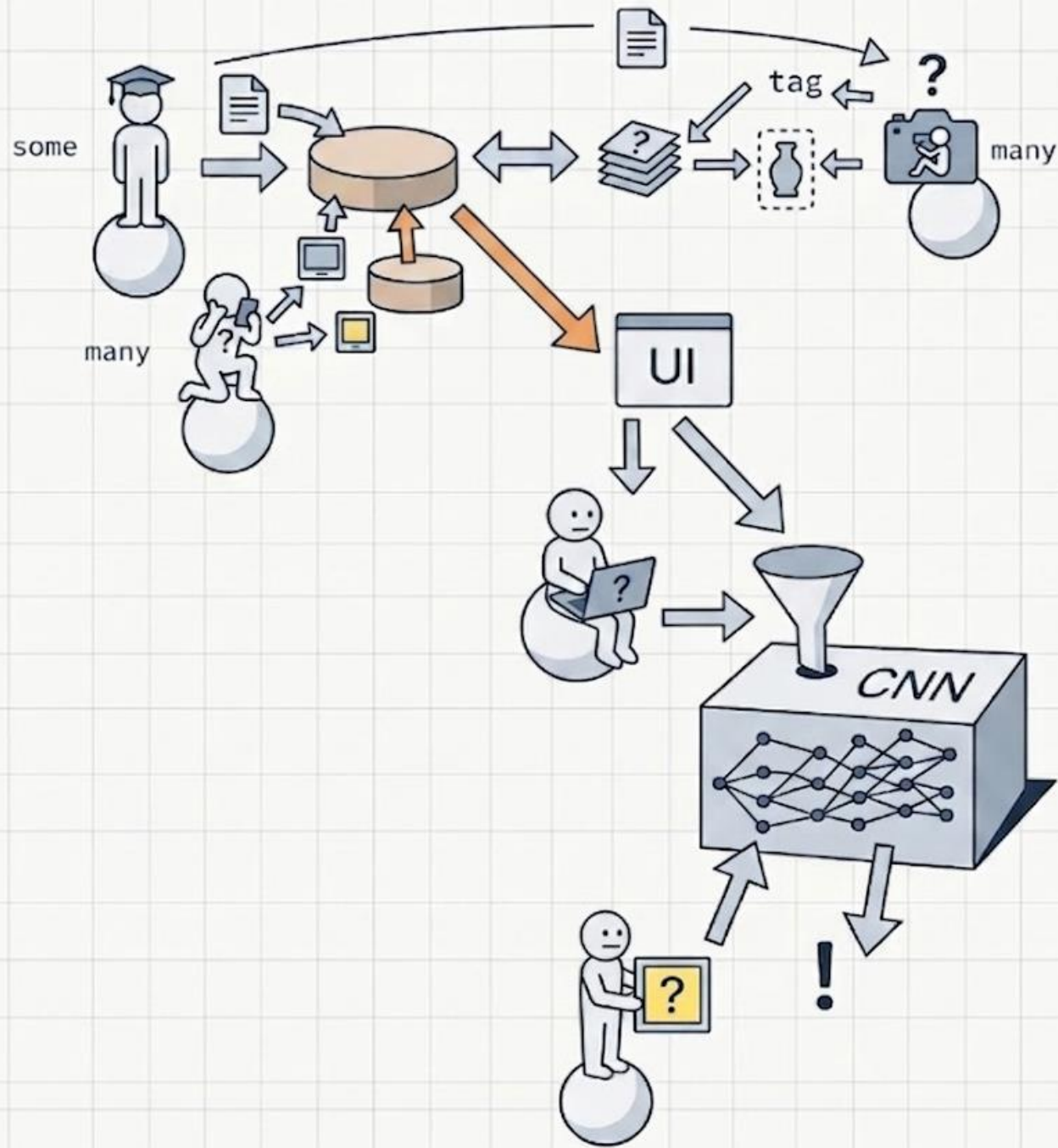
17. Jh.

18. Jh.

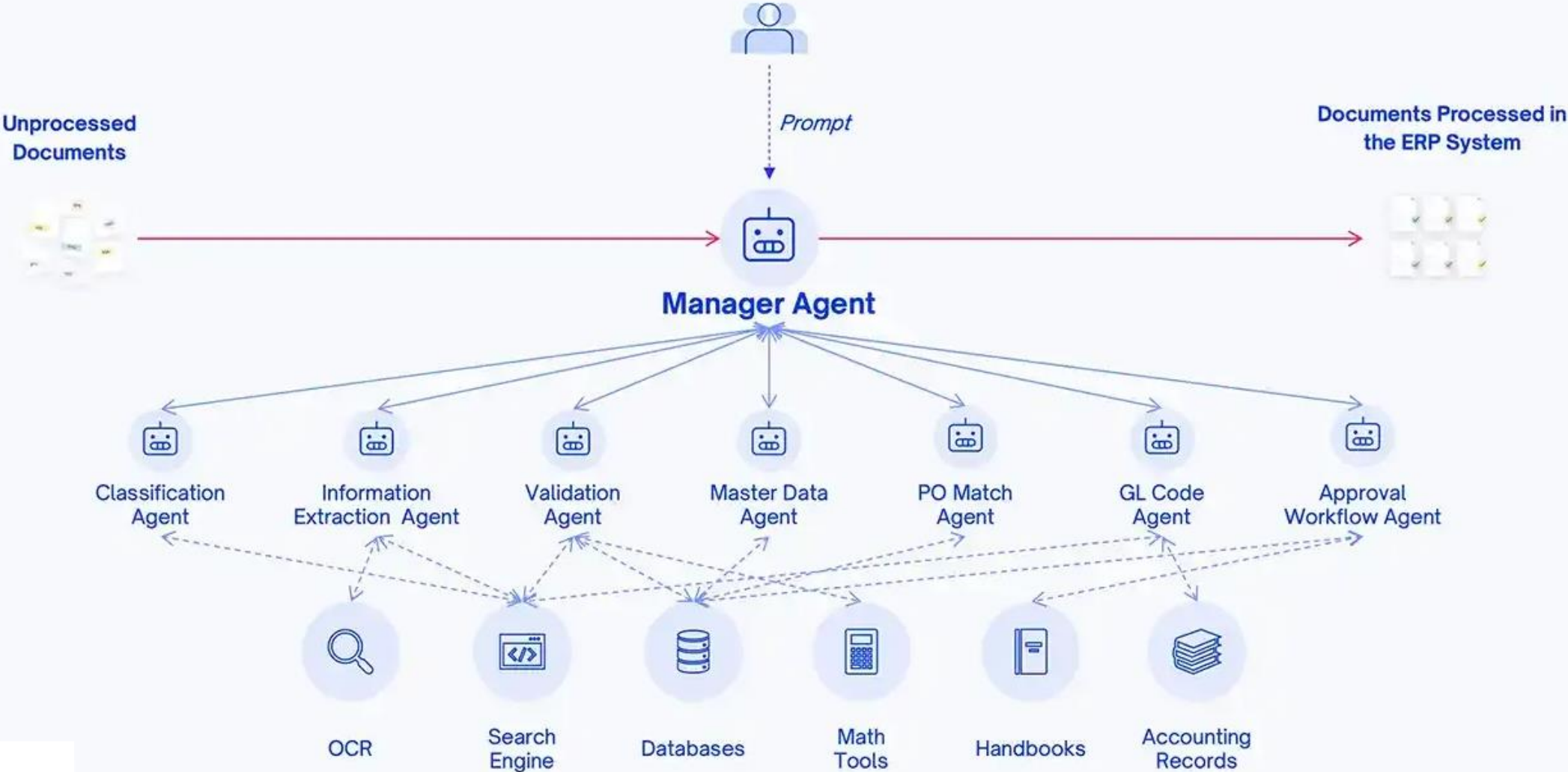
19. Jh.

20. Jh.

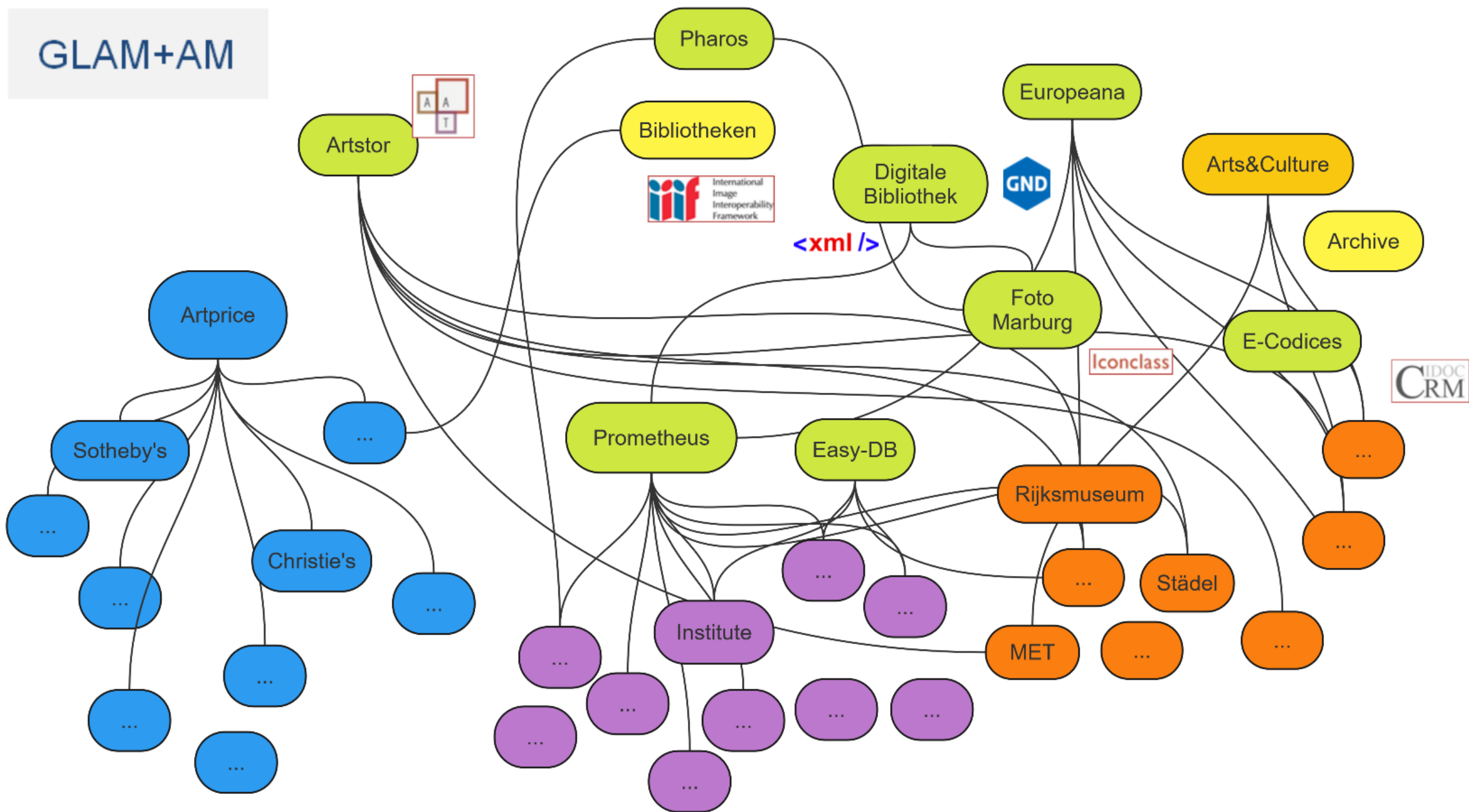
21. Jh.

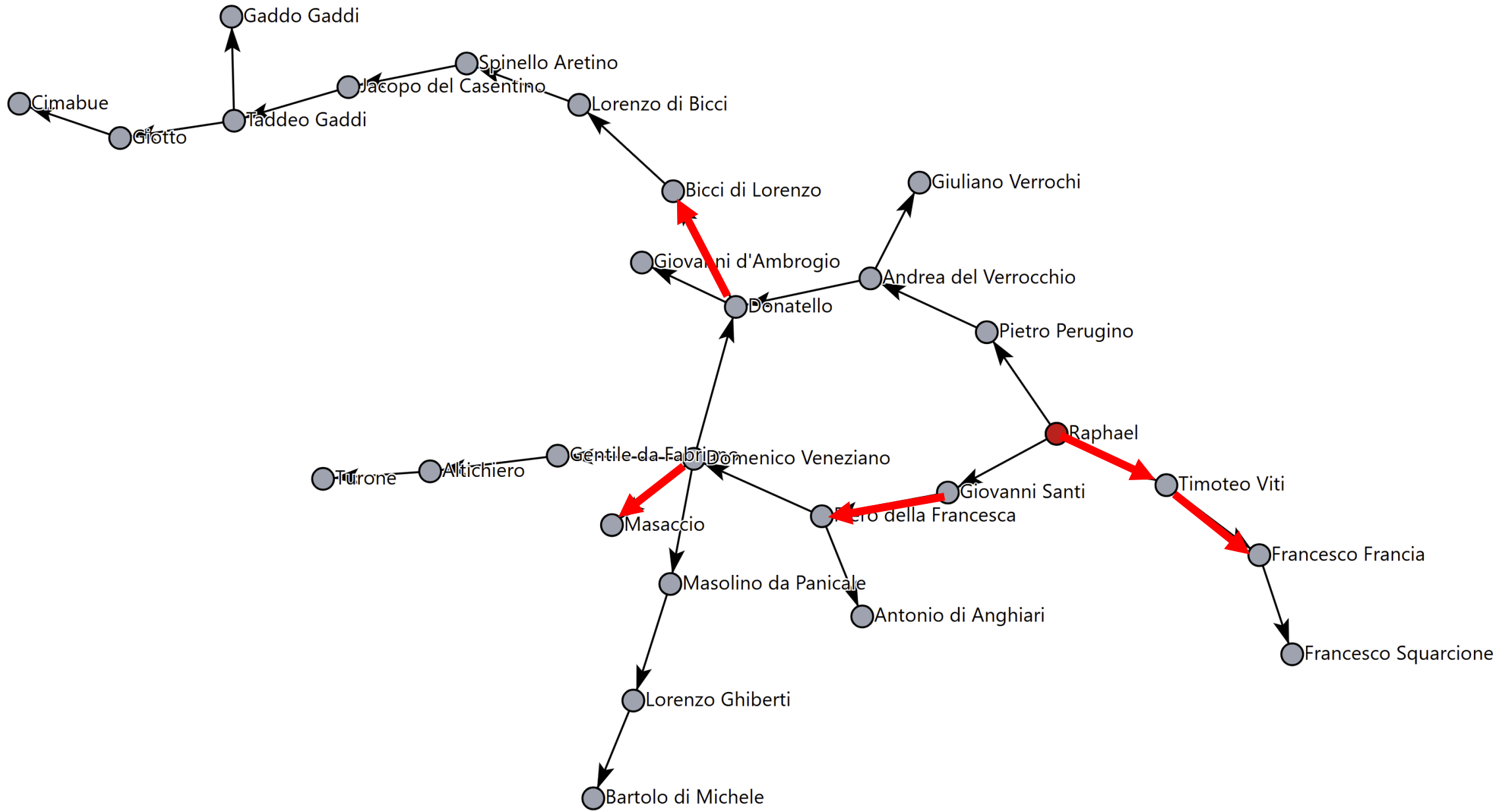


We have no black box problem anymore, we have n black box problems per n agents and more



GLAM+AM





Outlook

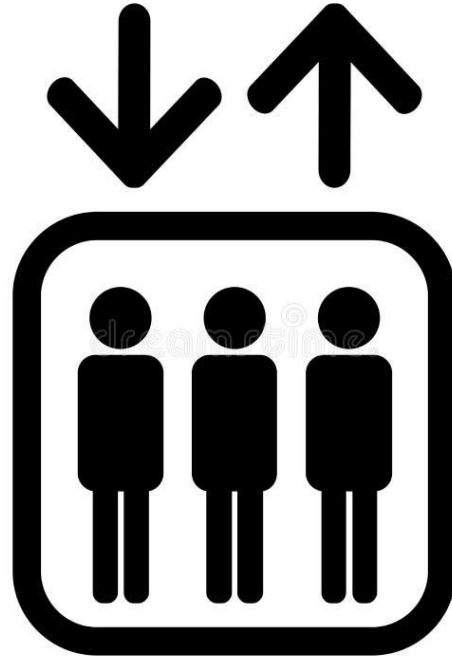




„Automation paradox“



Passively participating in AI advancement and utilizing free applications



Commercial AI tools to customize a bit more



Individual AI models developed by yourself or through close collaborations with computer science

Dive into the ocean of computer vision methods

Take some humanities method with you

Implement XAI and decide between
weak and stronger AI per case

art history & digital humanities

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BS: [@pbellarthist.bsky.social](#)

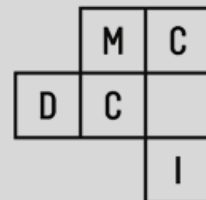
Philipps-Universität Marburg

Kunstgeschichtliches Institut

Biegenstraße 13

35032 Marburg

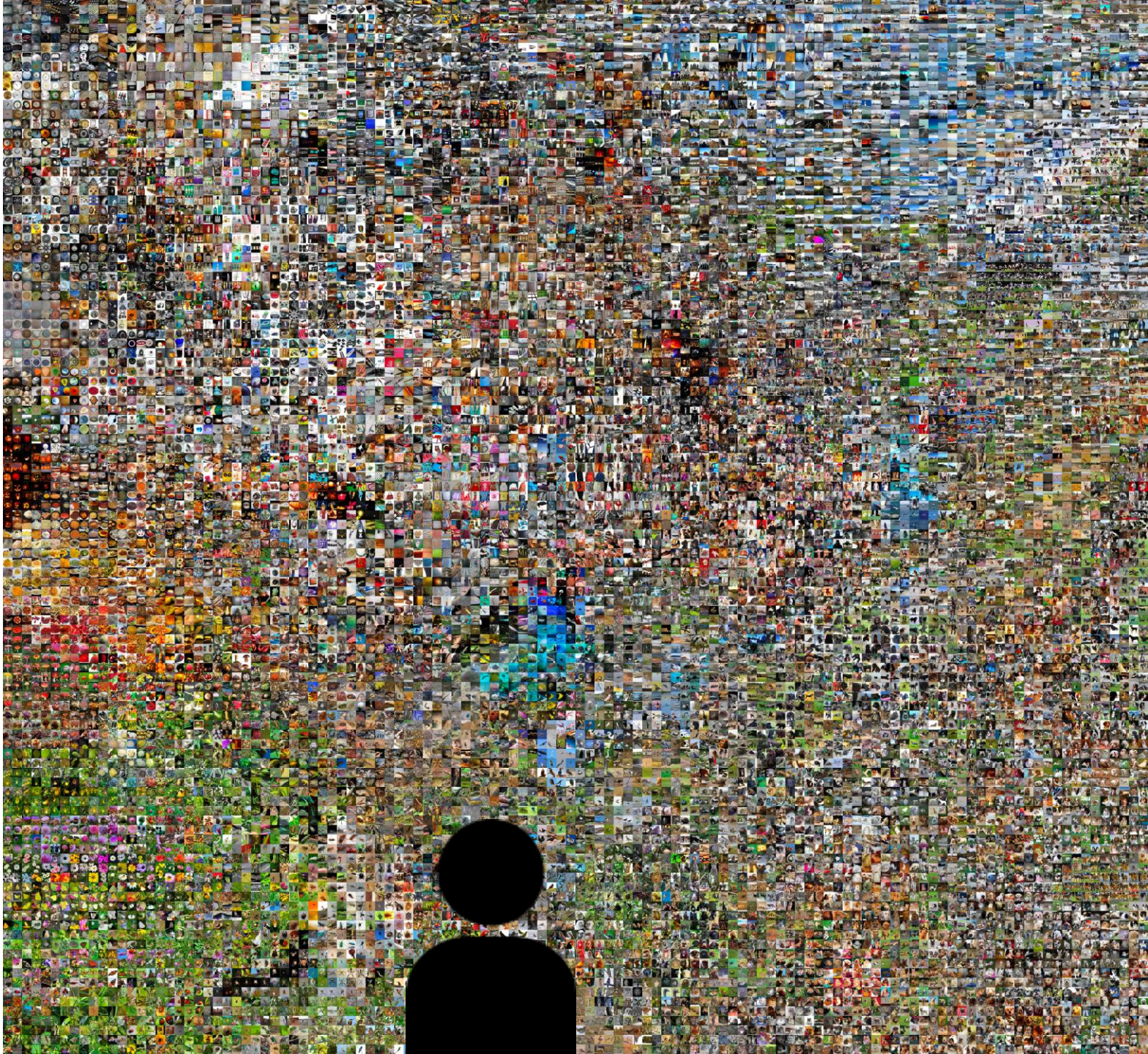
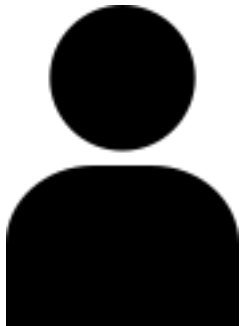
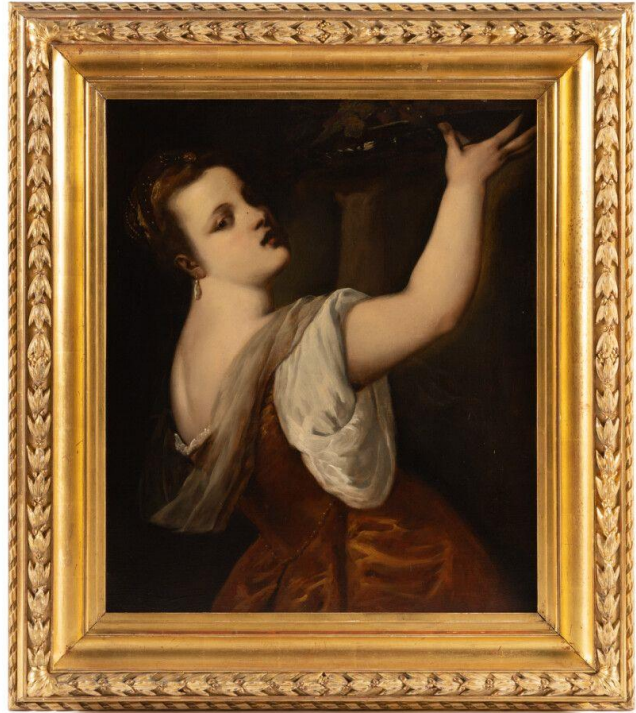
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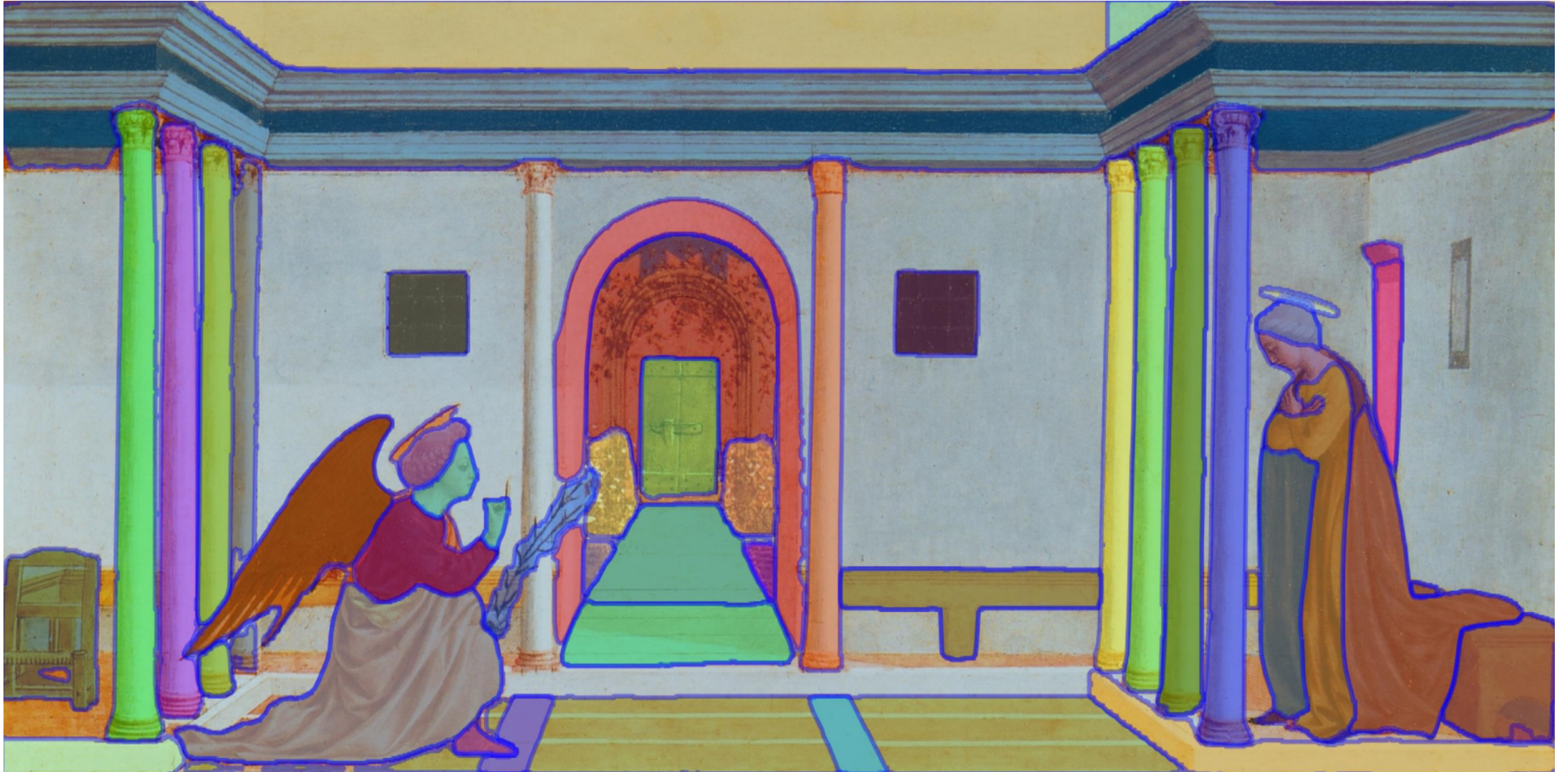


additiv

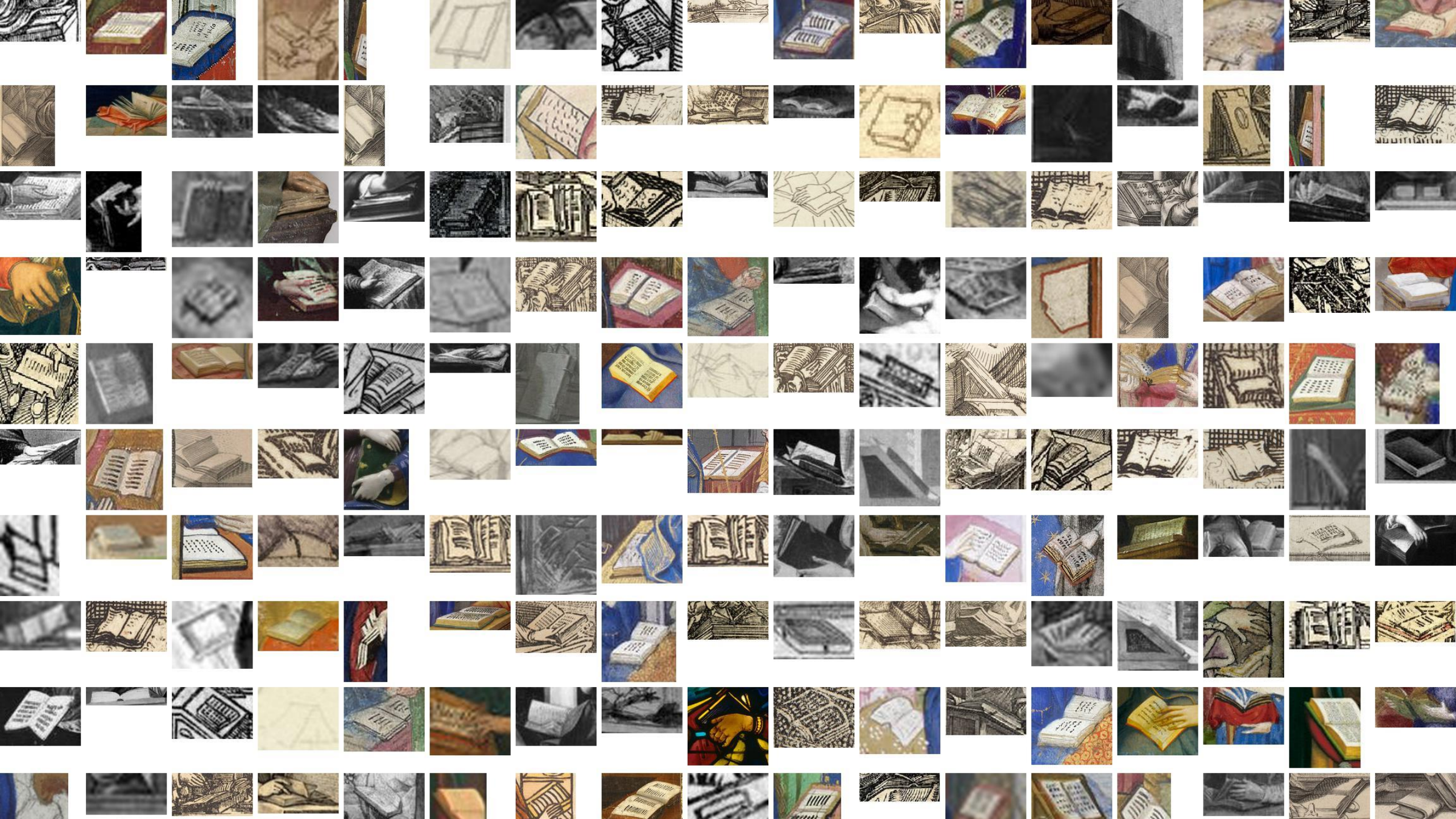


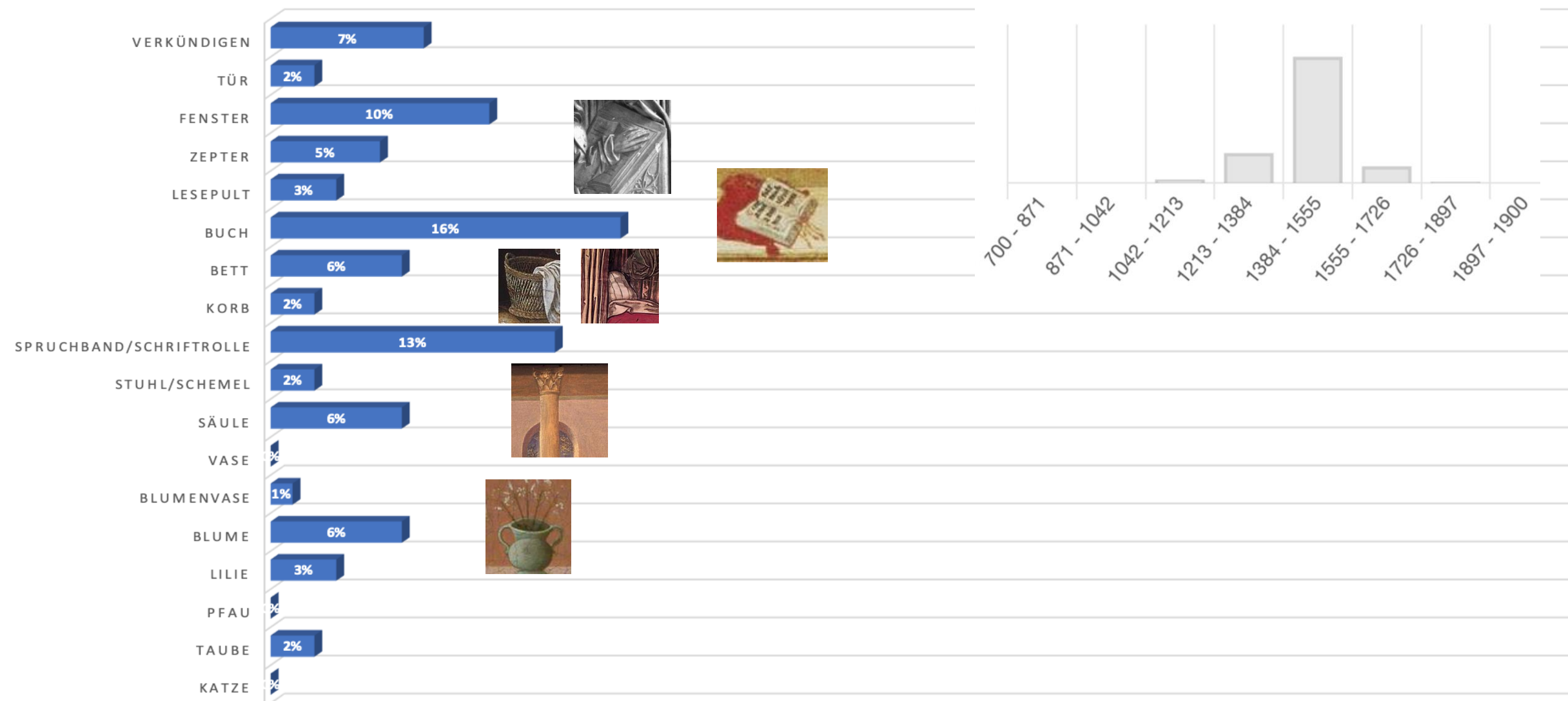
subtraktiv





Segment Anything, 2023





- ▼ **Szene: E1** (E1)
 - Handlung: **verkündigen** (E2)
 - ▼ **Person: Hl. Maria** (E3)
 - Körper: **Haartracht** (E4)
 - Kleidung: **Schapel** (E5)
 - ▼ **Kleidung: Heuke** (E6)
 - Kleidung: **Kleiderfutter** (E7)
 - ▼ **Kleidung: Rock** (E8)
 - Kleidung: **Borte** (E9)
 - ▼ **Person: Jesusknabe** (E10)
 - Objekt: Kreuz** (E11)
 - Kleidung: **nackt** (E12)
 - ▼ **Person: Hl. Gabriel** (E13)
 - ▼ **Objekt: Spruchband** (E14)
 - ▼ **Objekt: Inschrift** (E15)
 - Originalzitat: **Originalzitat** (E16)
 - ▼ **Kleidung: Chormantel** (E17)
 - Objekt: **Agraffe** (E18)
 - Kleidung: **Borte** (E19)
 - ▼ **Kleidung: Saum** (E20)
 - Objekt: **Besatz** (E21)
 - Kleidung: **Albe** (E22)
 - ▼ **Person: Gottvater** (E23)
 - Kleidung: **Heuke** (E24)
 - Objekt: **Heiliggeisttaube** (E25)
 - ▼ **Objekt: Fenster** (E26)
 - Objekt: **Vogelkäfig** (E27)
 - Objekt: **Vogel, Stieglitz** (E28)
 - Objekt: **Apfel** (E29)
 - Objekt: **Pfirsich** (E30)
 - ▼ **Objekt: Betpult** (E31)
 - Objekt: **Pennal** (E32)
 - ▼ **Objekt: Leseputz** (E33)
 - ▼ **Objekt: Pultlaken** (E34)
 - Objekt: **Franse** (E35)
 - Objekt: **Borte** (E36)
 - ▼ **Objekt: Buch** (E37)
 - Objekt: **Beschlag** (E38)
 - ▼ **Objekt: Sitzbank** (E39)
 - Objekt: **Sitzkissen, Polster** (E40)
 - ▼ **Objekt: Baldachin** (E41)
 - ▼ **Objekt: Rücklaken** (E42)
 - Objekt: **Stoffmuster** (E43)
 - ▼ **Objekt: Fenster** (E44)
 - Objekt: **Fenstergitter** (E45)
 - ▼ **Objekt: Fußboden** (E46)
 - Objekt: **Polster** (E47)
 - Objekt: **Platte** (E48)
 - Ort: **Innenraum** (E53)
 - ▼ **Szene: E49** (E49)
 - Objekt: **Fluss** (E50)
 - Objekt: **Wald** (E51)
 - Objekt: **Burg** (E52)
 - Ort: **Landschaft** (E54)

Kreuz ^{E11}

Objekt

Name

Kreuz

Primärbild



Schließen

FILTER

Bildthema: Verkündigung an

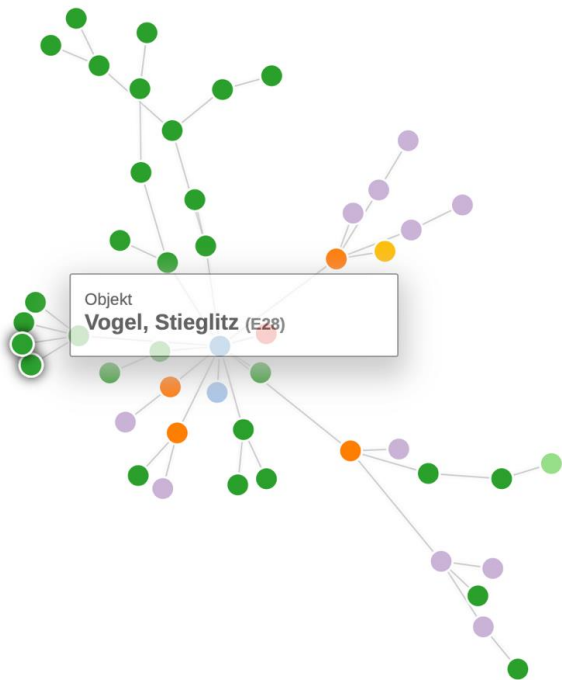
Visueller Graph

Listenansicht

Volltextansicht

Werksinformationen

- Szene ●
- Handlung ●
- Ort ●
- Historischer Ort ●
- Person ●
- Körper ●
- Kleidung ●
- Objekt ●
- Originalzitat ●



+ -



Vogel, Stieglitz ^{E28}

Objekt

Name

Vogel

Stieglitz ?

Primärbild



Schließen

FILTER

Bildthema: Verkündigung an

TECHNIK