

# Visualizing the Avant-Garde: Data-Driven Insights into Artist Connections

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Bachelor Thesis Colloquium

1. *Evaluated by: Pr. Dr. Daniel Keim*

2. *Evaluated by: Jun.-Prof. Dr. Andreas Spitz*

Supervisor: Raphael Buchmüller

Chair of Data Analysis & Visualization



# Explosion of Diverse Artistic Movements

## Motivation

[1] The City Rises, 1910  
by Umberto Boccioni  
**(Futurism)**



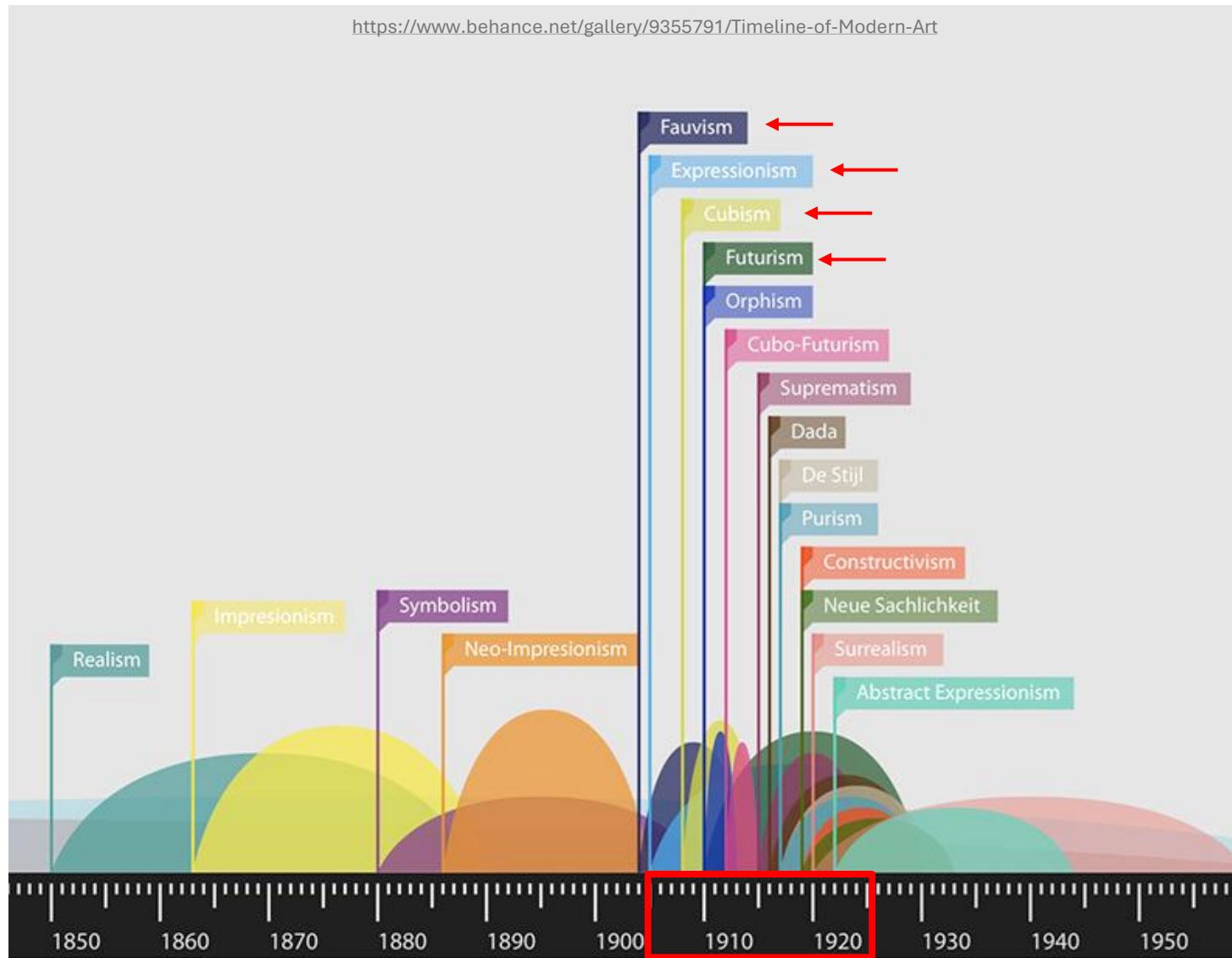
<https://www.moma.org/collection/works/79865>

[2] The Scream, 1893 by  
Edvard Munch  
**(Expressionism)**



[https://www.edvardmunch.org/the-scream.jsp#google\\_vignette](https://www.edvardmunch.org/the-scream.jsp#google_vignette)

<https://www.behance.net/gallery/9355791/Timeline-of-Modern-Art>



[3] Joy of Life, 1905  
by Henri Matisse  
**(Fauvism)**



<https://www.henrimatisse.org/joy-of-life.jsp>

[4] Girl with Mandolin, 1910  
by Pablo Picasso  
**(Cubism)**



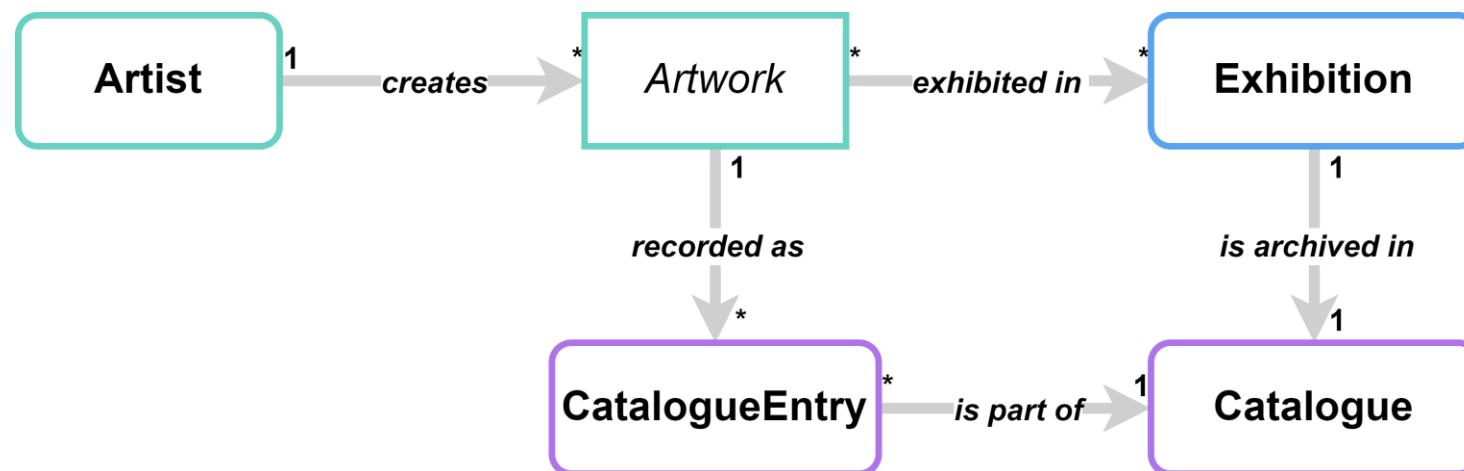
<https://www.pablopicasso.org/cubism.jsp>

# Exhibitions as Hubs for Artistic Exchange

*Motivation*



## Overview Database „DoME“



- Principal Investigator: **Raphael Rosenberg**
  - professor at the Department of **Art History** (University of Vienna)
- **European Paintings and Drawings 1905-1915**

# Research Question

*Introduction*

**How can we deepen the  
Understanding of Artist Connections  
through Visual Analytics?**

# DoME Offers Multiple Dimensions

## Introduction

Geographical



Temporal



Contextual



### Artist



Born in: Zundert  
(Netherlands)

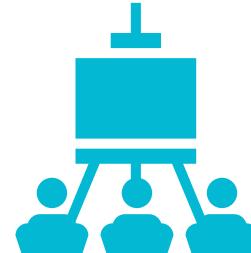
Died in: Auvers-sur-Oise (France)

Born in: 1853

Died in: 1890

Name: Vincent Van Gogh

### Exhibition



In New York (USA)

Duration: 17.02.1913 –  
15.03.1913

Name: International  
Exhibition of Modern  
Art

271 Participants

### Artwork



Technique: Oil painting

# Overview of Related Work

## Background

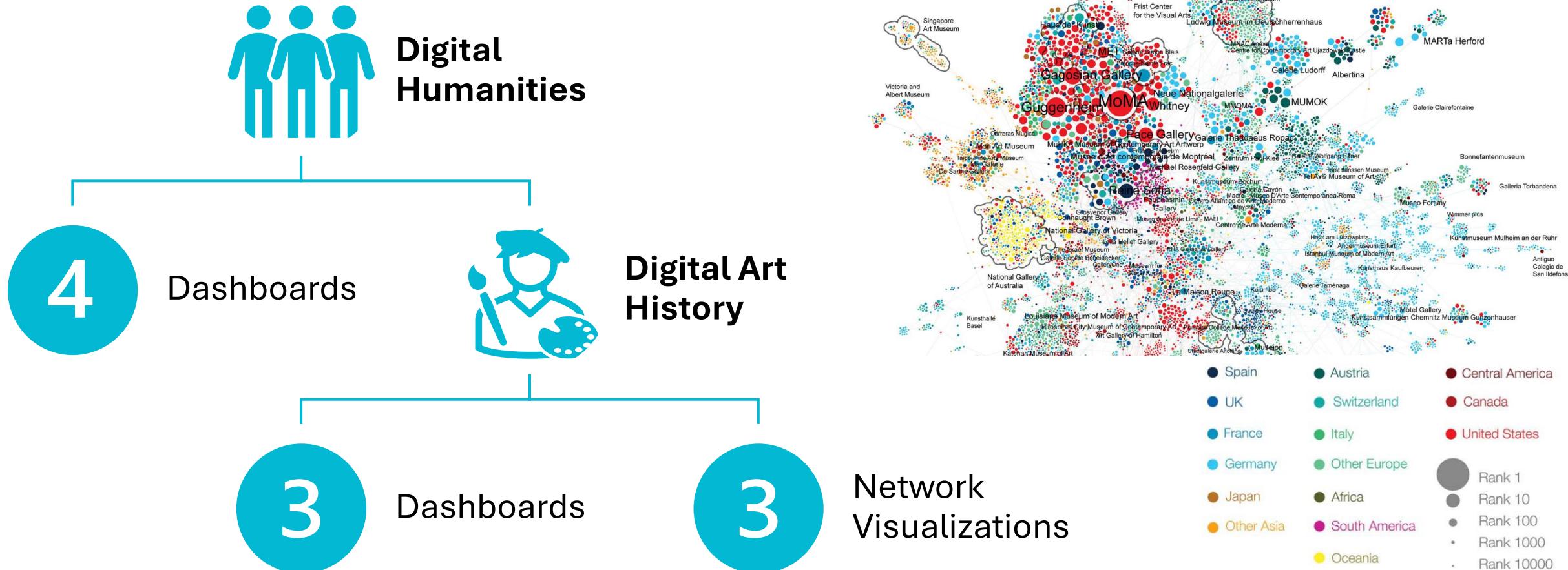


Figure 1 of Fraiberger, S. P., Sinatra, R., Resch, M., Riedl, C., & Barabási, A.-L. (2018). Quantifying reputation and success in art. *Science*, 362(6416), 825-829.  
<https://doi.org/10.1126/science.aau7224>

# Related Work: Eurovis 2024

## Background

### Mapping the Avantgarde: Visualizing Modern Artists' Exhibition Activity.

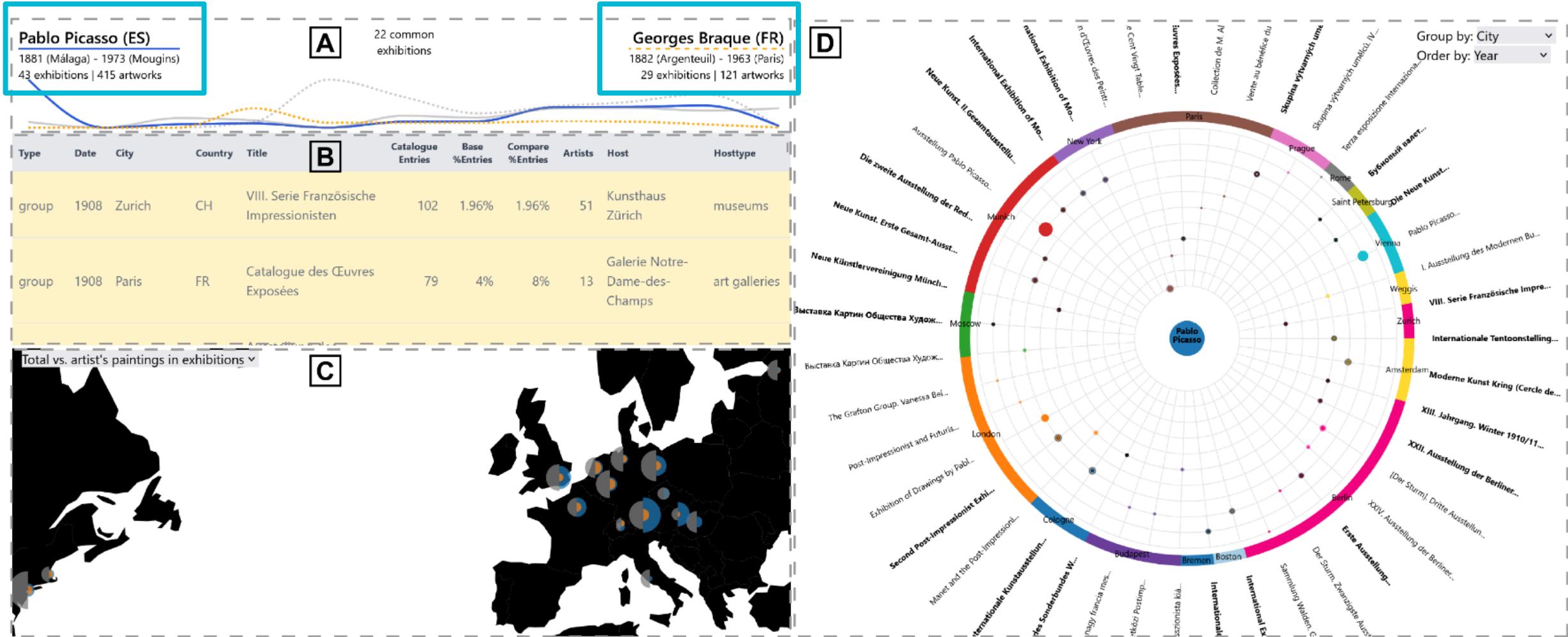


Figure 1 of Michaela Tuscher, Velitchko Andreev Filipov, Teresa Kamencek, **Raphael Rosenberg**, and Silvia Miksch. 2024. Mapping the Avantgarde: Visualizing Modern Artists' Exhibition Activity. *EuroVis 2024 - Short Papers* (2024). <https://doi.org/10.2312/EVS.20241063>

# 4 Main Analytical Tasks

Use of **Intermediate Feedback** with Research Group in Vienna  
including **Raphael Rosenberg** and **Silvia Miksch**



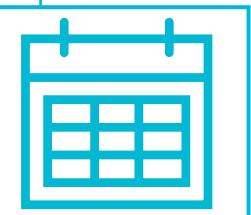
## [T1] Unveiling Artist Networks

- [R1.1] Show Clusters and Artists
- [R1.2] Display Intra-Cluster Connections
- [R1.3] Display Inter-Cluster Connections
- [R1.4] Highlight Influential Artists
- [R1.5] Support Interactive Exploration



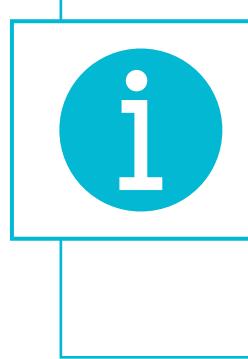
## [T2] Mapping Geographic Influences

- [R2.1] Integrate Geographic Information into Network
- [R2.2] Provide Exhibition Locations
- [R2.3] Visualize Artists' Lifespan Locations
- [R2.4] Use Maps as Visual Legends



## [T3] Exploring Temporal Overlaps

- [R3.1] Display Artist Lifespans
- [R3.2] Provide Overview of Exhibition Periods
- [R3.3] Visualize Detailed Exhibition Timelines
- [R3.4] Facilitate Comparing Temporal Patterns

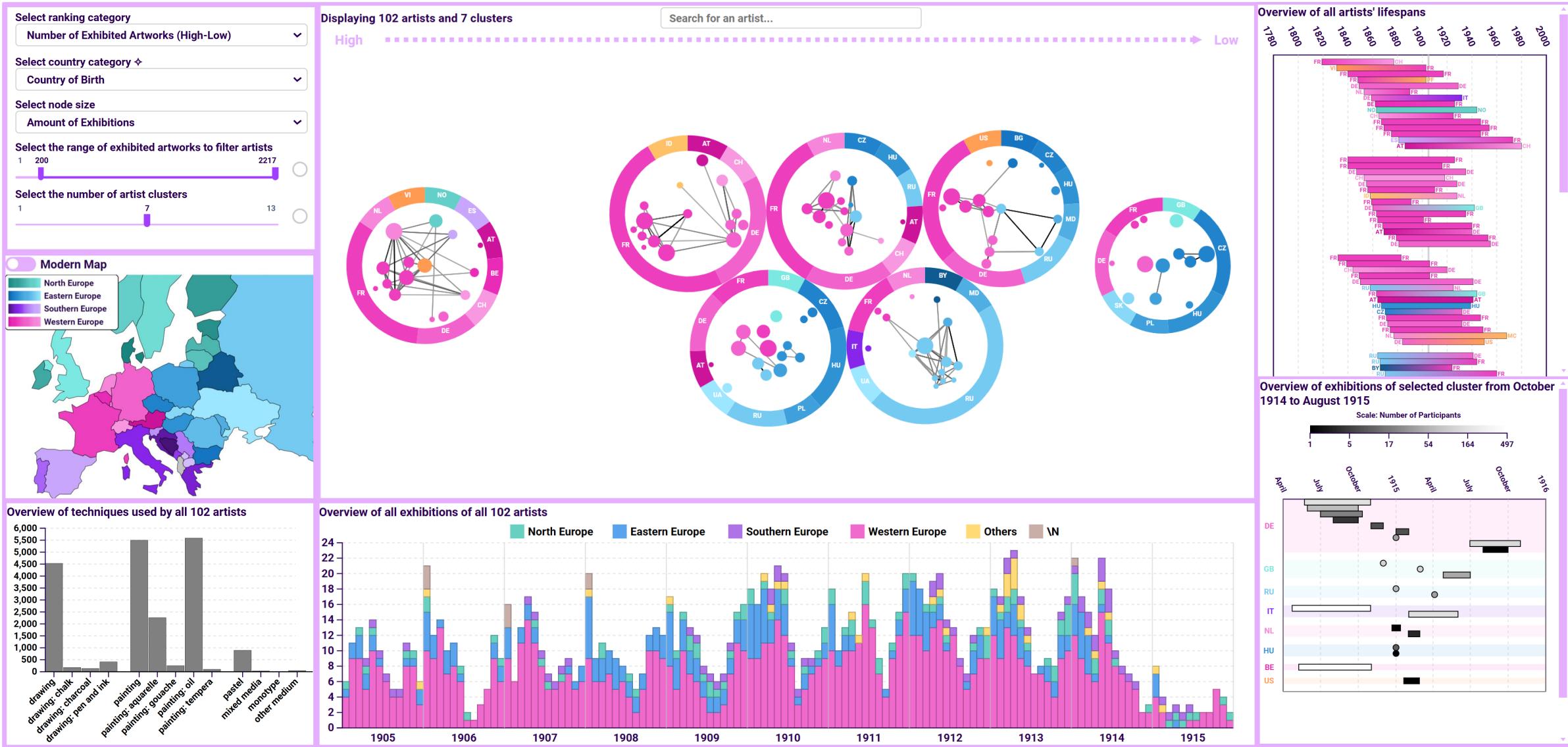


## [T4] Providing Comprehensive Context

- [R4.1] Include Biographical Details
- [R4.2] Display Exhibition Details
- [R4.3] Provide Artist Techniques
- [R4.4] Support AI-Generated Insights

# Overview of Dashboard

## ArtistryConnect



# Custom Radial Layout

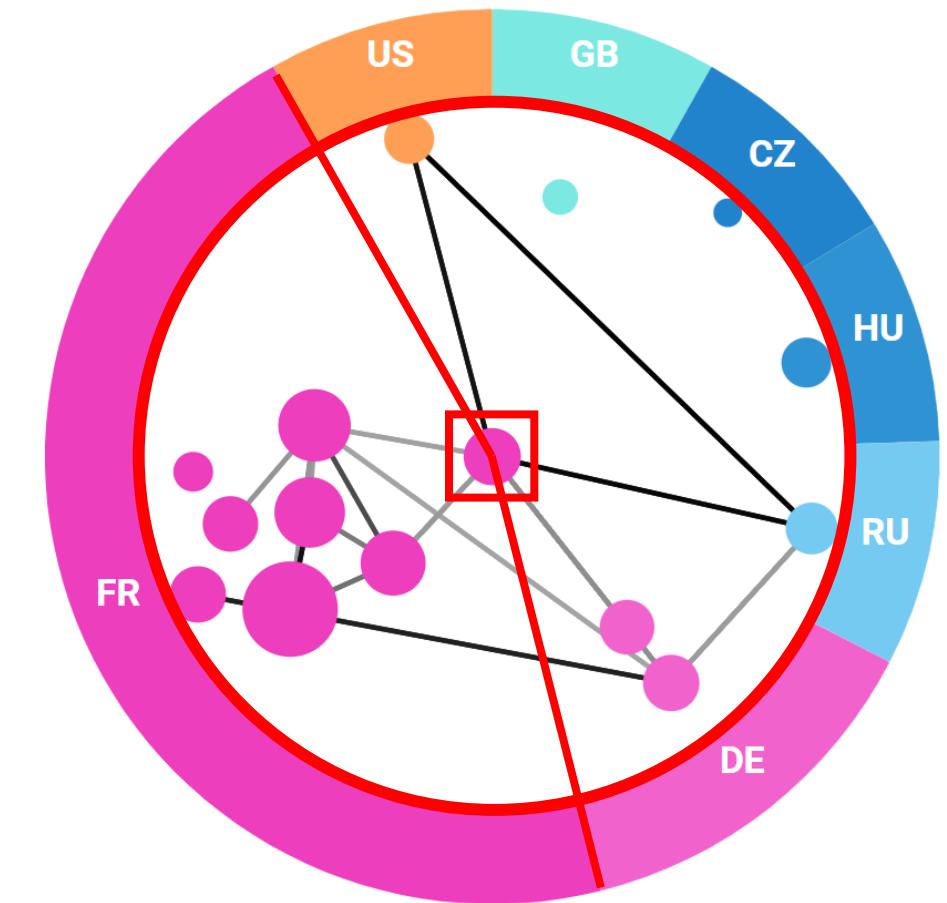
ArtistryConnect

## Node - Artist

- Placed from **inner to outer circle** based on degree to visualize **relevance**
- Positioned within **angle** of (here:) their death **country**
- **Size:** Amount of Exhibitions
  - Adjustable in tool

## Edges – Co-Exhibition

- Edge **weight:** based on min. number of artworks both artists exhibited
- Avoid Clutter: **threshold & color scale**



[R1.4] Highlight Influential Artists  
[R2.1] Integrate Geographic Information into Network

# Custom Radial Layout

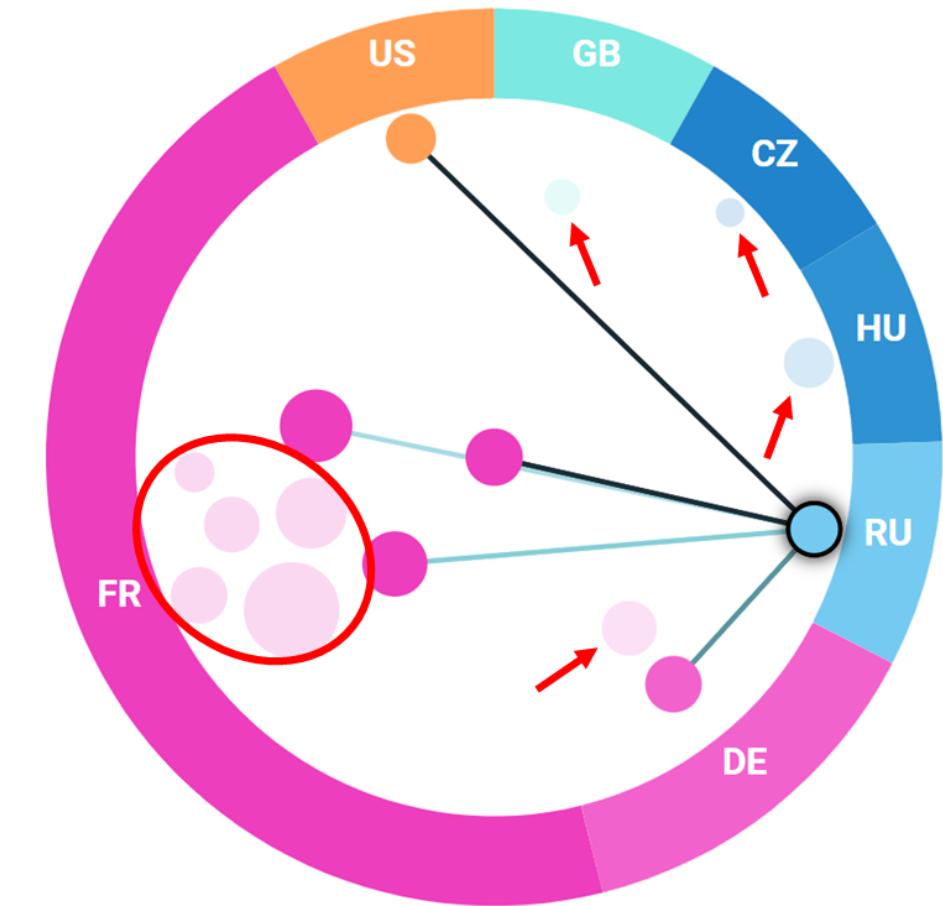
ArtistryConnect

## Node - Artist

- Placed from **inner to outer circle** based on degree to visualize **relevance**
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- **Size:** Amount of Exhibitions
  - Adjustable in tool

## Edges – Co-Exhibition

- Edge **weight:** based on min. number of artworks both artists exhibited
- Avoid Clutter: **threshold & color scale**
- **Edges visible by interaction**



[R1.4] Highlight Influential Artists  
[R2.1] Integrate Geographic Information into Network  
[R1.2] Display Intra-Cluster Connections 11

# Custom Clustering Approach

*ArtistryConnect*

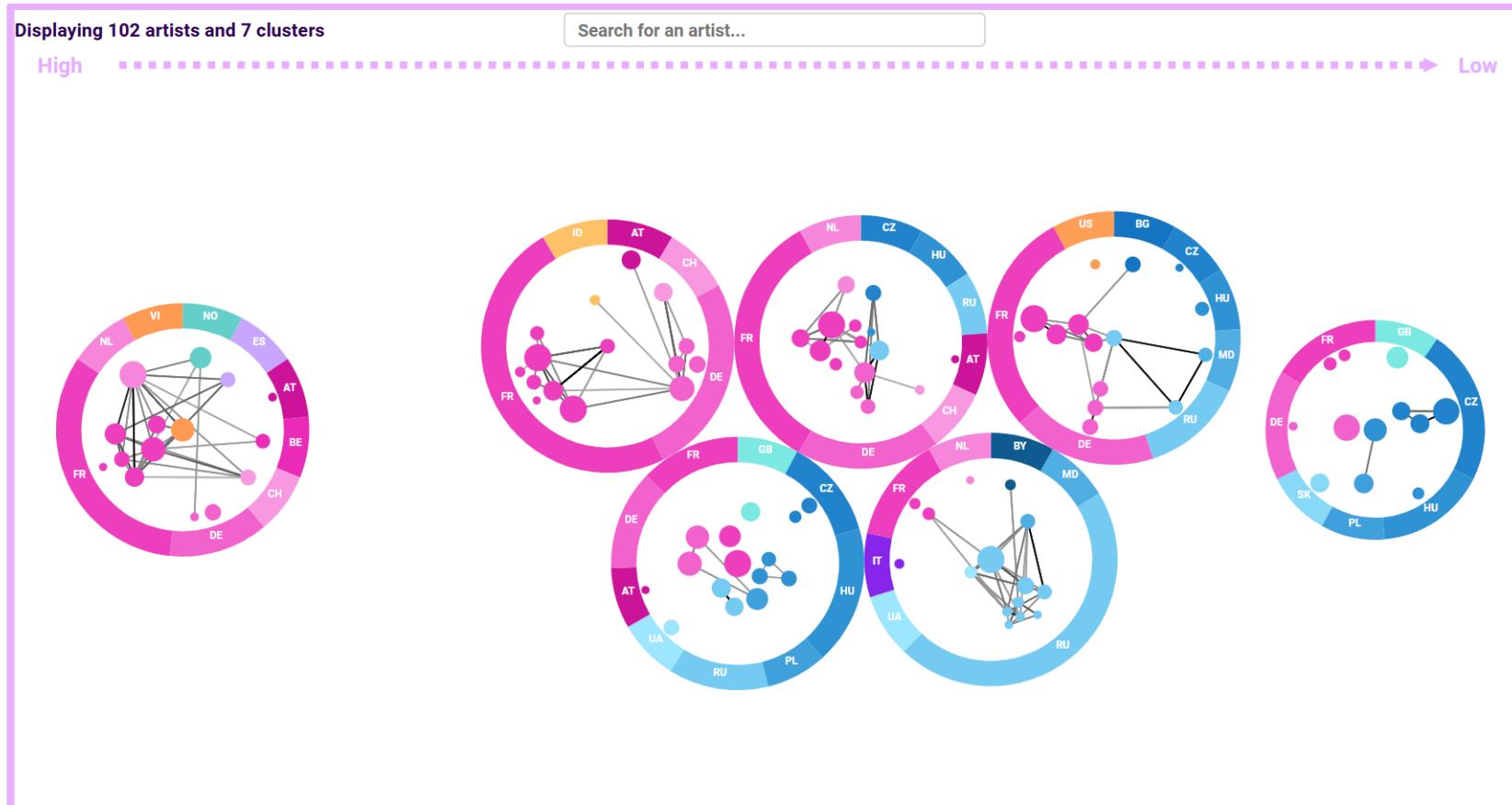
- Experimented with benchmark Algorithms:
  - *Modularity Optimization, SCC, WCC, Louvain*
  - Too many clusters even for a smaller number of artists
  - **No control over the number of clusters**
- Own Implementation of **Spectral Clustering**
  - Suitable for graph structure
  - Utilizes edge weights

## **Main Steps:**

1. Adjacency & Degree Matrix Construction
2. Laplacian Matrix Calculation & Normalization
3. Eigenvalue Decomposition
4. K-means Clustering

# Ranking of Clusters

*ArtistryConnect*

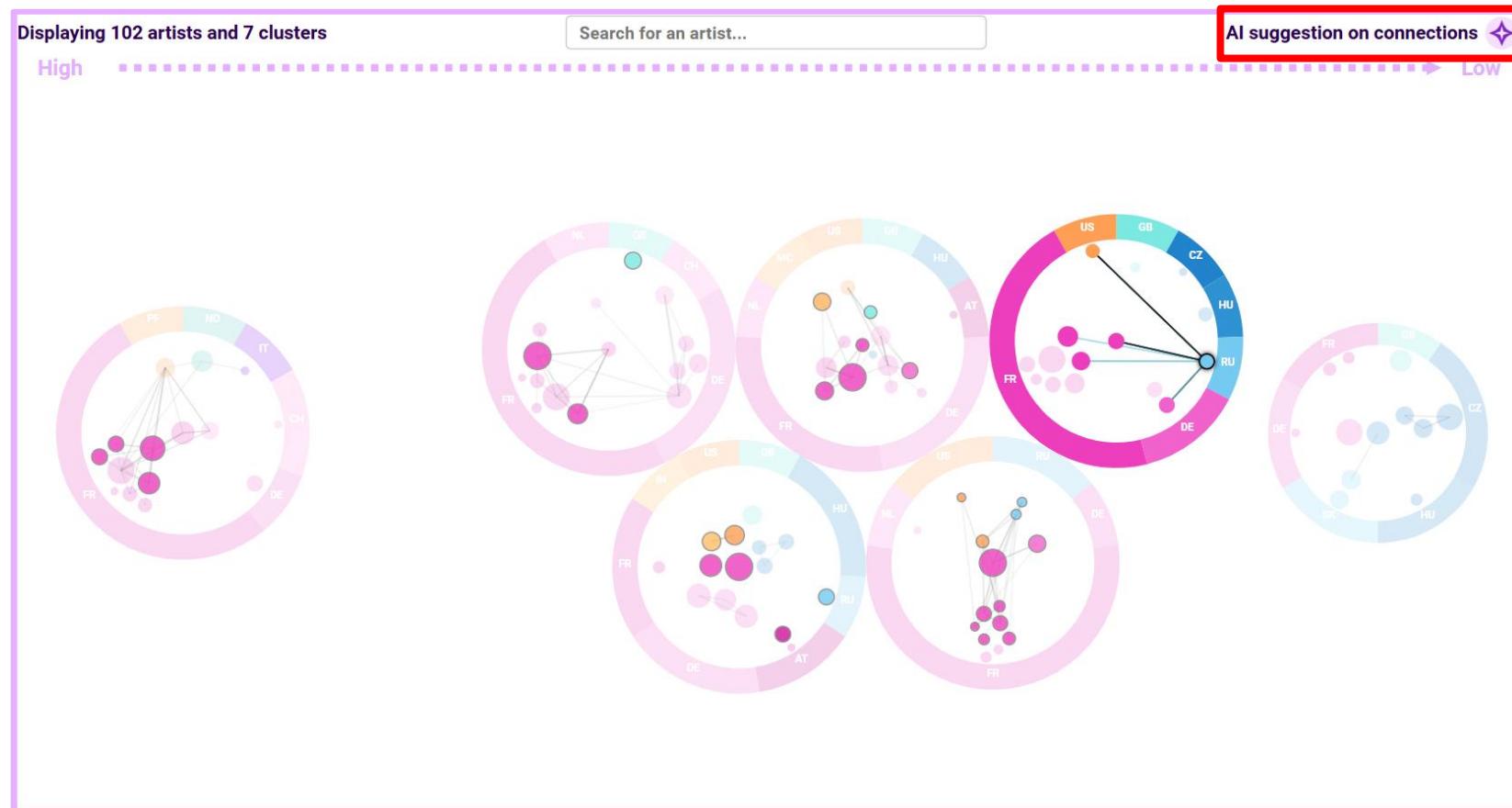


[R1.1] Show Clusters and Artists



# Inter-community Connections

ArtistryConnect



[R4.4] Support AI-Generated Insights

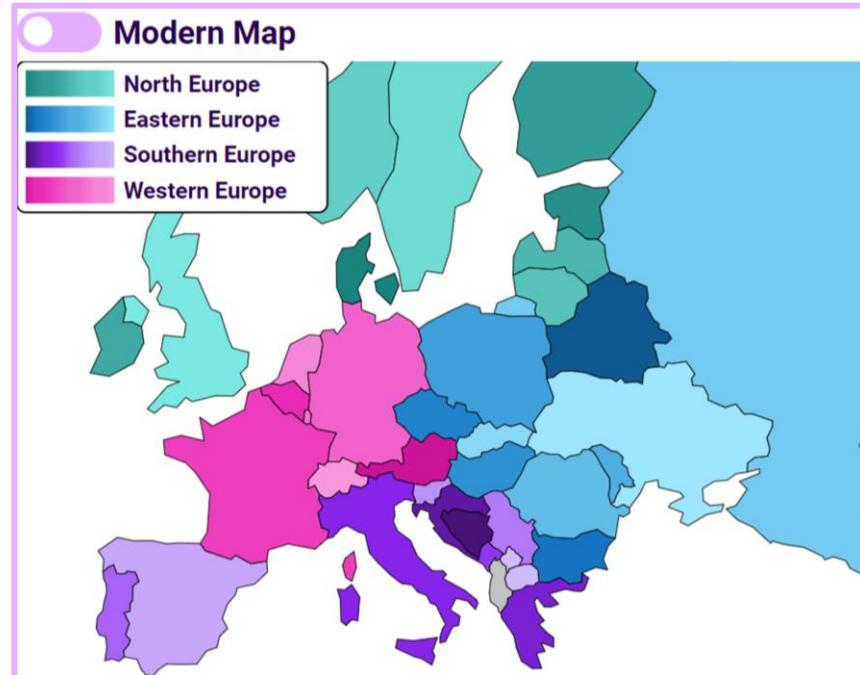


[R1.3] Display Inter-Cluster Connections

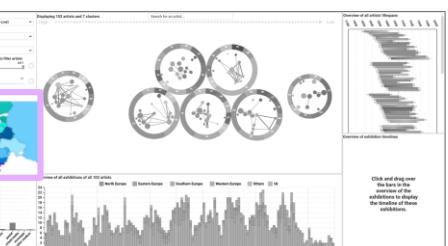


# Regional Color Schemes

ArtistryConnect



Split of Regions: Geoscheme of United Nations Statistics Division (**UNSD**)

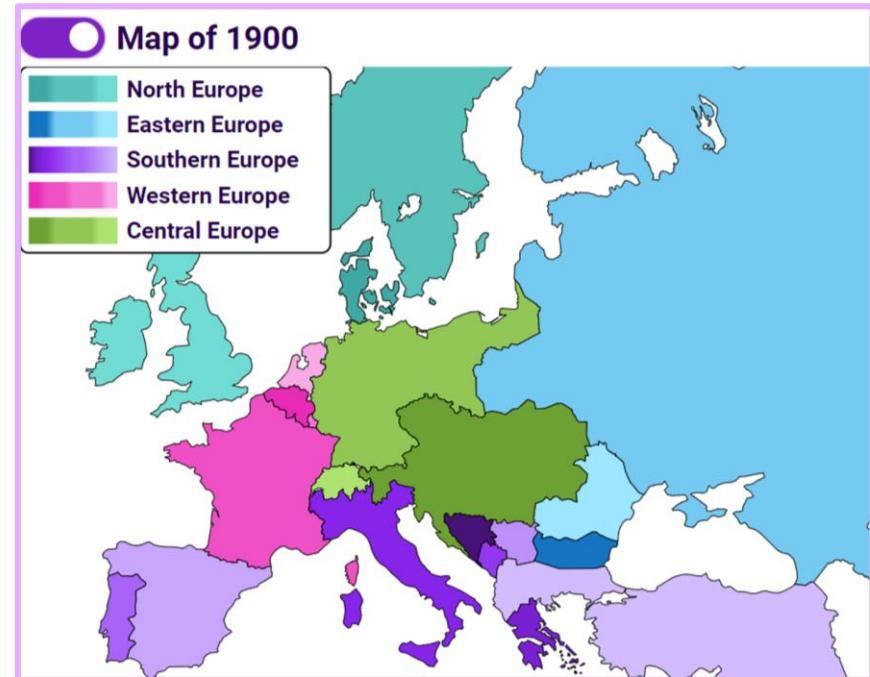


**Goal:** Support Geographical tasks in whole dashboard

For non-european countries:



[R2.4] Use Maps as Visual Legends



Central Europe added based on **Raphael Rosenberg's** feedback  
(intermediate feedback)

UNSD: <https://unstats.un.org/unsd/methodology/m49/>

# Navigation Component

ArtistryConnect



[R1.5] Support Interactive Exploration

Select ranking category

Number of Exhibited Artworks (High-Low) ▾

Select country category ✧

Country of Birth ▾

Select node size

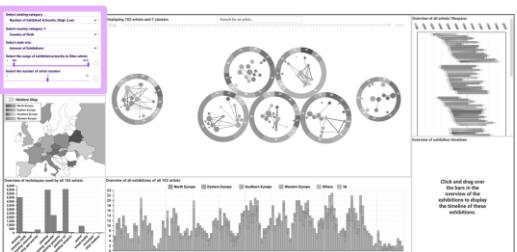
Amount of Exhibitions ▾

Select the range of exhibited artworks to filter artists

1    200    2217

Select the number of artist clusters

1    7    13



# Navigation Component

ArtistryConnect



[R1.5] Support Interactive Exploration

Select ranking category

Number of Exhibited Artworks (High-Low)

Select country category ✧

Country of Birth

Select node size

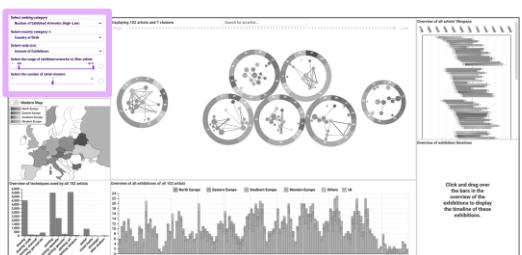
Variety of Used Techniques

Select the range of exhibited artworks to filter artists

1    200    2217

Select the number of artist clusters

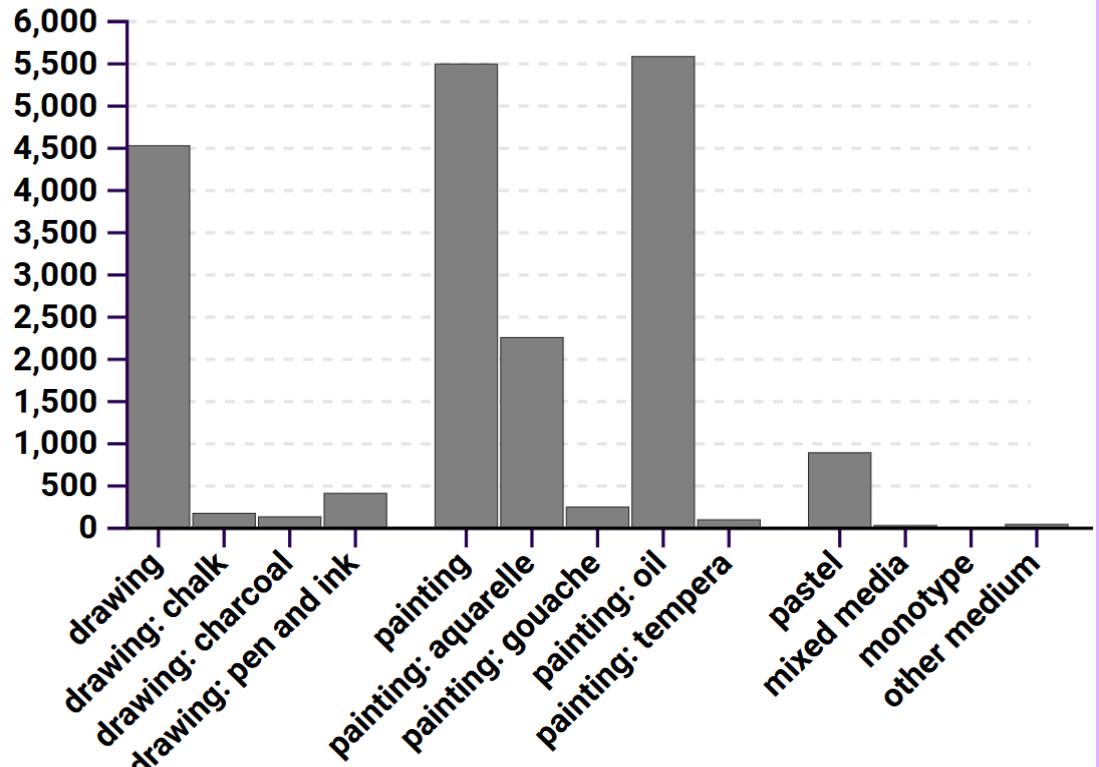
1    7    13



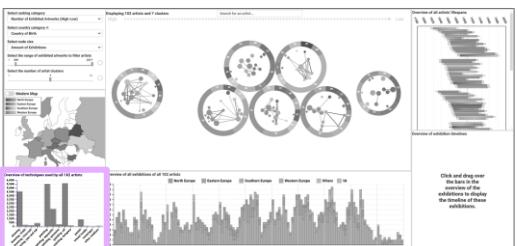
# Techniques

ArtistryConnect

## Overview of techniques used by all 102 artists



[R4.3] Provide Artist Techniques

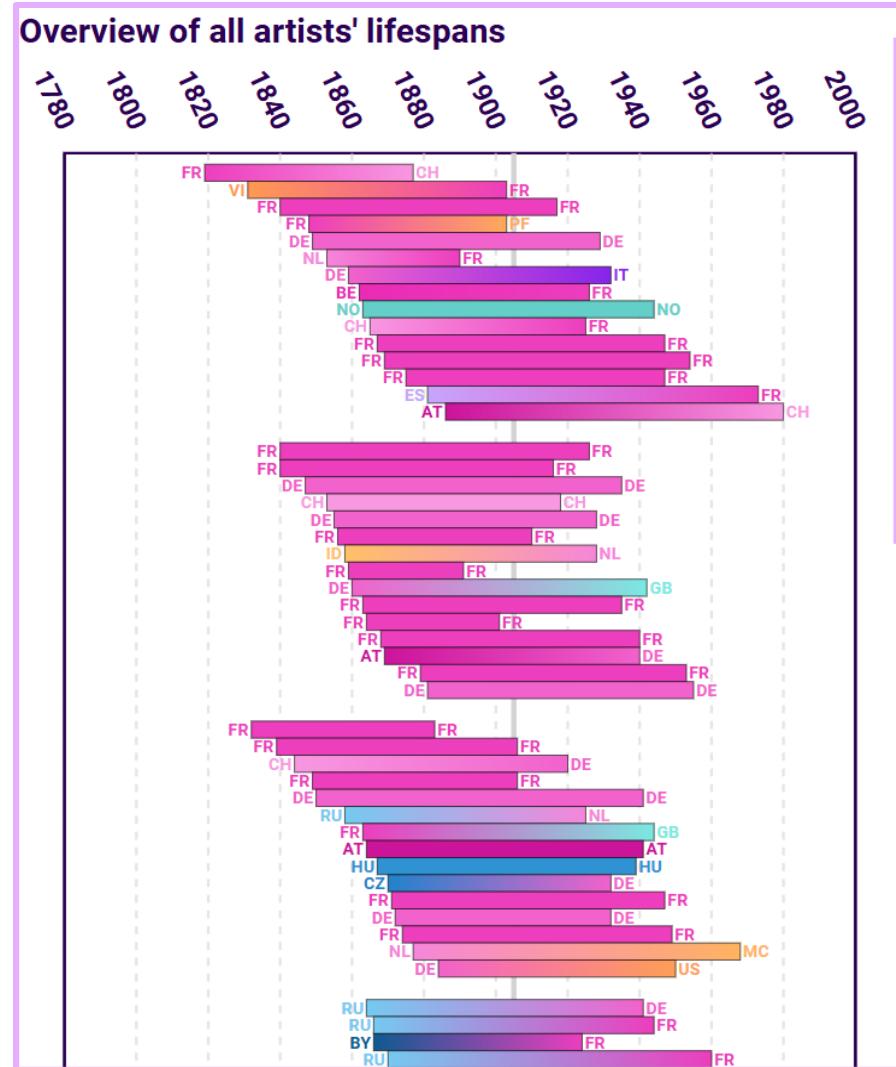
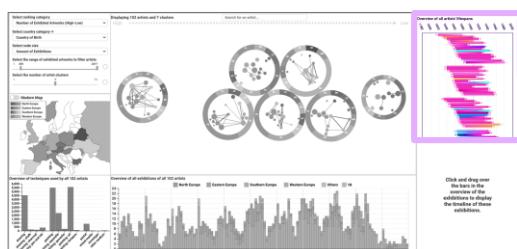


# Artist Lifespans

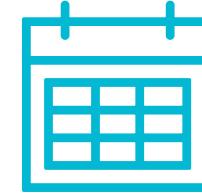
ArtistryConnect



[R4.1] Include Biographical Details



[R2.3] Visualize Artists' Lifespan  
Locations

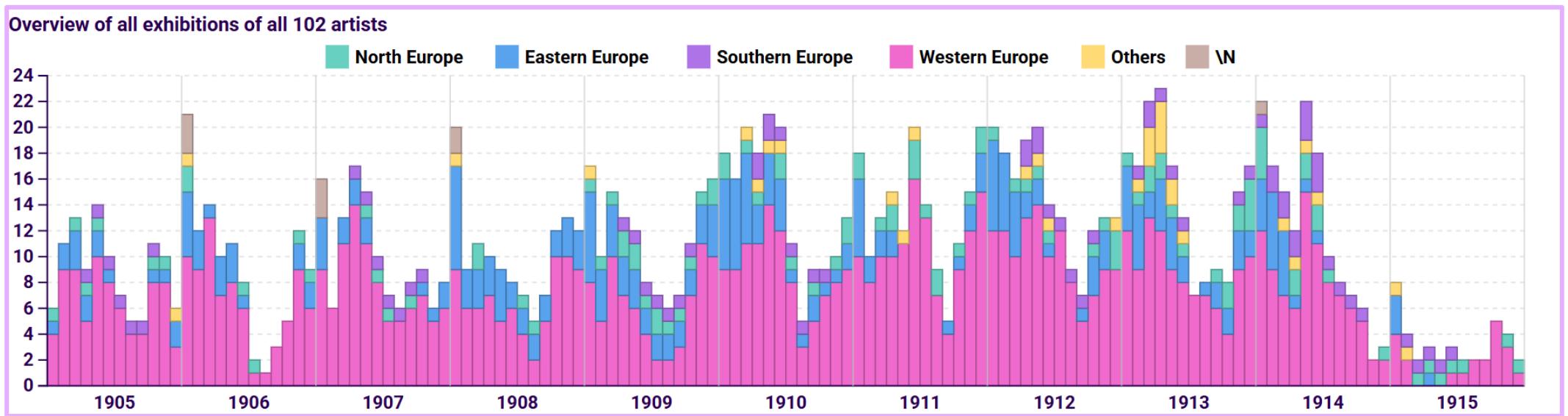


[R3.1] Display Artist Lifespans

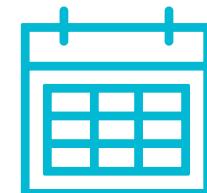
[R3.4] Facilitate Comparing Temporal  
Patterns

# Exhibitions

## ArtistryConnect

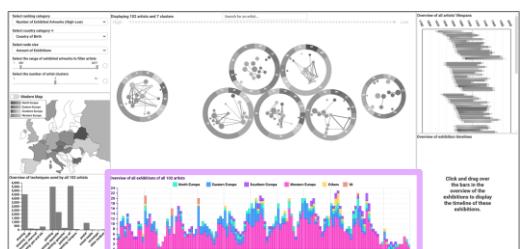


[R2.2] Provide Exhibition Locations



[R3.2] Provide Overview of Exhibition Periods

[R3.4] Facilitate Comparing Temporal Patterns

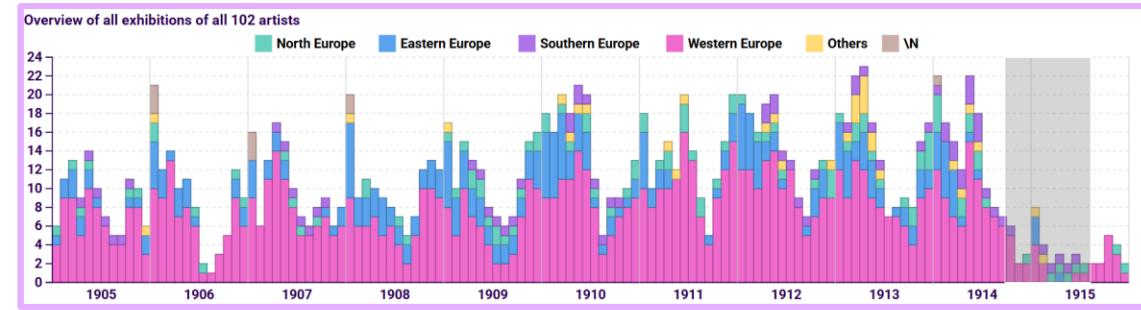
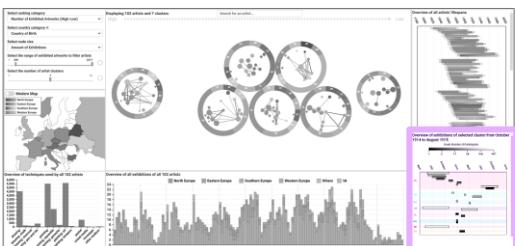


# Details of Exhibitions

*ArtistryConnect*

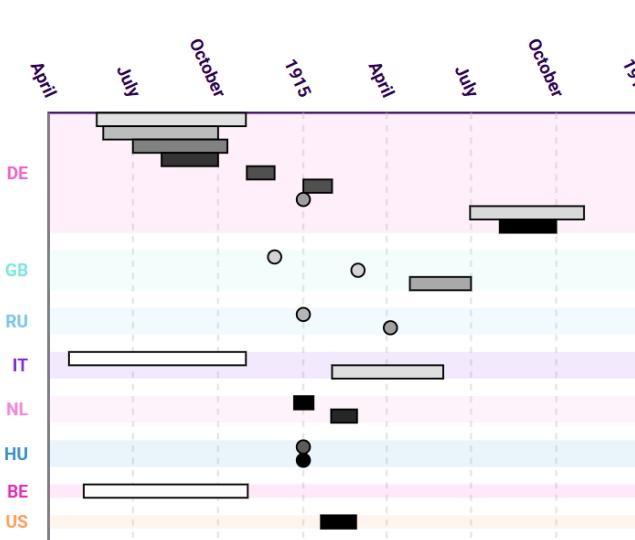


[R4.2] Display Exhibition Details



Overview of exhibitions of selected cluster from October 1914 to August 1915

Scale: Number of Participants



[R2.2] Provide Exhibition Locations



[R3.3] Visualize Detailed Exhibition Timelines

[R3.4] Facilitate Comparing Temporal Patterns

# Live-Demo

ArtistryConnect



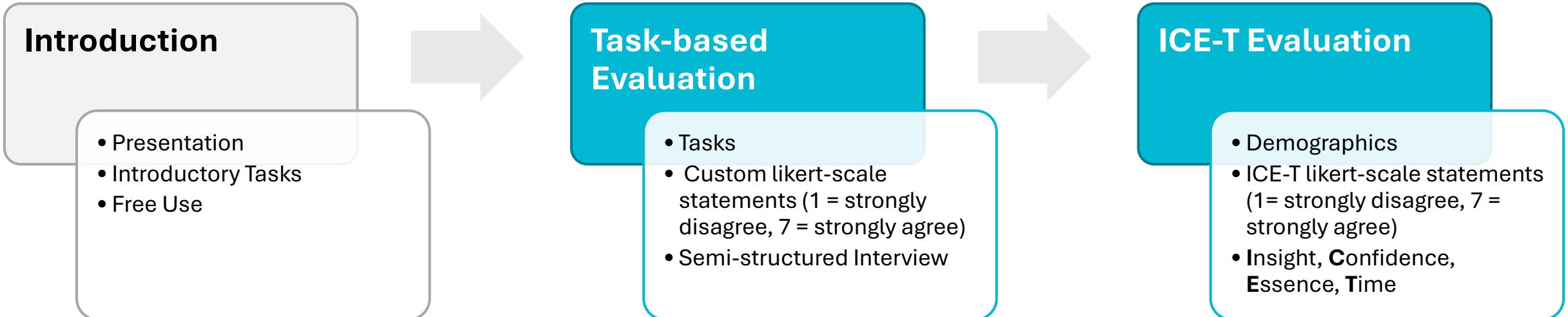
## Sources validating Findings on Connections:

- “Through [Pissarro’s] dedication to the Impressionist movement, he earned the nickname “The father of Impressionism”. ” <https://artincontext.org/camille-pissarro>
- John Rewald. 1938. Camille Pissarro: His Work and Influence. The Burlington Magazine for Connoisseurs 72, 423 (1938), 280–291.
- <https://www.vangoghmuseum.nl/en/prints/person/39732/pissarro-camille>
- <https://www.riseart.com/article/2607/gauguin-and-van-gogh-an-explosive-friendship>
- <https://www.tricera.net/artclip/blog912>
- <https://www.kunstimunterricht.de/kunstgeschichte/stilrichtungen/72-impressionismus-allgemeine-grundlagen.html>

# Study Design

*Study*

## 3 Phases

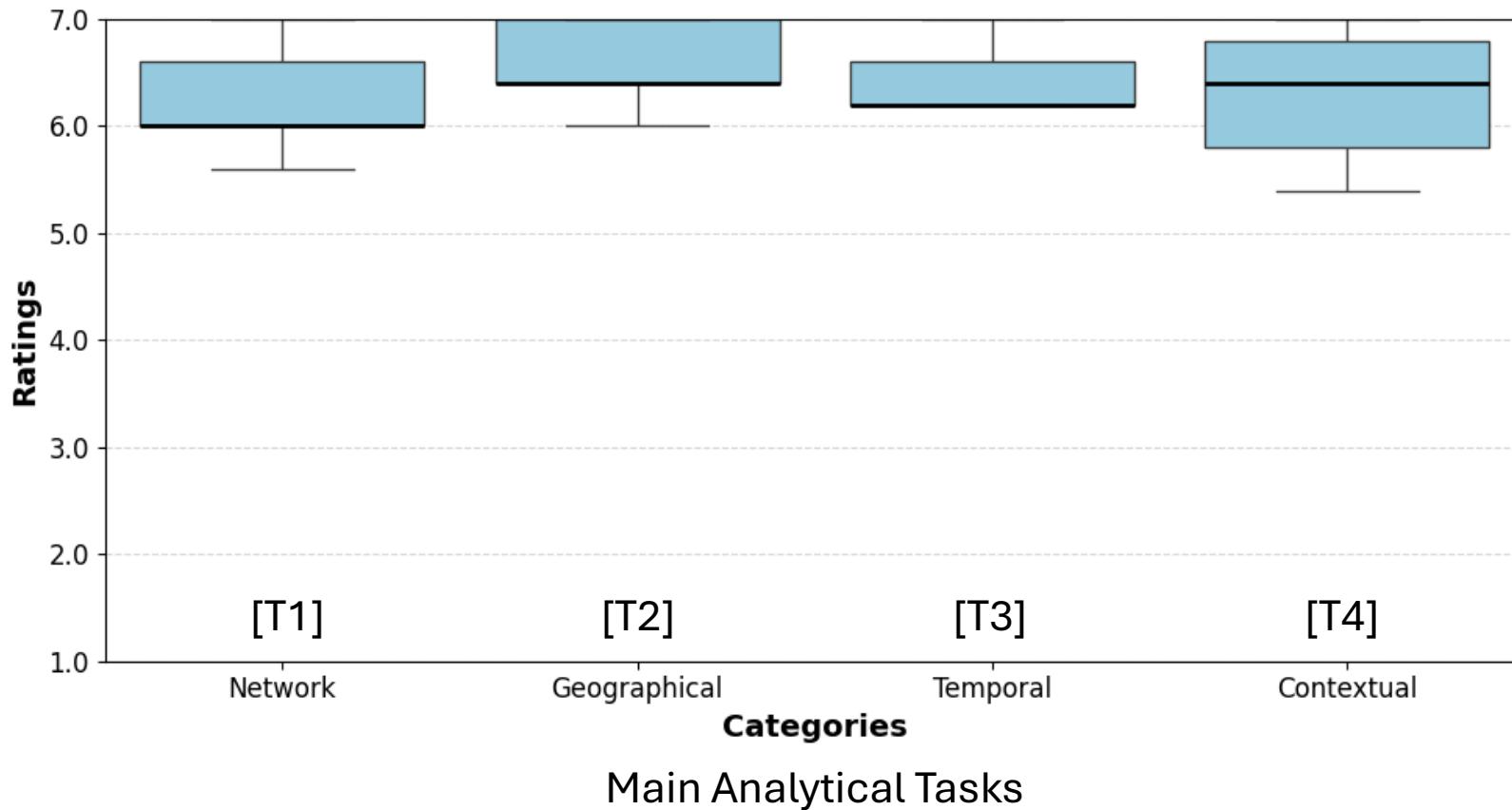


## Demographics of Participants

| ID  | Education Level   | Area of Expertise                    | Gender | Age |
|-----|-------------------|--------------------------------------|--------|-----|
| DB  | Student           | Familiar with <b>Database</b>        | F      | 23  |
| VA  | Master's Degree   | <b>Visual Analytics</b> Professional | F      | 26  |
| AH  | Master's Degree   | <b>Art Historian</b>                 | F      | 28  |
| AS1 | Student           | <b>Art History</b> Student           | F      | 39  |
| AS2 | Bachelor's Degree | <b>Art History</b> Student           | F      | 33  |

# Task-based Results

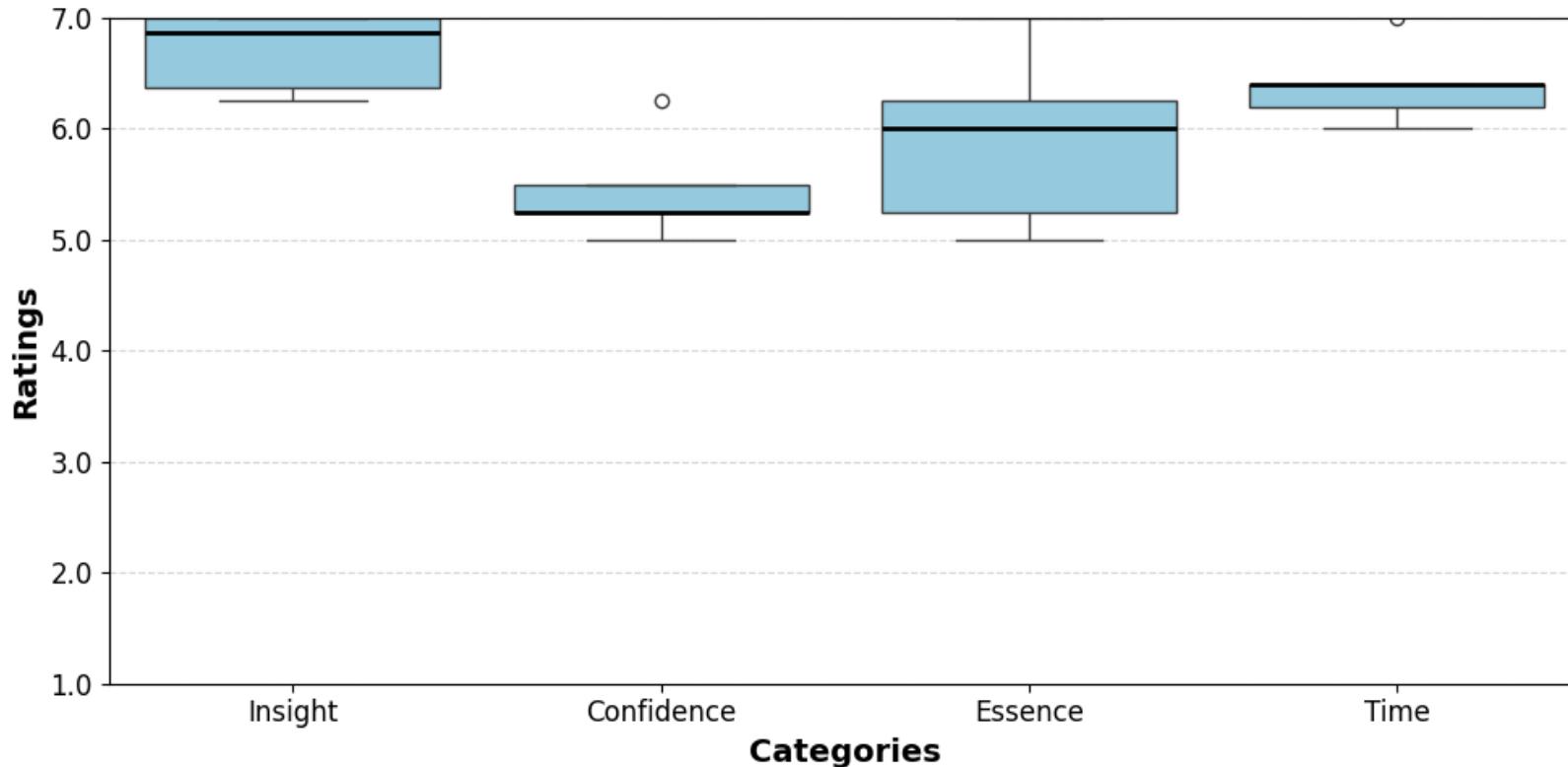
*Study*



- Variety in Contextual:
  - Critique on techniques
  - Doubts on AI accuracy

# ICE-T Results

*Study*



- No indicator for **data quality** in tool
- Different Opinions on how well the tool communicates the **data essence**
- Generate **Insights** in Short **Time**

# Tool Most Effective in Generating Data-Driven Insights

## *Discussion*

| Category | Guidelines   | Likert-Scale-Statement   | Mean | DB | VA | AH | AS1 | AS2 |
|----------|--|--|------|----|----|----|-----|-----|
| Insight  | The visualization facilitates answering questions about the data.      | The visualization exposes individual data cases and their attributes.  | 6,6  | 7  | 7  | 7  | 5   | 7   |
|          |  | The visualization facilitates perceiving relationships in the data like patterns & distributions of the variables.             | 6,6  | 7  | 6  | 7  | 6   | 7   |
|          |  | The visualization promotes exploring relationships between individual data cases as well as different groupings of data cases. | 6,8  | 7  | 6  | 7  | 7   | 7   |
|          | The visualization provides a new or better understanding of the data.  | The visualization helps generate data-driven questions.  | 7    | 7  | 7  | 7  | 7   | 7   |
|          |  | The visualization helps identify unusual or unexpected, yet valid, data characteristics or values.                             | 6,6  | 6  | 6  | 7  | 7   | 7   |
|          | The visualization provides opportunities for serendipitous discoveries | The visualization provides useful interactive capabilities to help investigate the data in multiple ways.                      | 6,8  | 7  | 7  | 7  | 6   | 7   |
|          |  | The visualization shows multiple perspectives about the data.  | 6,6  | 7  | 6  | 7  | 6   | 7   |
|          |  | The visualization uses an effective representation of the data that shows related and partially related data cases.            | 6,6  | 7  | 6  | 7  | 6   | 7   |

1=Strongly Disagree, 7=Strongly Agree

„This is **interesting**“ – AH, AS1

„There are **more connections** here than i see in the database“ – DB

„I am just realizing that your tool really shows me **things that I didn't know**. And I really **want to look into that**.“ – AH



# [T1] Interactive Exploration of Networks

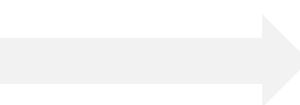
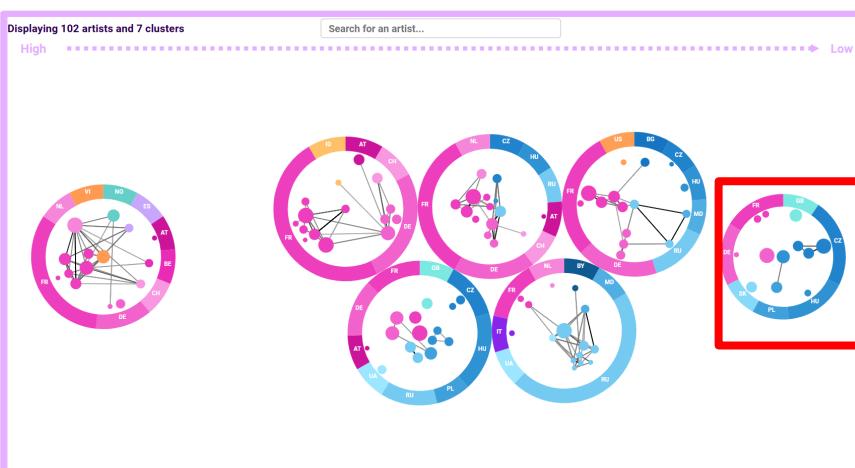
## Discussion

[R1.5] Support Interactive Exploration  
[R1.1] Show Clusters and Artists

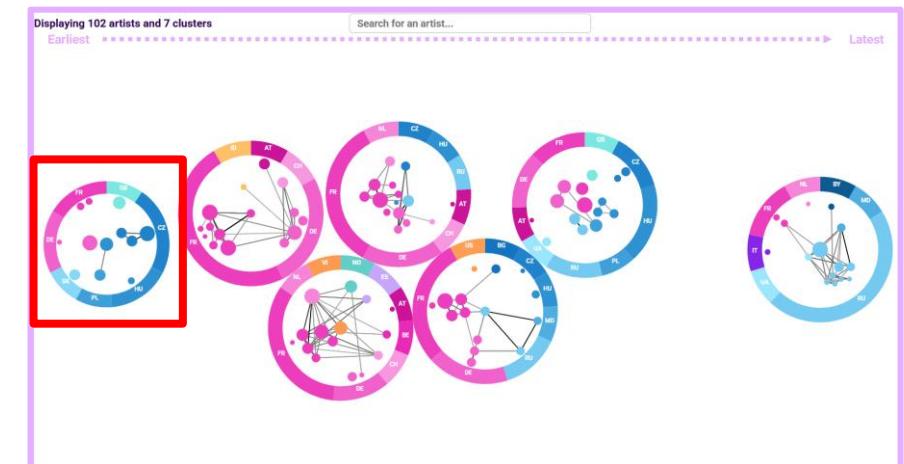
**Positioning of clusters facilitated cross-cluster comparisons**

| Category | Likert-Scale-Statement  | Mean | DB | VA | AH | AS1 | AS2 |
|----------|---|------|----|----|----|-----|-----|
| Network  | Switching the ranking category allowed me to compare clusters and through that gain insights into the characteristics of the artist groups. | 6,6  | 6  | 6  | 7  | 7   | 7   |
|          | The structure of a cluster made it easy to see which artists were connected.  | 6,6  | 6  | 7  | 7  | 7   | 6   |
|          | The colored lines (edges) between artists within clusters helped me easily spot strong connections.   | 6    | 5  | 7  | 7  | 5   | 6   |
|          | Switching the country category and node sizes gave me better insights into artist connections and the connected artists.                    | 6,4  | 7  | 5  | 7  | 6   | 7   |
|          | It was easy to track and compare changes when I adjusted rankings, country categories, or node sizes.                                       | 5,6  | 6  | 3  | 7  | 5   | 7   |

Number of Exhibited Artworks



Average Death year

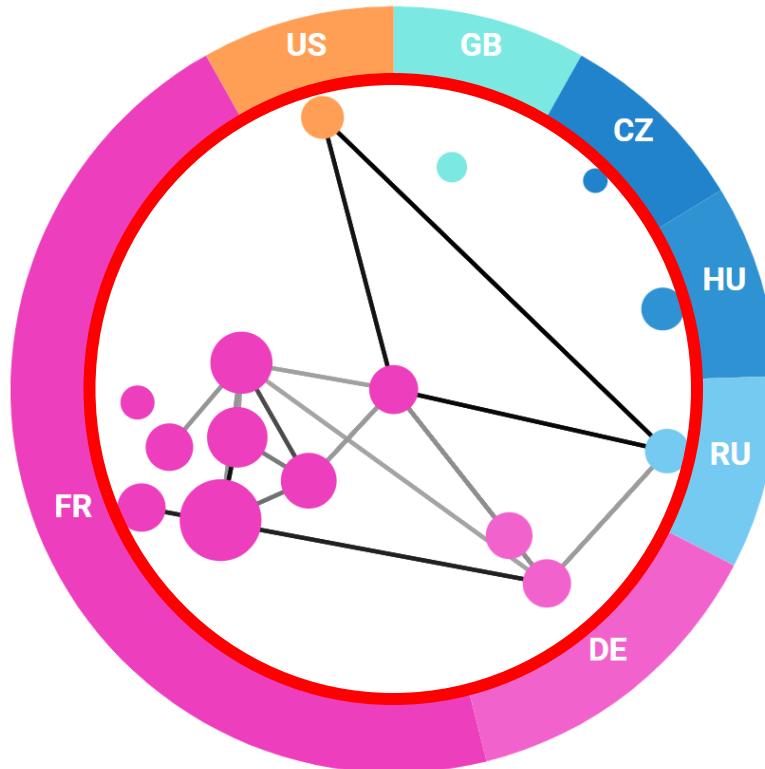




# [T1] Positioning as an important visual variable

*Discussion*

[R1.4] Highlight Influential Artists



*„a great idea“ for understanding each artist's relative importance – AS2*

*„How they are placed allowed me to instantly see [central figures]“ - AH*

*„[Being able to see influential artists is] very important“ – AS2*



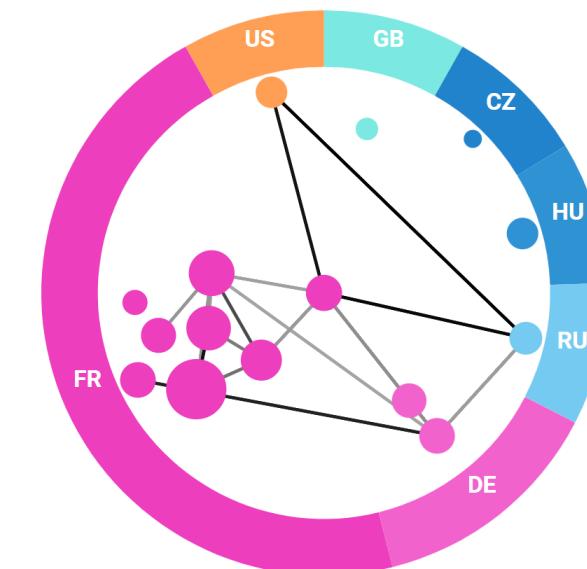
# [T1] Cluster Structure Considered Useful

## Discussion

### [R1.2] Display Intra-Cluster Connections

**Color Value for edges** facilitated recognition of **strong connections**

| Category | Likert-Scale-Statement  | Mean | DB | VA | AH | AS1 | AS2 |
|----------|---|------|----|----|----|-----|-----|
| Network  | Switching the ranking category allowed me to compare clusters and through that gain insights into the characteristics of the artist groups. | 6,6  | 6  | 6  | 7  | 7   | 7   |
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|          | It was easy to track and compare changes when I adjusted rankings, country categories, or node sizes.                                       | 5,6  | 6  | 3  | 7  | 5   | 7   |



„You wouldn't know which connection is really strong [without this visual cue]“ – VA

Frequently used by participants to find **important and interesting connections**



Clutter & Edges cutting through nodes=> Edge Bundling?

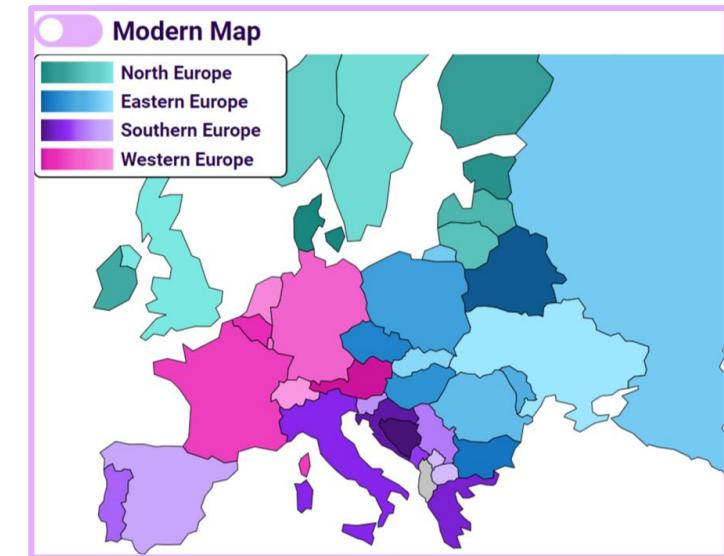


# [T2] Regional Color Scale Facilitates Tasks

## Discussion

### [T2] Mapping Geographic Influences

| Category     | Likert-Scale-Statement   | Mean | DB | VA | AH | AS1 | AS2 |
|--------------|--|------|----|----|----|-----|-----|
| Geographical | The tool made it easy to extract key geographic details about artists, like their birth, death, and exhibition locations.  | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The gradient coloring of the rectangles (artist) in the artist lifespans let me quickly identify geographic patterns among artists.                                    | 6,6  | 7  | 7  | 7  | 5   | 7   |
|              | The cluster structure helped me identify geographical patterns in artist connections, such as artists from the same country/european region having strong connections. | 6,2  | 5  | 6  | 7  | 6   | 7   |
|              | The overview of the exhibitions let me easily spot the most prominent european regions of exhibitions.   | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The timeline of the exhibitions was useful in quickly identifying the most prominent countries of exhibitions.   | 6    | 6  | 5  | 7  | 5   | 7   |



„[The regional color scheme] helped because it makes it **easier to distinguish different regions**“ – DB

AH appreciated the regional color scheme for highlighting „**social and socioeconomic contexts**“

Color scale gives a „**good overview**“ and is „**aesthetic**“ – AS2

**⚡ Similarity of some colors:** „You really **have to look closely**. You can't just scan it with [the] colors“ – AS1



# [T2] & [T3] Geographical and Temporal Information

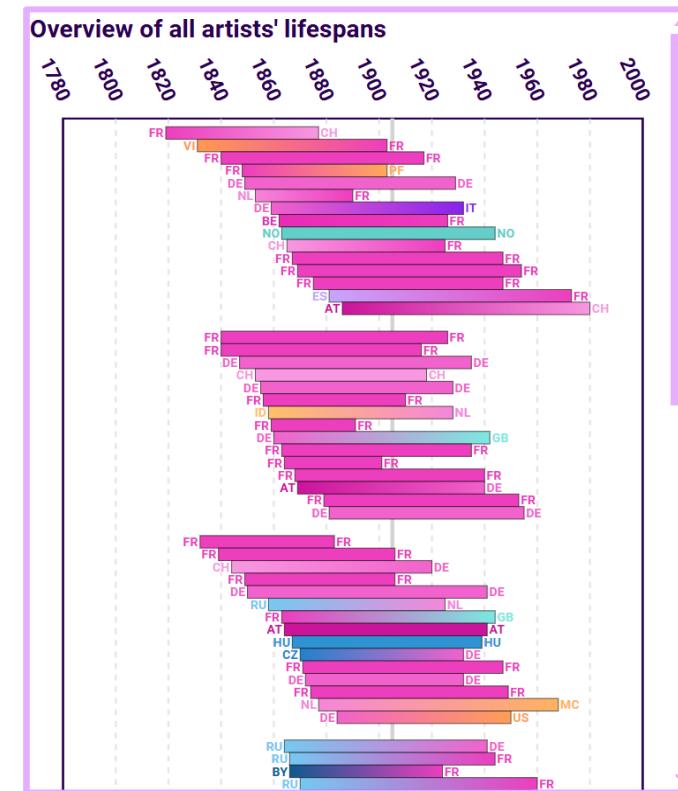
## Discussion



### [T2] Mapping Geographic Influences [R3.1] Display Artist Lifespans

| Category     | Likert-Scale-Statement   | Mean | DB | VA | AH | AS1 | AS2 |
|--------------|--|------|----|----|----|-----|-----|
| Geographical | The tool made it easy to extract key geographic details about artists, like their birth, death, and exhibition locations.  | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The gradient coloring of the rectangles (artist) in the artist lifespans let me quickly identify geographic patterns among artists.                                    | 6,6  | 7  | 7  | 7  | 5   | 7   |
|              | The cluster structure helped me identify geographical patterns in artist connections, such as artists from the same country/european region having strong connections. | 6,2  | 5  | 6  | 7  | 6   | 7   |
|              | The overview of the exhibitions let me easily spot the most prominent european regions of exhibitions.   | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The timeline of the exhibitions was useful in quickly identifying the most prominent countries of exhibitions.   | 6    | 6  | 5  | 7  | 5   | 7   |

| Category | Likert-Scale-Statement  | Mean | DB | VA | AH | AS1 | AS2 |
|----------|---|------|----|----|----|-----|-----|
| Temporal | The overview of the artist lifespans facilitated comparisons by quickly highlighting overlaps and notable differences in their lifespans.   | 6,2  | 6  | 7  | 7  | 5   | 6   |
|          | By hovering over artists in the overview of artist lifespans and the artists being highlighted in their respective clusters, I could see how their early/late birth or death years influenced their positioning within the cluster. | 5,8  | 7  | 4  | 7  | 6   | 5   |
|          | The overview of the exhibitions allowed me to quickly identify periods with more or fewer exhibitions for individual artists or clusters.   | 6,8  | 7  | 6  | 7  | 7   | 7   |
|          | The exhibition timeline provided a detailed view of durations, making it easy to quickly identify long and short exhibitions.   | 6,6  | 6  | 7  | 7  | 6   | 7   |
|          | The ability to select a specific time period in the overview of the exhibitions was useful for accessing more detailed information.   | 6,8  | 7  | 7  | 7  | 7   | 6   |



„[Artist's movement patterns are] easy to see.“ – VA

“I find it really interesting, because you can directly see the color change [if an artist migrated].” – VA

⚡ Rectangles sometimes too small for clear hovering



# [T2] & [T3] Geographical and Temporal Information

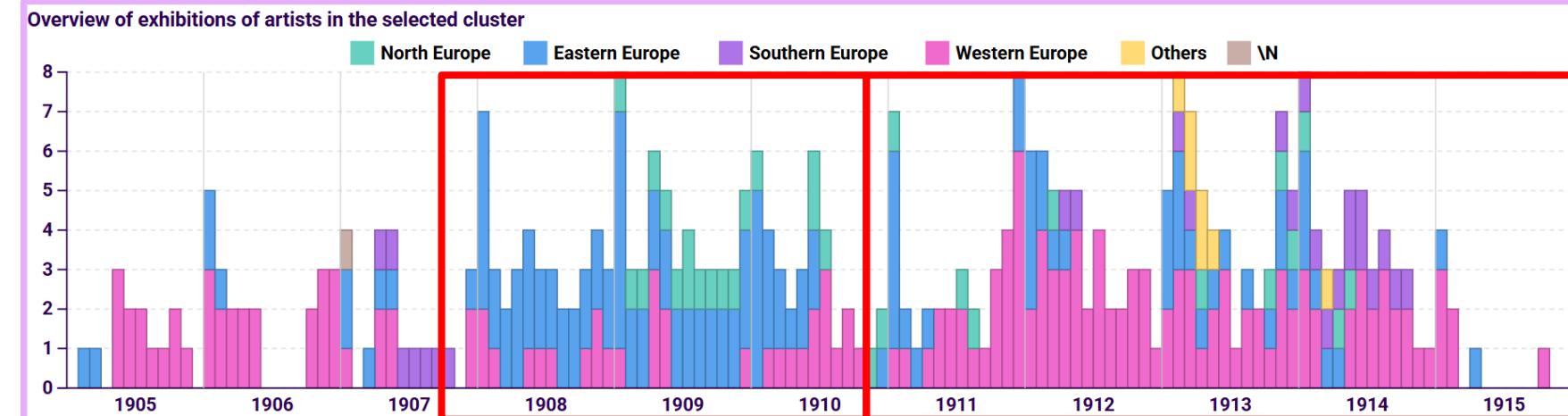
## Discussion



### [T2] Mapping Geographic Influences

### [R3.2] Provide Overview of Exhibition Periods

*„I really find it interesting that there's a clear focus on Eastern Europe between 1908 and 1910. And then they really shift the focus towards [other regions]“ – AH*



| Category     | Likert-Scale-Statement   | Mean | DB | VA | AH | AS1 | AS2 |
|--------------|--|------|----|----|----|-----|-----|
| Geographical | The tool made it easy to extract key geographic details about artists, like their birth, death, and exhibition locations.  | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The gradient coloring of the rectangles (artist) in the artist lifespans let me quickly identify geographic patterns among artists.                                    | 6,6  | 7  | 7  | 7  | 5   | 7   |
|              | The cluster structure helped me identify geographical patterns in artist connections, such as artists from the same country/european region having strong connections. | 6,2  | 5  | 6  | 7  | 6   | 7   |
|              | The overview of the exhibitions let me easily spot the most prominent european regions of exhibitions.   | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The timeline of the exhibitions was useful in quickly identifying the most prominent countries of exhibitions.   | 6    | 6  | 5  | 7  | 5   | 7   |

| Category | Likert-Scale-Statement  | Mean | DB | VA | AH | AS1 | AS2 |
|----------|---|------|----|----|----|-----|-----|
| Temporal | The overview of the artist lifespans facilitated comparisons by quickly highlighting overlaps and notable differences in their lifespans.   | 6,2  | 6  | 7  | 7  | 5   | 6   |
|          | By hovering over artists in the overview of artist lifespans and the artists being highlighted in their respective clusters, I could see how their early/late birth or death years influenced their positioning within the cluster. | 5,8  | 7  | 4  | 7  | 6   | 5   |
|          | The overview of the exhibitions allowed me to quickly identify periods with more or fewer exhibitions for individual artists or clusters.   | 6,8  | 7  | 6  | 7  | 7   | 7   |
|          | The exhibition timeline provided a detailed view of durations, making it easy to quickly identify long and short exhibitions.   | 6,6  | 6  | 7  | 7  | 6   | 7   |
|          | The ability to select a specific time period in the overview of the exhibitions was useful for accessing more detailed information.   | 6,8  | 7  | 7  | 7  | 7   | 6   |



# [T2] & [T3] Geographical and Temporal Information

## Discussion

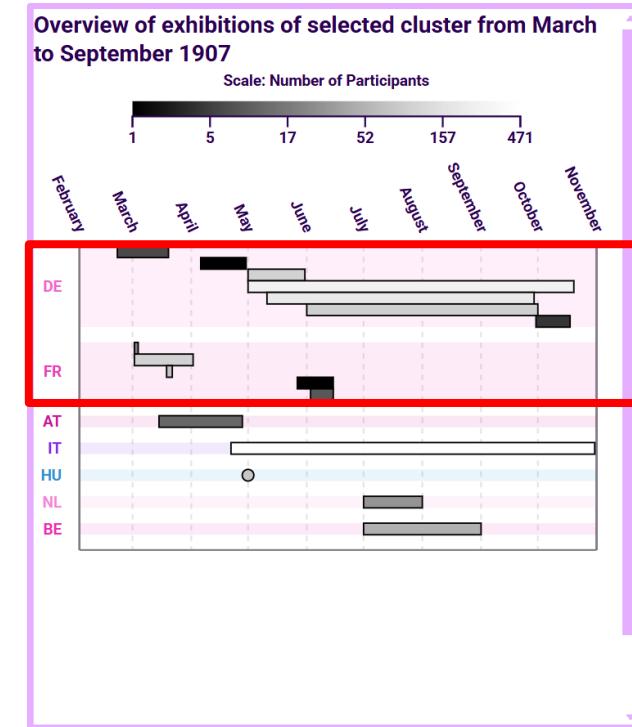


### [T2] Mapping Geographic Influences

### [R3.3] Visualize Detailed Exhibition Timelines

| Category     | Likert-Scale-Statement   | Mean | DB | VA | AH | AS1 | AS2 |
|--------------|--|------|----|----|----|-----|-----|
| Geographical | The tool made it easy to extract key geographic details about artists, like their birth, death, and exhibition locations.  | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The gradient coloring of the rectangles (artist) in the artist lifespans let me quickly identify geographic patterns among artists.                                    | 6,6  | 7  | 7  | 7  | 5   | 7   |
|              | The cluster structure helped me identify geographical patterns in artist connections, such as artists from the same country/european region having strong connections. | 6,2  | 5  | 6  | 7  | 6   | 7   |
|              | The overview of the exhibitions let me easily spot the most prominent european regions of exhibitions.   | 7    | 7  | 7  | 7  | 7   | 7   |
|              | The timeline of the exhibitions was useful in quickly identifying the most prominent countries of exhibitions.   | 6    | 6  | 5  | 7  | 5   | 7   |

| Category | Likert-Scale-Statement  | Mean | DB | VA | AH | AS1 | AS2 |
|----------|---|------|----|----|----|-----|-----|
| Temporal | The overview of the artist lifespans facilitated comparisons by quickly highlighting overlaps and notable differences in their lifespans.   | 6,2  | 6  | 7  | 7  | 5   | 6   |
|          | By hovering over artists in the overview of artist lifespans and the artists being highlighted in their respective clusters, I could see how their early/late birth or death years influenced their positioning within the cluster. | 5,8  | 7  | 4  | 7  | 6   | 5   |
|          | The overview of the exhibitions allowed me to quickly identify periods with more or fewer exhibitions for individual artists or clusters.   | 6,8  | 7  | 6  | 7  | 7   | 7   |
|          | The exhibition timeline provided a detailed view of durations, making it easy to quickly identify long and short exhibitions.   | 6,6  | 6  | 7  | 7  | 6   | 7   |
|          | The ability to select a specific time period in the overview of the exhibitions was useful for accessing more detailed information.   | 6,8  | 7  | 7  | 7  | 7   | 6   |



„The German exhibitions are a lot longer than the French exhibitions“  
– AH

# i

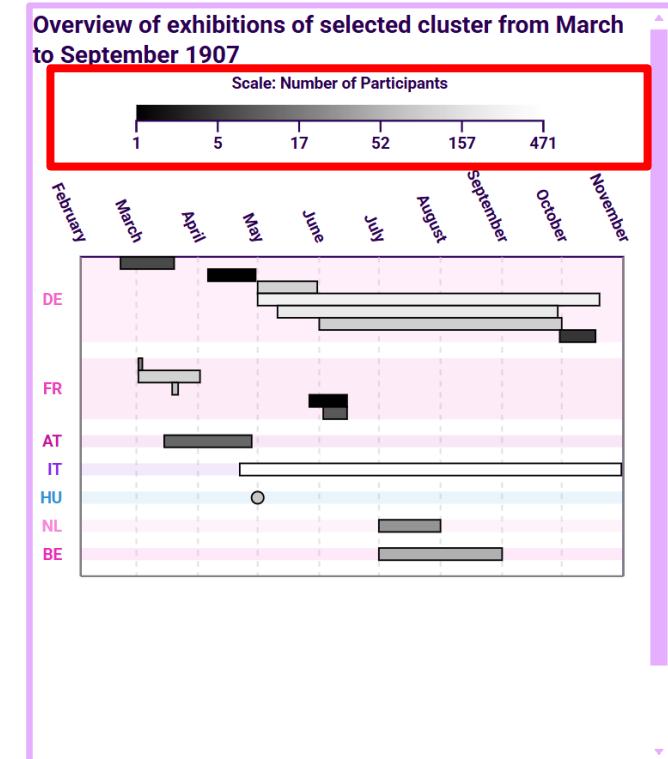
# [T4] Color Scale for Highlighting Contextual Information

## Discussion

### [R4.2] Display Exhibition Details

Main Goal: Support distinguishing between *solo* and *group* exhibitions

| Category   | Likert-Scale-Statement   | Mean | DB | VA | AH | AS1 | AS2 |
|------------|--|------|----|----|----|-----|-----|
| Contextual | The tooltips in the components provided the detailed information I needed to explore the data.   | 6,6  | 7  | 6  | 7  | 7   | 6   |
|            | The color scale of the rectangles (exhibitions) in the exhibition timeline made it easy to quickly extract the number of participants.                                       | 6,6  | 7  | 5  | 7  | 7   | 7   |
|            | Comparing an artist's distribution of techniques to their cluster helped me understand the artist's relevance to specific techniques within that cluster.                    | 6,2  | 7  | 6  | 7  | 4   | 7   |
|            | Comparing techniques among connected artists helped me identify both similarities and differences in their artistic styles, deepening my understanding of their connections. | 5,8  | 7  | 7  | 7  | 2   | 6   |
|            | The AI-generated answers gave me useful insights into artist connections.  | 6,2  | 6  | 5  | 7  | 7   | 6   |



„[It is] pretty **easy to see** [exhibitions with the most/least participants]“ – AH

„You see if it's a solo or group exhibition very **fast and quickly**“ – AS1



Due to normalization unclear number of participants for **grey colored** exhibitions

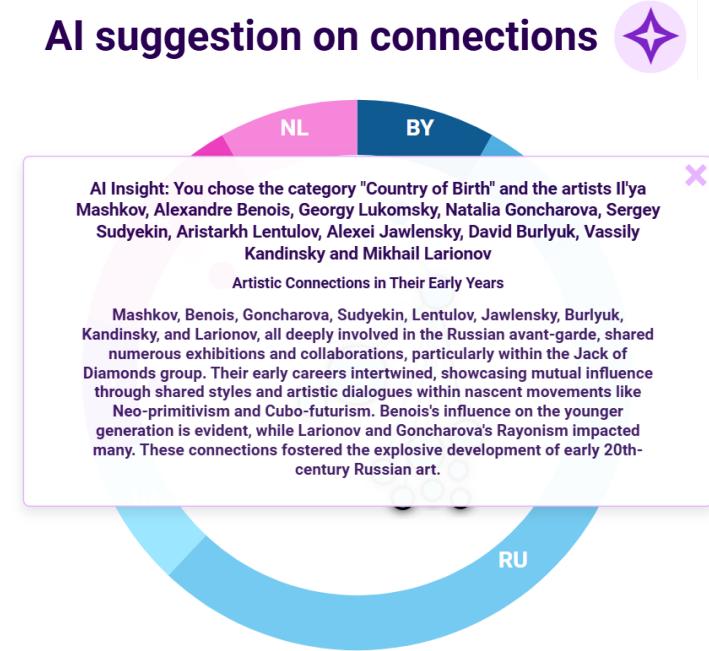
# [T4] AI-Suggestions for Additional Information

## Discussion

### [R4.4] Support AI-Generated Insights

| Category   | Likert-Scale-Statement   | Mean | DB | VA | AH | AS1 | AS2 |
|------------|--|------|----|----|----|-----|-----|
| Contextual | The tooltips in the components provided the detailed information I needed to explore the data.   | 6,6  | 7  | 6  | 7  | 7   | 6   |
|            | The color scale of the rectangles (exhibitions) in the exhibition timeline made it easy to quickly extract the number of participants.                                       | 6,6  | 7  | 5  | 7  | 7   | 7   |
|            | Comparing an artist's distribution of techniques to their cluster helped me understand the artist's relevance to specific techniques within that cluster.                    | 6,2  | 7  | 6  | 7  | 4   | 7   |
|            | Comparing techniques among connected artists helped me identify both similarities and differences in their artistic styles, deepening my understanding of their connections. | 5,8  | 7  | 7  | 7  | 2   | 6   |
|            | The AI-generated answers gave me useful insights into artist connections.  | 6,2  | 6  | 5  | 7  | 7   | 6   |

### AI suggestion on connections



AH mentioned it could **benefit both art historians and general users**

„One of the **exciting** points“ – AS2

„didn't read any misleading information“ – AS2, „[AI Responses seem] plausible“ – AS1

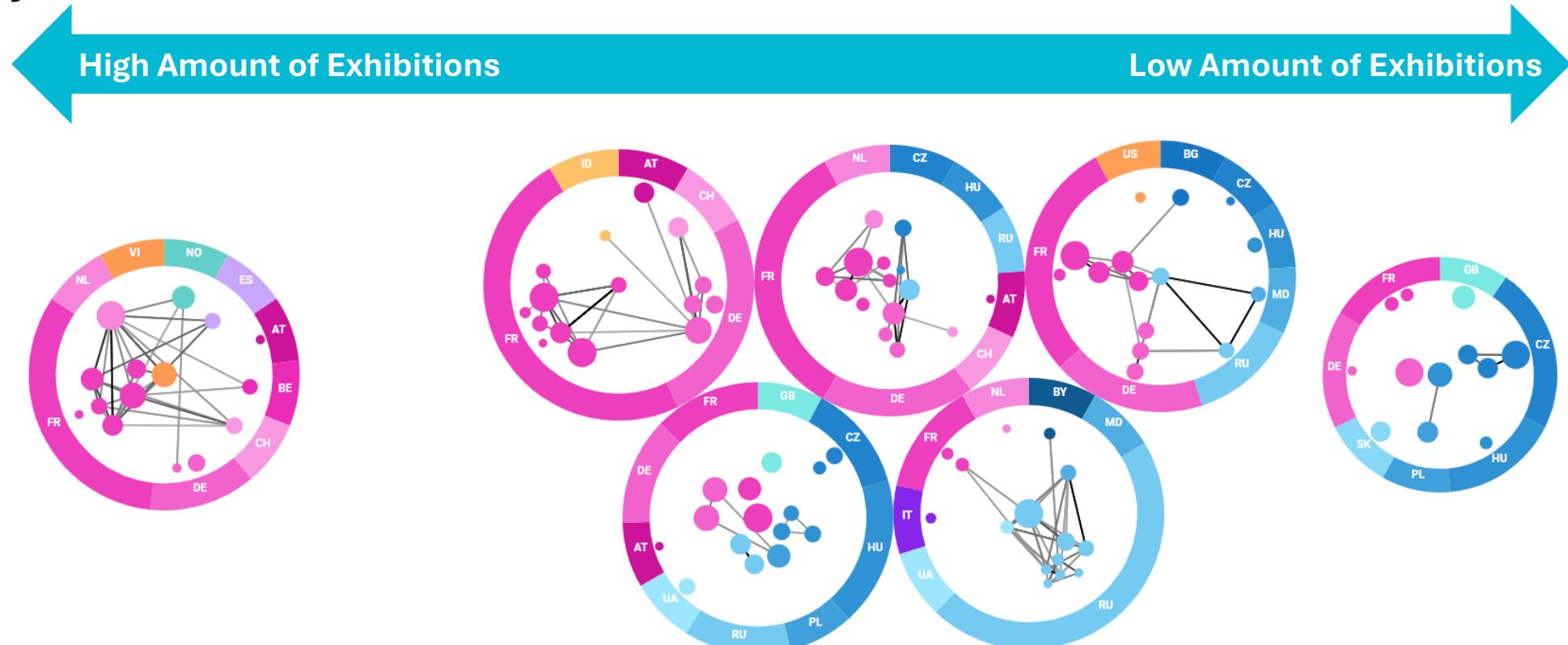


**Doubts in AI:** „Seems plausible, but I don't know if it's true“ - DB

# Further Findings

## *Discussion*

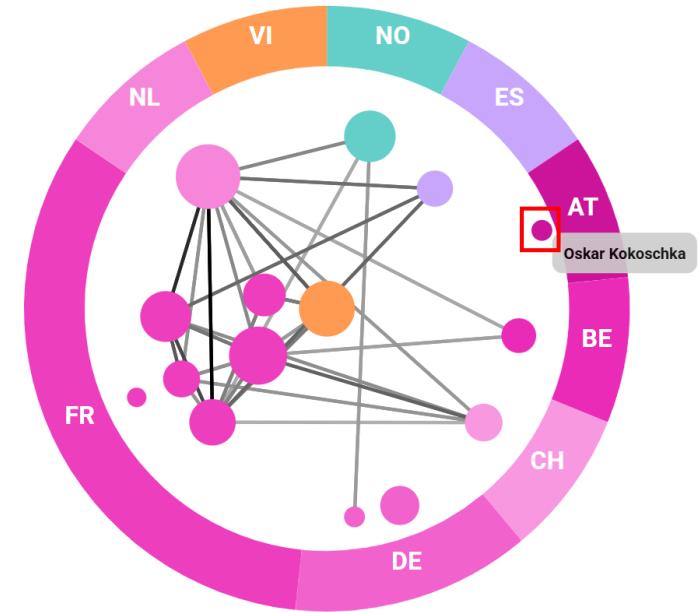
1. AH identified regional trend from Western Europe (left) to Eastern Europe (right) shows difference in exhibition activity.



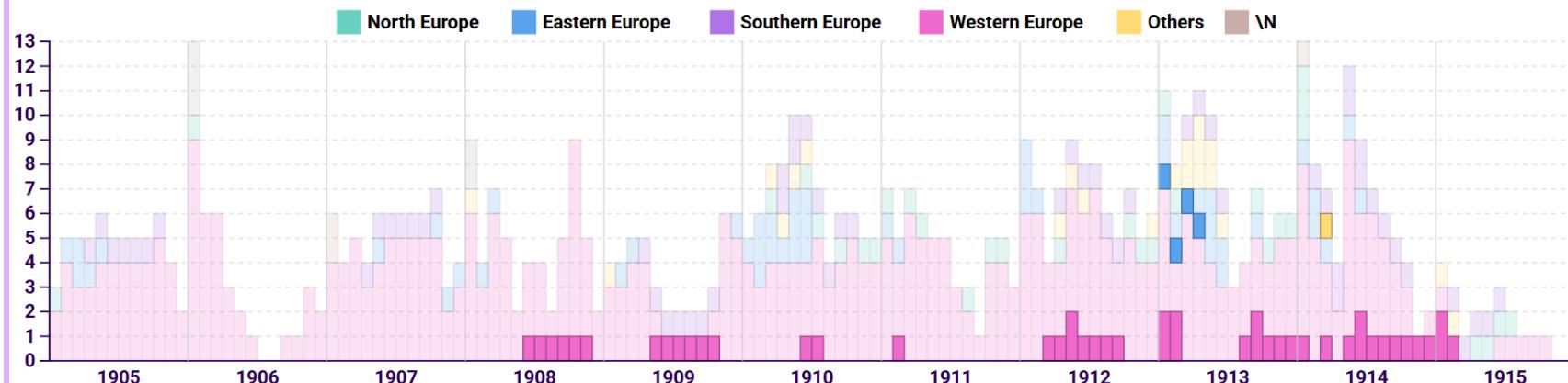
# Further Findings

## Discussion

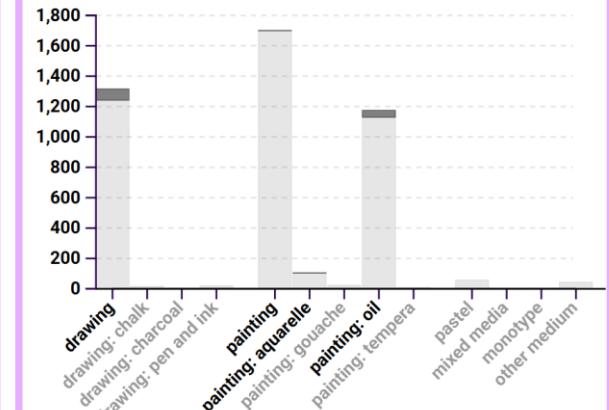
1. AH identified regional trend from Western Europe (left) to Eastern Europe (right) shows difference in exhibition activity.
2. Three Participants agreed that the comparison of the artist and his cluster helps to understand the artist's position in his cluster and his importance.



Exhibitions of Oskar Kokoschka



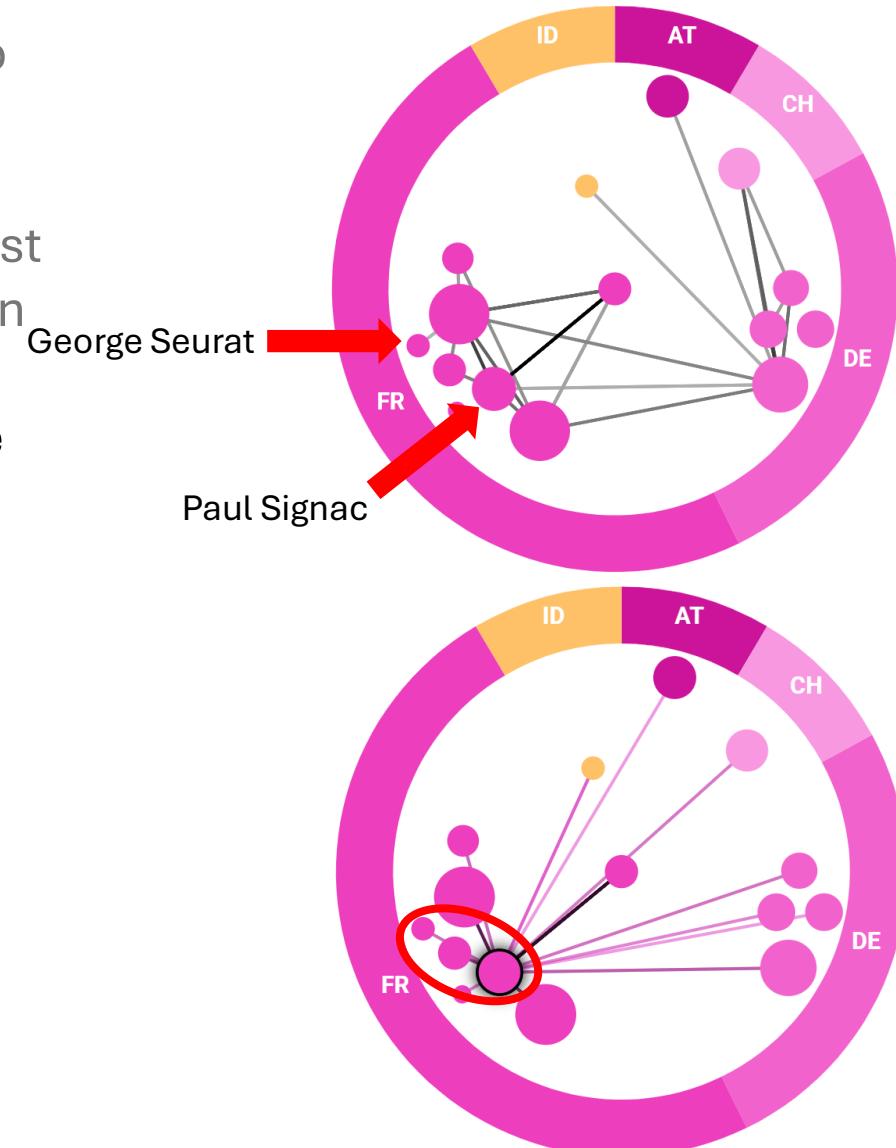
Techniques used by Oskar Kokoschka



# Further Findings

## Discussion

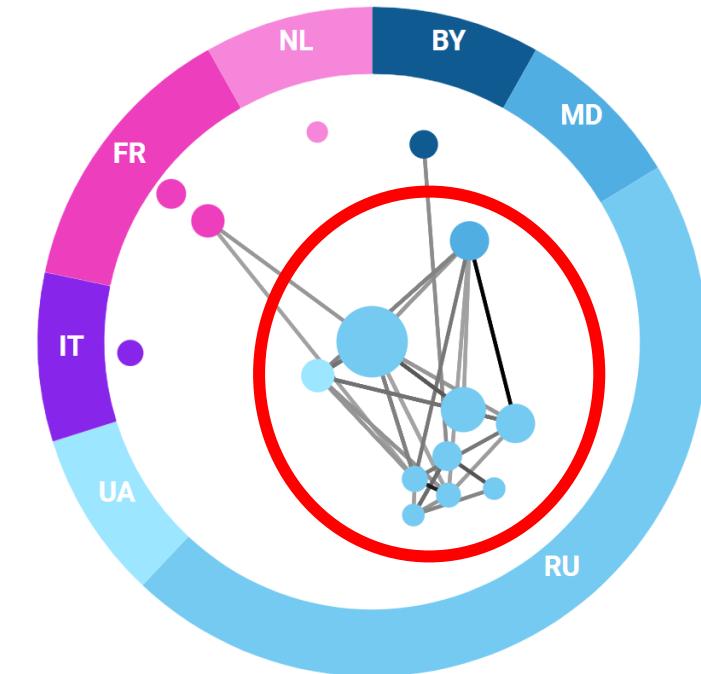
1. AH identified regional trend from Western Europe (left) to Eastern Europe (right) shows difference in exhibition activity.
2. Three Participants agreed that the comparison of the artist and his cluster helps to understand the artist's position in his cluster and his importance.
3. „**I always was wondering if people who have the same stylistic tendencies [like Georges Seurat and Paul Signac] are necessarily very strongly connected, but obviously not**“ – AH



# Further Findings

## Discussion

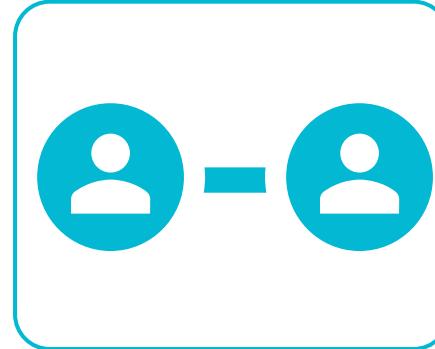
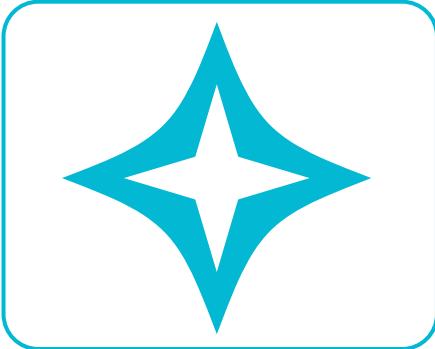
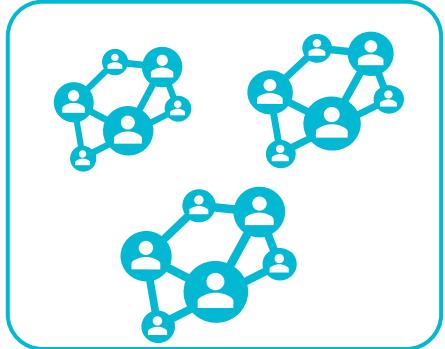
1. AH identified regional trend from Western Europe (left) to Eastern Europe (right) shows difference in exhibition activity.
2. Three Participants agreed that the comparison of the artist and his cluster helps to understand the artist's position in his cluster and his importance.
3. „I always was wondering if people who have the same stylistic tendencies [like Georges Seurat and Paul Signac] are necessarily very strongly connected, but obviously not“ – AH
4. **AH recognized a cluster as group of artists of the „Russian avant-garde“.**



*“these 3 artists are from the same regions, and they form [...] a small cluster” – VA*

*“the color really helped, but also the positioning” – AH*

# Limitations



**Spectral  
Clustering**

**AI-Feature  
only as good  
as used AI**

**Risk of False  
Inference**

**Connections  
between  
Artists**

- Intra-community edges clutter and crossings
- No direct inter-community edges

**Data  
Limitation**

- Bias on western european data?
- Techniques
- Focused on Exhibitions, not Artists

# Future Work

## Contextualizing

### by Adding Visual Information

Vincent Van Gogh  
**(Impressionism)**



Vassily Kandinsky  
**(Expressionism)**



## Expand Application Area

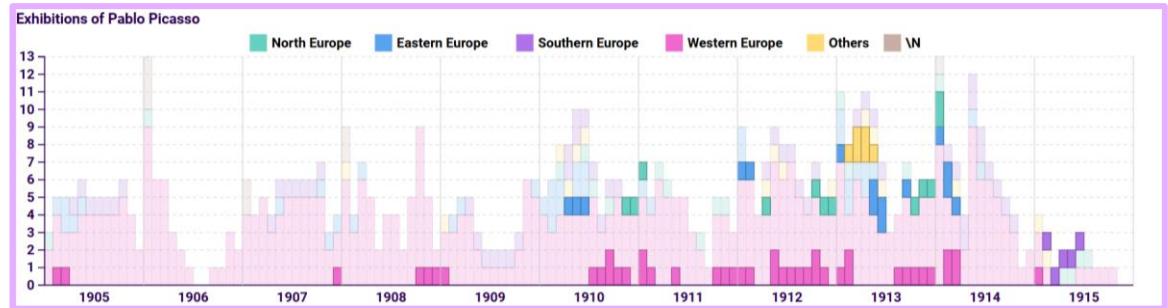
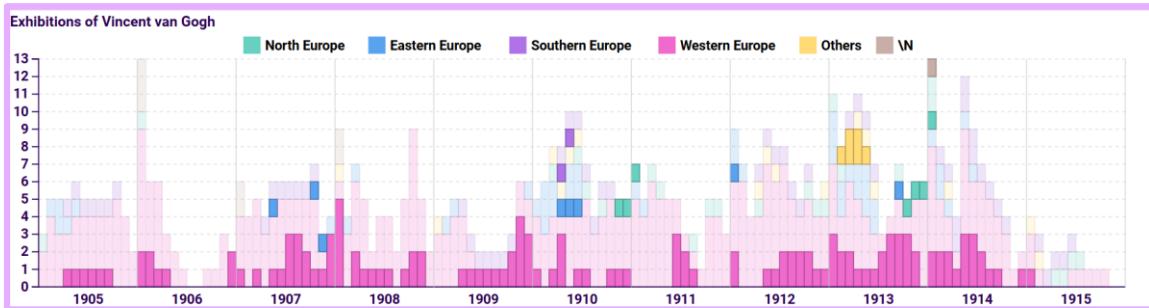
- Different databases
- E.g. ArtLas
  - international, broader time period
- Digital humanities
  - Composer Collaborations
  - Performance Networks in Theater



<https://artlas.huma-num.fr/map/#/result?collection=all&value=&type=exhibition&page=1>

## Side-by-Side-View

- Enhance direct comparisons between artists (e.g. Exhibition Overview)



Self-portrait of Gogh: <https://www.britannica.com/biography/Vincent-van-Gogh/Legacy>, Artwork of Gogh: <https://artsandculture.google.com/asset/the-starry-night-vincent-van-gogh/bgEuwDxeI93-Pg>, Picture Kandinsky: <https://totallyhistory.com/composition-vii/>, Artwork of Kandinsky: <https://mymodernmet.com/es/wassily-kandinsky/>

# Conclusion

Interactively **generate insights** about artist connections across **different dimensions**:



Cluster & Network structure, Interactivity



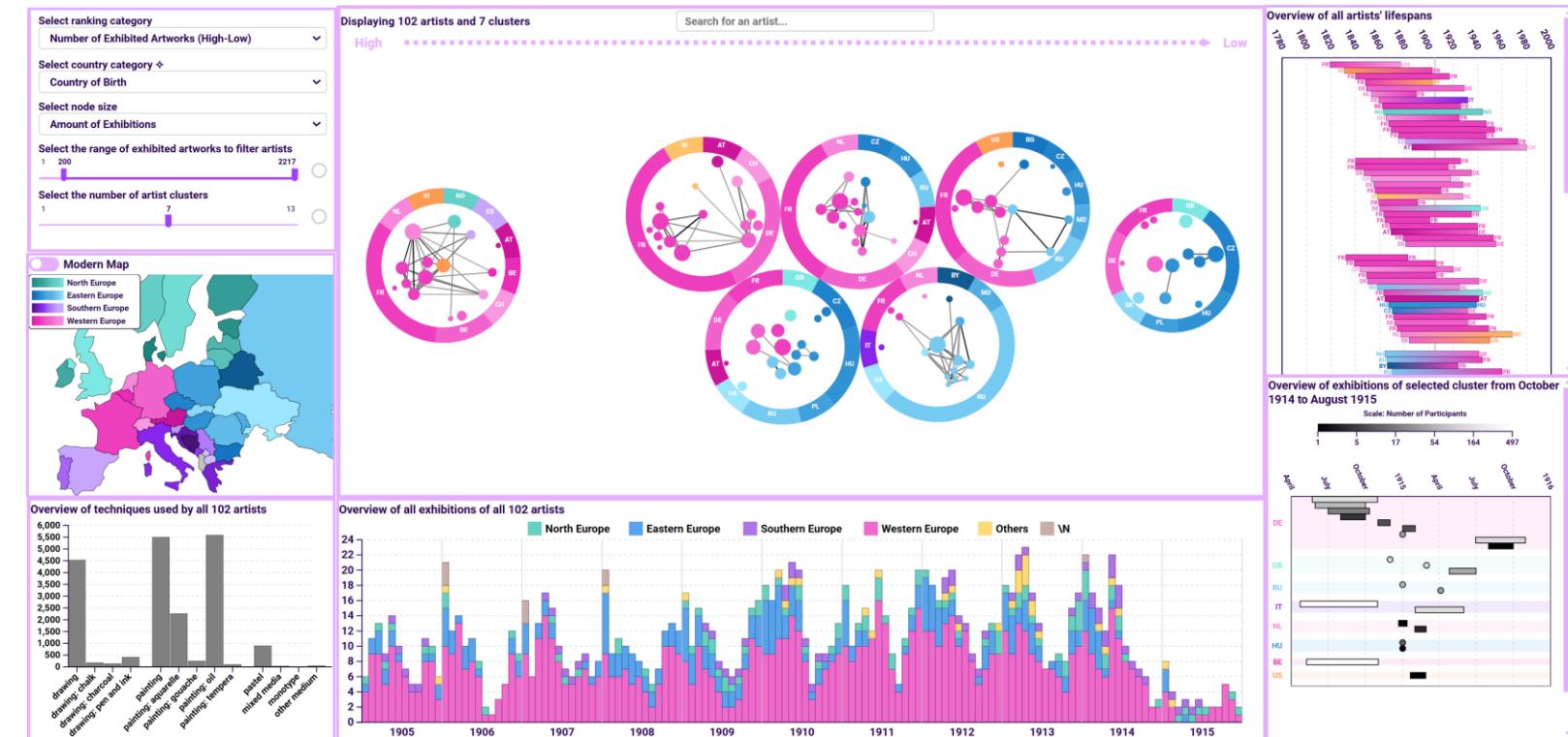
Regional color scheme



Overview first, Details on Demand



AI-generated Insights



**Support art historians** to uncover connections that would be difficult to discern using traditional methods alone