

# Quantity, Quality, Trust:

## Dilemmas and Strategies of Museum Documentation in the Age of AI

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The Art Museum in the Digital Age – 2024

Panel 3: Networks

January 17, 2024

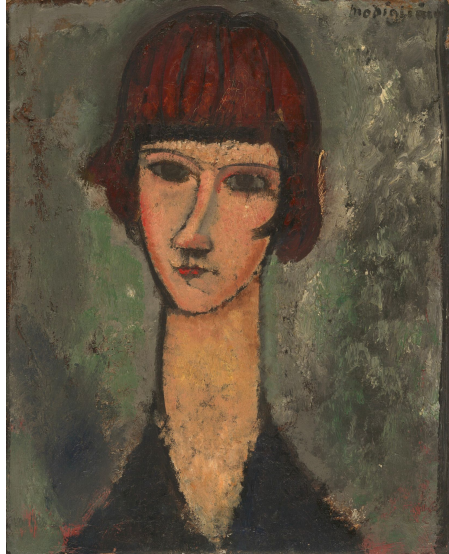
Belvedere Museum, Vienna

# Provenance Data in Museums

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Why should we care?

# Provenance Example AAM Format

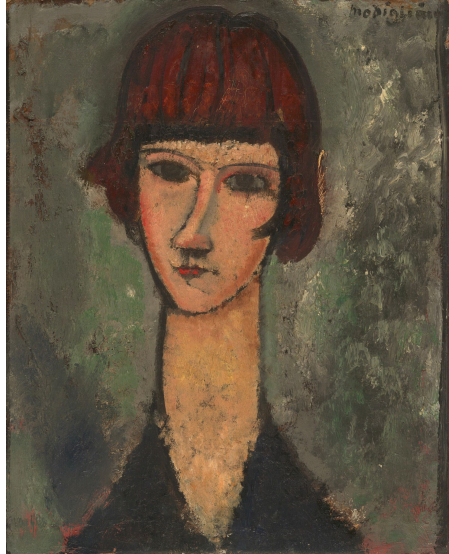


Amedeo Modigliani, *Portrait of a Woman*, c. 1917/19, oil on canvas, 55.9 × 45.4 cm (22 × 17 7/8 in.), Bequest of Joseph Winterbotham, 1954.316, The Art Institute of Chicago.

Galerie Zborowski, Paris, probably acquired directly from the artist. Bernheim Jeune, Paris, before 1929 [Pfannstiel, 1929]. Reinhardt Galleries, New York, by 1936 [this and the following according to Winterbotham Collection inventory, Oct. 2, 1936, copy in curatorial file]; sold to Joseph Winterbotham, Jr. (1878–1954), Chicago and Burlington, Vt., by Oct. 2, 1936; bequeathed to the Art Institute, 1954.

<https://www.artic.edu/artworks/80586/portrait-of-a-woman>

# Provenance Example AAM Format



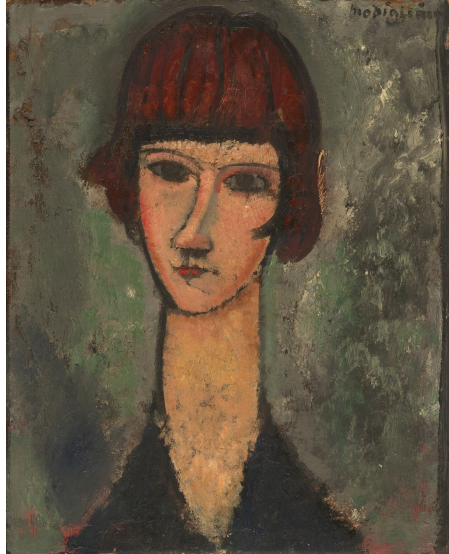
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# Provenance Example AAM Format



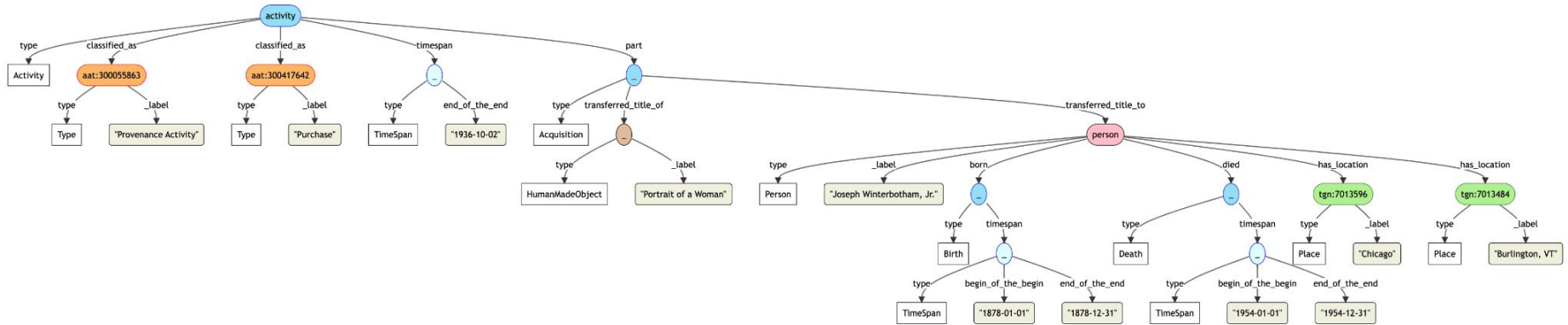
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# Linked.Art

“sold to Joseph Winterbotham, Jr. (1878–1954), Chicago and Burlington, Vt., by Oct. 2, 1936;”



Linked.Art is a CIDOC CRM Application Profile (cultural heritage standard), developed by a community of research institutions and museums.

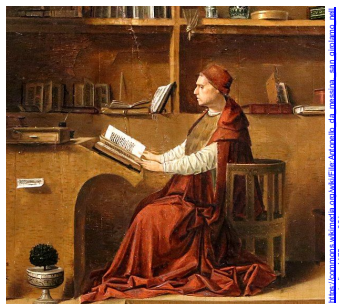
# Provenance

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## From Text to Data

# Human-in-the-loop

## Text



Domain experts  
compile provenance  
texts by consulting  
appropriate sources

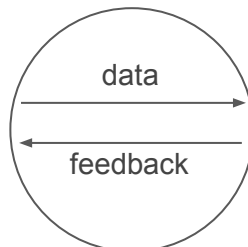


## Data Quantity



Natural Language  
Processing techniques  
for automatic  
knowledge extraction  
from text

**Fast Digitization**



loop

## Data Quality

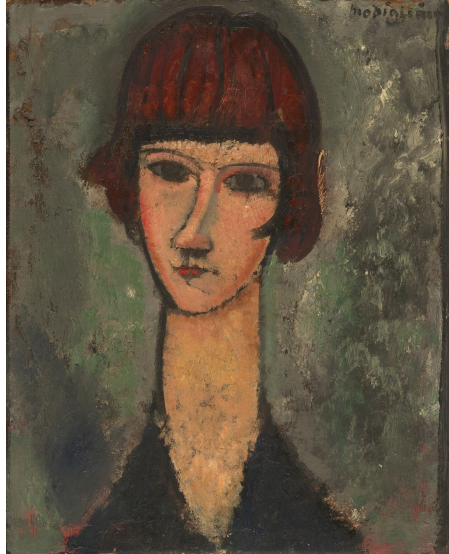


Domain experts  
supervise extracted  
data and assert new  
knowledge through an  
interface

**Slow Digitization**



# Provenance Example AAM Format



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# Event Extraction

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- **Event Mention:** the text portion containing a potential event.
- **Event Trigger:** the element that indicates the occurrence of an event (e.g., a verb).
- **Event Arguments:** the different constituents of an event (e.g., date, location, and parties).
- **Event Argument Role:** the role of the constituents of an event (e.g., the sender and the receiver)

# Natural Language Processing

## Sentence Boundary Disambiguation

**Task:** Divide provenance texts into individual events.

Galerie Zborowski, Paris, probably acquired directly from the artist. Bernheim Jeune, Paris, before 1929 [Pfannstiel, 1929]. Reinhardt Galleries, New York, by 1936 [this and the following according to Winterbotham Collection inventory, Oct. 2, 1936, copy in curatorial file]; sold to Joseph Winterbotham, Jr. (1878–1954), Chicago and Burlington, Vt., by Oct. 2, 1936; bequeathed to the Art Institute, 1954.

# Natural Language Processing

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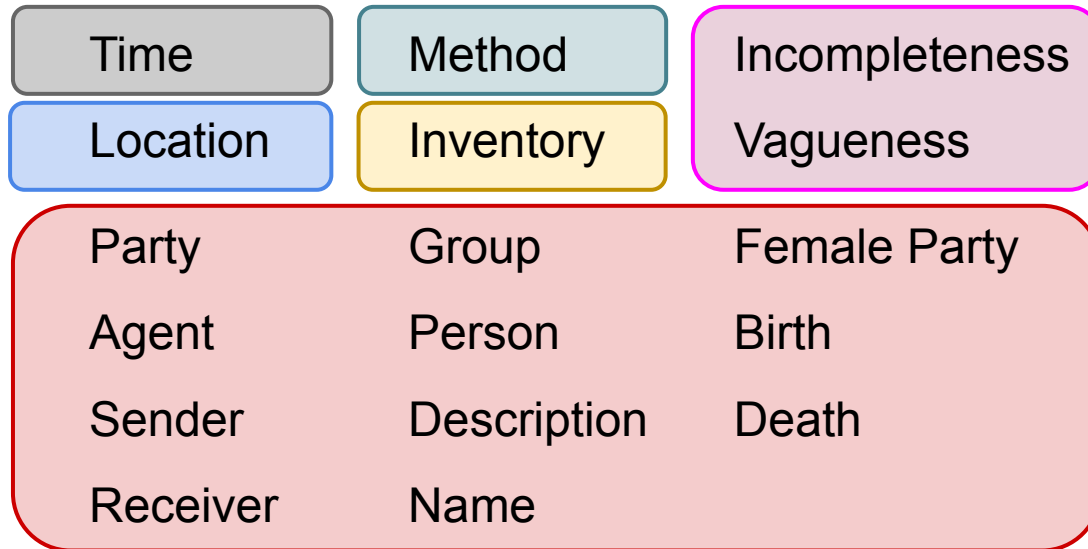
## Sentence Boundary Disambiguation

- Galerie Zborowski, Paris, probably acquired directly from the artist.
- [...]
- Bernheim Jeune, Paris, before 1929 [Pfannstiel, 1929].
- [...]
- Reinhardt Galleries, New York, by 1936 [this and the following according to Winterbotham Collection inventory, Oct. 2, 1936, copy in curatorial file];
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# Natural Language Processing

## Span Categorization

**Task:** Predicting the correct category of a given portion of text



# Natural Language Processing

## Span Categorization

**sold to Joseph Winterbotham, Jr. (1878–1954), Chicago and Burlington, Vt., by Oct. 2, 1936;**

						
<b>Method</b>	<b>Name</b>	<b>Time</b>	<b>Time</b>	<b>Location</b>	<b>Location</b>	<b>Time</b>
						
		<b>Birth</b>	<b>Death</b>		<b>Location</b>	<b>Vagueness</b>



**Party**



**Receiver**



**Person**



# Art Institute of Chicago Dataset

## AI Training Experiment

- **Art Institute of Chicago (ARTIC) dataset**
  - Downloaded on April 7th, 2022.
  - 11,392 provenance texts compiled according to AAM guidelines
- **Sentence Boundary Disambiguation**
  - F1 Score = 0.99
  - 6,000 annotated provenance texts: 60% training, 20% validation, 20% test
- **Span Categorization**
  - F1 Score = 0.94
  - 6,451 annotated provenance events: 60% training, 20% validation, 20% test

Source: Lynn Rother, Fabio Mariani, Max Koss, “Hidden Value. Provenance as a Source for Social and Economic History”, *Economic History Yearbook, Special Issue: Digital Methods*, May 2023.

# Provenance

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## Challenges and Biases

# Limits of AI

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## Complex provenance information requiring domain expert intervention

- Galerie Zborowski, Paris, probably acquired directly from the artist.
- [...]
- Bernheim Jeune, Paris, before 1929 [Pfannstiel, 1929].
- [...]
- Reinhardt Galleries, New York, by 1936 [this and the following according to Winterbotham Collection inventory, Oct. 2, 1936, copy in curatorial file];
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# VISU

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from Latin *de visu*, "with your own eyes" → Human supervision is required

**Vagueness:** approximation of spatial or temporal data (e.g., “near Paris”, “by Feb. 1957”)

**Incompleteness:** gap in historical reconstruction

**Subjectivity:** formulation of hypotheses using historical sources

**Uncertainty:** confidence in formulating a hypothesis (e.g., “possibly”, “probably”)

# Data Provenance of Provenance

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**Nanopublication:** the smallest unit of publishable information.

## Assertions Graph

Statements about  
a specific (art)  
provenance event

## Provenance Graph


Statements about  
how and who  
formulated the  
statements in the  
Assertions Graph.

## Publication Info Graph

Metadata of the  
nanopublication:  
date, license, and  
editors.

# Human-in-the-Loop Interface

PROVA - The Provenance App [Back to Projects](#) Logout



**Portrait of a Woman, c. 1917/19**  
Amedeo Modigliani  
The Art Institute of Chicago  
1954.316

[Wikidata ID](#)

Portrait of a Woman (Q20267217) - paintin... x

Galerie Zborowski, Paris, probably acquired directly from the artist. Bernheim Jeune, Paris, before 1929 [Pfnanstiel, 1929]. Reinhardt Galleries, New York, by 1936 [this and the following according to Winterbotham Collection inventory, Oct. 2, 1936, copy in curatorial file]; sold to Joseph Winterbotham, Jr. (1878–1954), Chicago and Burlington, Vt., by Oct. 2, 1936; bequeathed to the Art Institute, 1954.

[Credit Line](#)

[Inscription](#)

### Provenance Activity

**Activity Certainty**

? This activity is a hypothesis in contradiction with the previous activity (e.g., "or").

⚠ This activity is part of the contradictory hypothesis described in the previous activity.

**Activity Type**

**Activity Type Certainty**

**Activity Time**

EDTF ?

### Activities:

Drag and drop an Activity to change ascending chronological order

- Creation 1917–/1919
- Acquisition ????
- Acquisition ../1929
- Acquisition ../1936
- Purchase ../1936-10-02
- Inheritance 1954

[Add Activity](#)



# Thank you for your attention!

[provenance.hypotheses.org](https://provenance.hypotheses.org)

[provenance@leuphana.de](mailto:provenance@leuphana.de)

[modernmigrants.art](https://modernmigrants.art)

 [@Provenance\\_Lab](https://twitter.com/Provenance_Lab)



[whatisapainting.com](https://whatisapainting.com)

Fabio Mariani, Lynn Rother, Max Koss, “**Teaching Provenance to AI: An Annotation Scheme for Museum Data**”, *AI in Museums: Reflections, Perspectives and Applications*, 2023.

Fabio Mariani, “**Introducing VISU: Vagueness, Incompleteness, Subjectivity and Uncertainty in Art Provenance Data**”, *Proceedings of the Workshop on Computational Methods in the Humanities 2022*, 2023.

Lynn Rother, Fabio Mariani, Max Koss, “**Hidden Value. Provenance as a Source for Social and Economic History**”, *Economic History Yearbook, Special Issue: Digital Methods*, vol. 64, nr. 1 (May 2023).

Lynn Rother, Max Koss, Fabio Mariani, “**Taking Care of History. Toward a Politics of Provenance Linked Open Data in Museums**”, *Perspectives on Data*, Art Institute of Chicago, 2022.