

# Towards a formal model for scholarly observations

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## An artwork



Figure 1: *Guernica* by Pablo Picasso, 1937

# 2

## An artwork ... interpreted 1.

### Symbolism and interpretations [\[ edit \]](#)

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Interpretations of *Guernica* vary widely and contradict one another. This extends, for example, to the mural's two dominant elements: the bull and the horse. Art historian Patricia Failing said, "The bull and the horse are important characters in Spanish culture. Picasso himself certainly used these characters to play many different roles over time. This has made the task of interpreting the specific meaning of the bull and the horse very tough. Their relationship is a kind of ballet that was conceived in a variety of ways throughout Picasso's career."

When pressed to explain the elements in *Guernica*, Picasso said,

...this bull is a bull and this horse is a horse... If you give a meaning to certain things in my paintings it may be very true, but it is not my idea to give this meaning. What ideas and conclusions you have got I obtained too, but instinctively, unconsciously. I make the painting for the painting. I paint the objects for what they are.<sup>[24]</sup>

Figure 2: Source: Wikipedia

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## An artwork ... digitally represented

### **Guernica**

Pablo Picasso (Pablo Ruiz Picasso)

Malaga, Spain, 1881 - Mougins, France,  
1973

Date: 1937 (May 1st-June 4th, Paris)

Technique: Oil on canvas

Dimensions: 349,3 x 776,6 cm

Category: Painting

Figure 3: Source: [museoreinasofia.es](http://museoreinasofia.es)

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## An artwork ... interpreted 2.

An accurate depiction of a cruel, dramatic situation, *Guernica* was created to be part of the Spanish Pavilion at the International Exposition in Paris in 1937. Pablo Picasso's motivation for painting the scene in this great work was the news of the German aerial bombing of the Basque town whose name the piece bears, which the artist had seen in the dramatic photographs published in various periodicals, including the French newspaper *L'Humanité*. Despite that, neither the studies nor the finished picture contain a single allusion to a specific event, constituting instead a generic plea against the barbarity and terror of war. The huge picture is conceived as a giant poster, testimony to the horror that the Spanish Civil War was causing and a forewarning of what was to come in the Second World War. The muted colours, the intensity of each and every one of the motifs and the way they are

articulated are all essential to the extreme tragedy of the scene, which would become the emblem for all the devastating tragedies of modern society. *Guernica* has attracted a number of controversial interpretations, doubtless due in part to the deliberate use in the painting of only greyish tones. Analysing the iconography in the painting, one *Guernica* scholar, Anthony Blunt, divides the protagonists of the pyramidal composition into two groups, the first of which is made up of three animals; the bull, the wounded horse and the winged bird that can just be made out in the background on the left. The second group is made up of the human beings, consisting of a dead soldier and a number of women: the one on the upper right, holding a lamp and leaning through a window, the mother on the left, wailing as she holds her dead child, the one rushing in from the right and

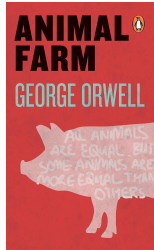
finally the one who is crying out to the heavens, her arms raised as a house burns down behind her. At this point it should be remembered that two years earlier, in 1935, Picasso had done the etching *Minotauromaquia*, a synthetic work condensing into a single image all the symbols of his cycle dedicated to the mythological creature, which stands as *Guernica*'s most direct relative. Incidents in Picasso's private life and the political events afflicting Europe between the wars fused together in the motifs the painter was using at the time, resulting both in *Guernica* itself and all the studies and 'postscrips', regarded as among the most representative works of art of the 20<sup>th</sup> century.

Paloma Esteban Leal

Figure 4: Source: museoreinasofia.es

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## Literary texts



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## Research goal

The ontological representation of cultural heritage needs to take into account **observations** considering that

- There can be multiple observations about the same item
- Reflecting different perspectives, terminologies, cultures
- Not necessarily mutually consistent or compatible
- Non-veridical wrt the item

**Research question:** how shall we make sense of all of this in (computational) ontologies?

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## Short note on methodology

Reasoning in ontological terms is a old philosophical enterprise – sometimes supported by logical formalism (especially in contemporary analytic philosophy). For example

- **Mereology** (study of parthood relations)
  - Nowadays widely studied in symbolic AI for the representation of space, physical objects, etc.
  - Embedded in most foundational ontologies

Hence,

- Look at philosophical methods and theories to support the development of well-founded (computational) ontologies



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## Observations 1.

- Information representing the world as **being conceived** in a certain way, i.e., the classification of entities under certain concepts via, e.g., analytic, testing, measurement procedures
- Do not depend on single observers or observing acts
- Are not necessarily true or mutually consistent

## 9 Observations 2.

- Have a public dimension, i.e., are inter-subjectively accessible without ambiguity (are not mental entities)
  - Agreement on a common observational language\* that ...
  - Can be tuned to different application contexts, e.g., archeology, musicology, literary studies, etc.
- Can be organized in various abstraction levels

See: Masolo, C., Botti Benevides, A., & Porello, D. (2018). The interplay between models and observations. *Applied Ontology*, 13(1), 41-71.

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## Observations 3.

- In the proposed framework (in FOL, work in progress)
  - Observations are organized according to a *finite* set  $\mathcal{P}$  of unary predicates representing the *kinds* of observations considered in the observational language of the users
  - $PC_i$  primitive to identify the *i*th-entity involved in the observation

For instance

**f1**  $65\text{KG}(\text{o}) \wedge PC_1(\text{john}, \text{o}) \wedge PC_2(20.6.2021, \text{o})$

**f2**  $\text{o} = 65\text{kg}(\text{john}, 20.6.2021)$   
(shortcut to ease the representation)

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## Desiderata

To develop a modeling framework

- To **document** scholars' observations
- To **compare** them (in formal terms) to understand whether scholars **agree** and at which level
- ▶ From an application perspective, explicit representation/handling of observations in digital platforms for cultural heritage

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## Philology and Literary studies

Scholars commonly express observations of different sorts, e.g.,

- About the text in a book
- About the author or production time of a text
- About the relations between texts
- About the “content” of a text, i.e., what a text says [interpretations]
- etc.

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## Running example

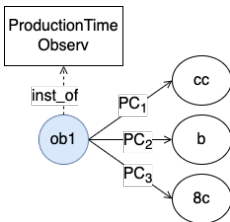
In the 15th century, by philological analysis, Lorenzo Valla observed that the *Constitutum Constantini* was a false document, probably written only in the 8th century rather than in the 4th cent.

Recall that, accordingly to the vulgata, by means of the *Constitutum*, the emperor Constantine was meant to have given political authority to the Pope over Rome and the western part of the Roman Empire.

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## Production time observation 1.

**f3** `ptm(const_constant, b, 8cent.ad)` (*Constitutum Constantini*)

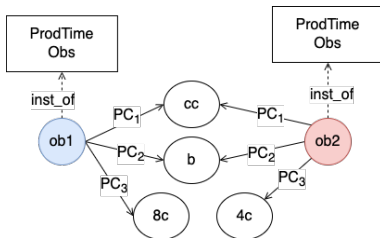


An observation about the production time of a text

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## Production time observation 2.

**f4** `ptm(const_constant, b, 4cent.ad)`

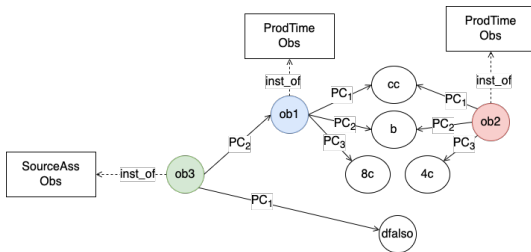




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## Source observation (asserting)

**f5** `srca(de_falso, ptm(const_constant, b, 8cent))`

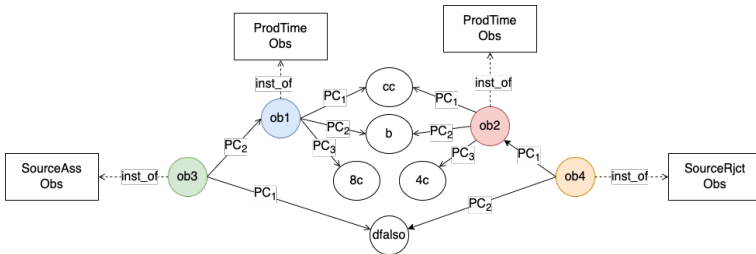


An observation documenting the source of an observation

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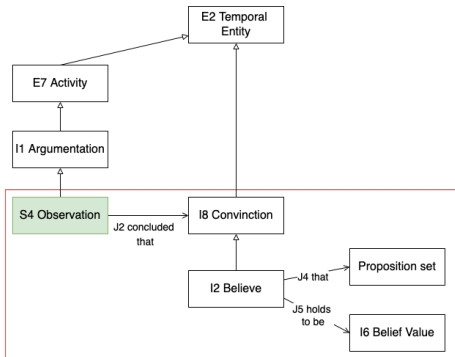
## Source observation (rejecting)

**f6** `srcr(de_falso, ptm(const_constant, b, 4cent))`



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## Observations in CIDOC-CRM 1.



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## Observations in CIDOC-CRM 2.

- **S4 Observation:** Human activity aimed at collecting data about physical things often by means of measurement tools
- **I1 Argumentation:** *activity* of making honest observations
- **I2 Belief:** the period of time that an individual/group holds a proposition set (to be true, false, etc.)
- **I4 Proposition Set:** propositions hold by a belief. It could be implemented as a graph or any other structured data-set. Regardless of the specific syntax employed, the *propositions should be made up of unambiguous identifiers, concepts of a formal ontology and constructs of logic*

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## CRM and our approach 1.

Our notion of observation:

- Abstracts from both observation activities and observing agents
  - Multiple agents can express the same observations
  - Observations are the outcomes of observation activities
- Is close to **I4 Proposition Set**

However,

- A **I4 Proposition Set** is the “content” of an agent’s belief
- Our observations are public, therefore accessible intersubjectively ([observation language](#))

# 21 CRM and our approach 2.

In addition:

- CRM's observations seem specifically tuned to natural sciences
- We attempt to be more general to cover also (sorts of) “qualitative” observations (e.g., for human and social sciences)
  - An observation can result from different kinds of activities, i.e., empirical measurements, perceptions, philological research methods, literary criticism studies, etc.

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## CRM and our approach 3.

In a nutshell, in our case, observations

- Are conceived in a wider sense (not restricted to natural sciences)
- Have a representational, public nature (intersubjective)
- Formally structured (desiderata for I4 Proposition Set)

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## Future work

Includes:

- Work out the general approach (partially done)
- Develop domain-specific observational languages (take into account that there can be more for the same domain!)
  - Specific focus on literary criticism
  - Preliminary result in musicology (SWODCH 2022)
  - Archeology?



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## Thank you

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