"Probably Sold to Paalen, Possibly by Exchange": Vagueness, Incompleteness, Subjectivity, and Uncertainty in Digital Art Provenance

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1 Introduction

In reading the provenance of "Head of a Woman," a painting by Pablo Picasso from 1927, published on the Metropolitan Museum website, one particular phrase draws attention: "probably sold to Paalen, possibly by exchange."[1] The uncertainty evinced in this formulation points to a gap in the historical reconstruction of the work's ownership history. The museum's curators have tried to formulate some hypotheses to fill the gap: the work was probably sold by Galerie Pierre Loeb (the previous owner, by 1938) directly to Wolfgang Paalen (the next known owner, by the 1940s) or possibly by exchange with other works of his. However, this does not exclude that other events may have occurred and that perhaps the object passed through other hands before reaching Paalen. In analyzing the context of the example, this gap appears crucial as it marks the moment the artwork left Europe, right at the beginning of the Second World War, and arrived in Mexico City.

According to the guidelines proposed by the American Alliance of Museums, art provenance summarizes the ownership history of an artwork from its creation to its current location (Yeide et al., 2001). This history unfolds with a sequence of different owners and, for each passage of ownership, it is essential to provide the date, the parties involved, the method of acquisition, and, if applicable, the place where the transaction took place. The stewardship of provenance texts, fundamental for proving an artwork's authenticity, value, and ownership status, is entrusted to the proprietary museum's curators. In fact, publishing provenance texts on a large scale on museum websites has become a priority because cultural heritage institutions are faced with increasing demands for transparency and accountability, especially in the context of looted and expropriated art. However, as we can see in the above example, given the intellectual and critical effort required to analyze historical sources, reconstructing a provenance is not a straightforward process, and often some information may be unavailable or only partially known. We have classified the vague, incomplete, subjective, and uncertain information encountered when reconstructing an art provenance under the acronym VISU (from Latin *de visu*, "with your own eyes"). Vague information represents the approximation of spatial or temporal data (e.g., "1945 circa," "near Paris"). Incomplete information relates to gaps in historical reconstruction, where no one has yet made assumptions. Subjective information comes from an intellectual process in which the curator, through a hermeneutical activity, provides hypotheses to fill a historical gap. Finally, as we saw in the "Head of a Woman" example, subjective information can have varying degrees of certainty based on the curator's confidence in formulating a hypothesis, such as "probably" (more certainty) or "possibly" (less certainty). In this case, we are talking about uncertain information.

2 Motivation

Taking care of art provenance, with the necessary focus required in handling VISU information, is a challenge that becomes even more crucial when institutions want to publish and share digital art provenance in a structured, machine-readable format. Indeed, in recent years, we have seen growing interest in publishing art provenance as linked open data (LOD). On the one hand, cultural institutions are called upon to share digital information that conforms to FAIR principles. On the other, art provenance as LOD opens up new research scenarios through large-scale analysis across different institutions. At the moment, and with the exception of auxiliary projects such as the Getty Provenance Index—an index of archival inventories, sales cat-

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[1] https://www.metmuseum.org/art/collection/search/490037 (last visited May 12, 2022)

alogs, and dealer stock books (Davis, 2019)—the only attempt to publish art provenance as LOD is the Art Tracks project developed at the Carnegie Museum of Art (Newbury, 2017). More recently, Linked Art, a community of museum and heritage professionals, has proposed a CIDOC CRM application profile devoted to the art domain, the Linked Art Data Model.[2] Specifically, the model offers components to describe art provenance according to LOD standards. In analyzing these state of the art efforts, we must note that neither Art Tracks nor Linked Art has fully addressed the issues concerning VISU information. Rather, the Linked Art community has voluntarily avoided adding complications to their Data Model, staying true to the principle of usability in making LOD more accessible to cultural heritage professionals. While we endorse the philosophy behind the Linked Art Data Model and consider it the standard for the community, we believe that VISU information cannot be disregarded in the digital transformation of art provenance. In fact, in keeping CIDOC's application profile accessible to practitioners, we should be including their intellectual work. Undoubtedly, this work is complex to represent, but only by preserving VISU information do we prevent making clear, complete, objective, or certain what scientifically is not.

3 Methods

In light of the problem we introduce, we propose modeling solutions to include VISU information in digitizing and publishing art provenance as LOD. Our contribution consists of an external module compatible with the Linked Art Data Model. First, the module aims to model vague information, such as spatiotemporal approximations, by integrating the CIDOC-compatible CRMgeo ontology (Hiebel et al., 2017). As for incomplete information, since we are dealing with gaps in historical reconstruction, we cannot address this problem directly through data modeling. However, at this stage, we can create the prerequisites to handle historical gaps in the following analysis phase. In fact, in modeling the subjectivity and uncertainty of provenance statements, we can evaluate on a large scale the validity of the assumptions and possible contradictions in addressing gaps. Moreover, expressing the hypotheses and their certainty value in machine-readable format opens possibilities for

filling the historical gaps by generating and validating new hypotheses semi-automatically through the machine. To allow this in the analysis phase, the module introduces the possibility of publishing art provenance LOD as nanopublications (Groth et al., 2010). With this approach, it is possible to semantically express the "provenance of provenances" (Huemer, 2020), guaranteeing the preservation of subjective and uncertain information. The new module integrates ontologies to represent the hermeneutic activities of scholars, such as the Historical Context Ontology (Daquino and Tomasi, 2015). With the addition of a module devoted to VISU information, scholars will be able to explore and make sense of Art provenance through a human-in-the-loop approach. While the machine will assist domain experts in analyzing provenance, they will also be able to assess *de visu*, with their own eyes, the most scientifically disputed information.

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[2]https://linked.art/ (last visited May 12, 2022)