

Ontological Representation of Narrative Places for Cinema Archives

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Abstract

Narrative places are places that have a role in a narrative. They can be real or imaginary, requiring a credible representation in visual media. Despite their relevance, an effective archive of the representations of narrative places, which could impact location management and historical archives, is currently missing in cinema databases. The paper describes an ontological approach to the modeling and archiving of narrative places, connected to the actual locations and the media production data. We address the basics of ontological modelling, their encoding, and its ongoing application in a project about an archive of silent movies that document the transformation of the urban landscape of the first decades of the twentieth century.

Keywords

Ontology, narrative, cataloguing, archive, landscape, cultural heritage

1. Introduction

The concept of narrative refers to the chain of events that unfold to reveal the story. Three major elements participate in the film narrative: causality, i.e., the cause-effect relationships between events, time, i.e., when events occur within the story, and space, i.e., the location or the place where events occur [1]. We call such spaces “*narrative places*”; they play a pivotal role in films and visual media in general. Narrative places can correspond to real-world places, e.g., Trevi Fountain in the famous scene where Sylvia calls Marcello in “*La Dolce Vita*”, or they may exist only as imaginary locations, such as the Middle-Earth in “*The Lords of the Rings*” saga. They mark the spatial evolution of the plot, a feature that is distinctive of the cinema art with respect to, e.g., novels [2]. Narrative places are distinct from filming locations: the former represents the place within the story, while the latter is the actual location where shooting occurs.

However, film archives barely report narrative places. Indeed, both institutional archives, e.g., Cinema Context, the online encyclopedia of Dutch films [3], and commercial archives, e.g., the IMDb platform¹, store film and film-related content by mostly addressing bibliographic data. This is trivially true for the preservation approach carried out by a number of cinema archives, which involves maintaining the physical copies of films and cataloguing them based on a predetermined set of bibliographic data. This method mainly emphasises information such as the film’s title, director, language, and other data related to the film production or the physical film copy, which serves as a bibliographic reference of the archive’s contents by scholars of film studies [4].

Narrative places are usually reduced to geographical coordinates and a set of keywords that represent their main characteristics, overlooking their narrative and spatial dimension (e.g., on the IMDb platform, a set of shooting locations is specified for each film but the information is limited to a label with the corresponding narrative place).

While this representation is functional in the context of bibliographic archiving, as it provides a clear and

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¹<https://www.imdb.com/>, visited on the 15th, September 2024

structured organisation of a large quantity of film and related data, we believe that, under a productive, cultural, and social perspective, a representational effort focused on other characteristics is needed.

This paper focuses on the role of narrative places in cinematographic production, with the goal of serving both historical documentation of both urban and natural landscape evolution, from a cultural perspective, or for managing locations for film production or tourism.

Indeed, in recent years, there has been a growing interest in film locations, e.g., concerning the so-called “Movie-induced tourism” phenomenon [5], which consists of people physically visiting places they experienced through watching a film. This tendency is also reflected on the internet, where new location-based web platforms have been developed (e.g., “Movie-locations”², a location-based platform designed for film tourism and finding real places associated with cinematographic production; “Il Davinotti”³, a collaborative platform for identifying locations where famous films were shot; and others^{4,5}). However, these approaches focus on shooting locations, represented by geographical coordinates and some photos, rather than films, narrative places and their relationships with real places.

In the present work, we delve into the semantic representation of cinematographic resources and narrative places. In particular, we address the basics of ontological modelling of films, narrative places, their relationship with real and imaginary places, and their encoding as digital items in a digital and accessible archive.

The remainder of this paper is organized as follows: Section 2 describes other approaches to cinematographic information representation. Section 3 presents the background, introducing the main concepts and terminology that will be used throughout the discussion. Section 4 illustrates our approach to ontological modelling, with a focus on narrative places and relations with real and imaginary ones. Section 5 briefly describes the use of our ontological model in a case study for encoding and organising films and narrative places, related to the Italian silent cinema of the early twentieth century, as digital items and use cases. Finally, Section 6 concludes this paper, with some considerations for future research.

2. Related works

Since 1980, films (or moving images) have been considered cultural heritage assets by UNESCO [6]. They need to be preserved for future generations, as they represent the visual expression of cultural heritage and artistic creativity of the years during which they were made. Their preservation does not only address the safeguarding of cinematographic techniques but also maintains the values, aesthetics, and ideologies they provide from the past. To this end, we can consider films as historical records, illustrative of the social, cultural and artistic evolution through time [7].

Traditionally, preservation was carried out by institutions and archives, either public or private. Films were preserved following a curatorial approach, starting from the preservation of the physical copy of the film. This may include the restoration of damaged copies, to preserve the overall integrity, if necessary. They were catalogued based on bibliographic attributes, such as title, director, year of publication, and the language of the copy [4].

The International Federation of Film Archives (FIAF) standardised this process with the FIAF Cataloguing Rules for Film Archives [8]. The document contains a list of guidelines for cataloguing materials classified as moving images, i.e., films, to facilitate information exchange between archives and cataloguers. These guidelines also aim at supporting the cataloguing procedure, as it is a long and expensive process.

However, within the current trend of digital preservation and the advent of Linked Open Data (LOD), this traditional method has been extended by including the digital copy of the film to be preserved and other metadata, to make archives accessible and interoperable according to the FAIR principles [9].

In recent years, the international community has devised diverse methodologies and tools for enhancing

²<https://movie-locations.com/>, visited on the 15th, September 2024

³<https://www.davinotti.com>, visited on the 15th, September 2024

⁴<https://www.locationshub.com/>, visited on the 15th, September 2024

⁵<https://moviemaps.org/>, visited on the 15th, September 2024

and guiding the digital preservation of films. In particular, FIAF published the FIAF Moving Image Cataloguing Manual [10]. This work extends the previous one by considering the implication of modern technologies in film preservation and digital cataloguing. Aspects such as which descriptive metadata should be considered, in addition to bibliographic ones, and which format should be used for film digital copies are discussed. Also, diverse vocabularies containing terms to be used in the cataloguing process have been released. This new version of the FIAF manual also takes into account two other works in the context of bibliographic cataloguing and digital archival, that is, Functional Requirements for Bibliographic Resources and EN 15907.

The Functional Requirements for Bibliographic Resources (FRBR) is a conceptual framework based on the entity-attribute-relationship model for organising bibliographic data [11]. Published in 1998, it addresses the issue of representing different manifestations of the same intellectual work by modelling the relationships between works, expressions, manifestations, and items. FIAF integrates the core model described within FRBR, specialising it in the cinematographic context, to better describe different copies of the same film.

Similarly, EN 15907 is a European standard specifically designed for cataloguing cinematographic works⁶. Implemented by German archives and formally adopted by the National Germany Filmography Filmportal⁷, it puts its focus on the intellectual work and describes its manifestations using a set of descriptive metadata, in a similar way as in FRBR. The focus of this representational model is put onto the interoperability of digital film archives, through the standardisation of the metadata descriptive structure.

In addition to the traditional standards for cataloguing, other initiatives have emerged following the LOD paradigm. This is the case of Wikidata [12], which is a collaborative and structured knowledge base that stores a large variety of information, including films. Based on the Resource Description Framework (RDF), a standard used in the context of the semantic web and LOD, information is stored as RDF triplets called statements. Each item is identified by a unique identifier and each statement asserts something about an item by using the notions of property and value (e.g., “The Lord of the Rings: The Fellowship of the Ring” (Q127367) “instance of” (P31) “film” (Q11424). Despite the Wikidata approach being compliant with other standards, such as, e.g., EN 15907, it still faces some limitations in terms of data authoring and data quality, because of its collaborative nature. However, it is possible to exploit its representational schema to devise a domain-specific ontology, a common approach to cataloguing resources in the context of cultural heritage [13][14][15].

While facing the representational challenge of film in digital archives, existing works rely on traditional methods, by focusing almost exclusively on bibliographic data and descriptors. Here, we intend to propose a different, semantic-based, representation, providing a different perspective on cinematographic resources. In particular, we focus on narrative places, which we strongly believe have the potential to be an intangible cultural heritage asset.

To this end, it is necessary to delve into the semantic description of narrative places and as well as shooting locations. Approaching the representation of such entities would require taking into account also the geographical and spatial dimensions, in the case of real places. Geospatial ontologies such as GeoNames Ontology⁸, a component of the geospatial database GeoNames, which represents geographic data using a hierarchical structure (e.g., country, region) and semantic metadata, and CRMGeo [16], an extension of the well known CIDOC-CRM ontology [17] with geospatial entities and properties, represent important initiatives that can be explored in an attempt to model narrative places. On the one hand, the hierarchical organisation provided by GeoNames Ontology could serve to model the partonomic (i.e., part-of) relationship between places. This representation is not limited to the administrative dimension (i.e., municipalities and regions), but could be extended to represent the composition of a narrative place (e.g., the Elven Palace (i.e., narrative place) as part of Rivendell (i.e., a narrative place) in *“The Lord of the Ring: The Fellowship of The Ring”*). On the other hand, the CRMGeo model

⁶http://filmstandards.org/fsc/index.php/EN_15907, visited on the 16th, September 2024

⁷<https://www.filmportal.de/en>, visited on the 16th, September 2024

⁸<http://www.geonames.org/ontology/documentation.html>, visited on the 16th, September 2024

defines the concept of spacetime volume, giving both temporal and spatial dimensions while describing a specific entity. This approach has been explored in our work since we aim to represent narrative places by focusing on their spatial dimension. Similarly, the temporal dimension could help represent the evolution of real places used in the cinematographic production as well as different representations of the same narrative places.

3. Background

Before describing the ontological model, it is important to introduce some fundamental concepts concerning the filmographic domain that will be used throughout the next sections of this paper. In particular, we will introduce some theoretical concepts, from [1], related to the filmographic domain as well as other operational concepts, from [10], related to the archival domain.

Film

With the term film or moving pictures, we refer to both the intellectual or artistic content of the cinematographic work and its realization process in a cinematographic medium, including details about its creation, contributors, and context (e.g., *"Jurassic Park"*, directed by Steven Spielberg and based on the novel of the same name by Michael Crichton). It encompasses a wide spectrum of recordings, from the artistic and cinematographic ones to the documentary or automatic ones.

Sequence

Each film can be divided into sequences, which identify a specific segment of the work (e.g., the sequence from *"Jurassic Park"* at the beginning of the film when John Hammond's helicopter lands near the fossil excavation site). The rationale behind the subdivision into film sequences may depend on different factors such as artistic ones (e.g., an act of a story narrated in the copy), contextual ones (i.e., based on the content displayed), or even technical ones (e.g., a single camera movement, without any change in camera position).

Shot

Finally, each sequence is composed of different shots, which are the basic unit of the film. A shot consists of a continuous and uninterrupted succession of images captured during a single camera take, eventually in motion, from the start to the stop of recording. Unlike a single still image (e.g., a screenshot), a shot typically captures a brief segment of action or movement in real time (e.g., the shot in the above-mentioned sequence when the helicopter lands).

Film Copy

From a bibliographic perspective, each film can have multiple film copies, which are its manifestations, that can differ from each other in terms of bibliographic characteristics such as language, publisher, film archive, and others (e.g., the *"Jurassic Park"*'s premiere copy).

Catalog Unit

From each film copy, it is possible to extract several catalogue units, which correspond to one or more film copy sequences that have some relevance from an archival and bibliographical perspective (e.g., the *Jurassic Park* sequence when the Tyrannosaurus Rex makes its first appearance, which could be interesting in terms of digital post-production for the visualisation of the dinosaurs).

Narrative Place

With the concept of narrative places, we refer to any real or imaginary place that participates in the narrative of a film, giving a spatial and geographical context to the narrated story (i.e., Isla Nublar, the fictional island where Jurassic Park is located). A narrative place doesn't necessarily belong only to a specific film, as it is an abstraction of the place where the narrative unfolds that can have different representations (e.g., Middle-Earth as a narrative place is related to both *"The Lord of The Rings: The Fellowship of the Ring"* and *"The Hobbit: An Unexpected Journey"*, even if it has different representation).

Displayed Place

On the other hand, a displayed place is the (real) place that has been actually captured to represent the narrative place in a film. A displayed place can correspond to the narrative place it represents (e.g., the Louvre Museums in Paris is both the displayed place and the narrative place at the beginning of *"The*

Da Vinci Code”, where the treasure hunt starts) but can also be different, as in the case of imaginary narrative places (e.g., Kauai, the Hawaiian island displayed to represent Isla Nublar in *“Jurassic Park”* during aerial view sequences).

Camera Placement

Finally, the camera placement (i.e., the place from where the camera shoots) refers to the real-world place where the camera was positioned while filming⁹ (e.g., the inside of the Louvre Museums for the shot inside the Louvre in *“The Da Vinci Code”*).

We used these concepts in the initial phase of our work, as they guided us in the realisation of the conceptual model. In particular, we addressed the modelling of narrative spaces by considering also correspondents displayed places and camera position places. Moreover, we take into account the bibliographic subdivision of film in sequences and catalogue units for the extension of our core model, realised for the use case application, which is briefly discussed in Section 5.

4. Film Locus and Place Representation Ontology

Starting from the concepts introduced in the above section, we devised a set of new ontological models capable of representing the concept of narrative places and their relationships with real-world places and cinematographic production. In particular, three ontologies were implemented: the first one is the top-level ontology which introduces the general entity of our domain of interest and the innovative concept of temporary property; the second one focuses on the concept of Locus, which will be introduced later in this section; finally, the third one focuses on the notion of narrative place representation and its relationships with other places. All three ontologies were developed using the Protégé editor.

The first ontology introduced the general entity of our work, named *Place Representation Top Entity* (Fig. 1), and represents the top-level ontology of our work. Any entity of this class has some basic attributes such as name and description, can be depicted by an image, and it is possible to express the partonomic relationship between entities by using the property *is Part Of*. It is also possible to express one or more types for each entity. The model requires types to be represented as individuals but does not enforce the use of any particular type system. Instead, it provides a general Type interface class that can be populated with individuals from any type system (e.g., the Art & Architecture Thesaurus¹⁰) or with custom, locally-defined types.

The temporal dimension has been modelled by including a set of temporary properties, beyond the traditional non-temporary ones such as *has Name* and *is Part Of*, capable of expressing a temporary value that can characterize a specific entity (e.g., *has Temporary Name*). To this end, each *Temporary Property* is characterized by a time interval and represents a reification of an individual property assertion. The introduction of such temporary properties is functional to the representation of such circumstances where the assertion of some fact may depend on the specific time interval (e.g., the city of Kaliningrad was called “Konisberg” from 1255 to 1946 and since then it has been called “Kaliningrad”). Within the second model (Fig. 2), we introduced the notion of *Locus* which comprises the three notions of narrative place, displayed place and camera placement in our domain of interest. Locus itself is a *Place Representation Top Entity* and inherits attributes and properties from the superclass. As we want to represent the geographical dimension of a narrative place (here, a *Locus*), we also introduced the *Map Reference* class, which represents the location of a Locus in a map. Finally, we introduced two Temporary Properties named *Temporary Map Reference* and *Temporary Location*, which is the temporary version of the *is Located In* property (e.g., a Locus *is Located In* another Locus: Turin *is Located In* Piedmont). By introducing the *Map Reference* class, enriched with the temporary dimension, the model allows to represent the spatiotemporal evolution of a *Locus* both in terms of position and geographical extension (e.g., the administrative boundaries of Rome city centre) and in terms of temporal evolution (e.g., administrative boundaries of Rome city centre in 300 c.e. and 2000 c.e.).

⁹Additional camera parameters such as orientation and exact position are not considered here.

¹⁰<https://www.getty.edu/research/tools/vocabularies/aat/>

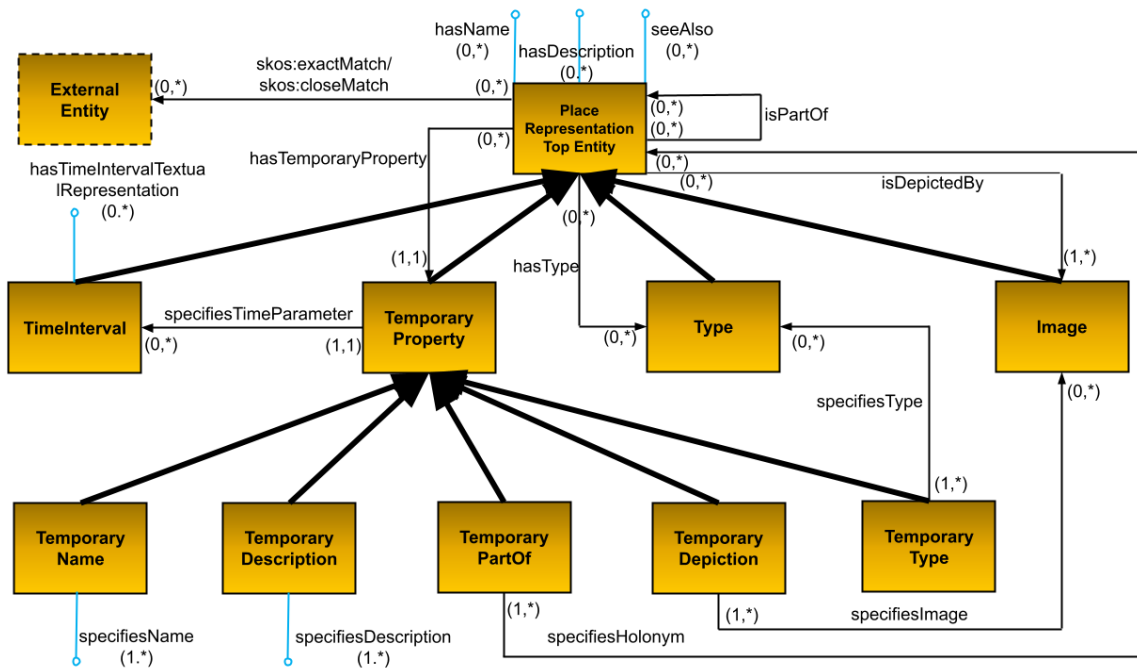


Figure 1: Film Locus and Place Representation Ontology Top: The Top-Level of the Model

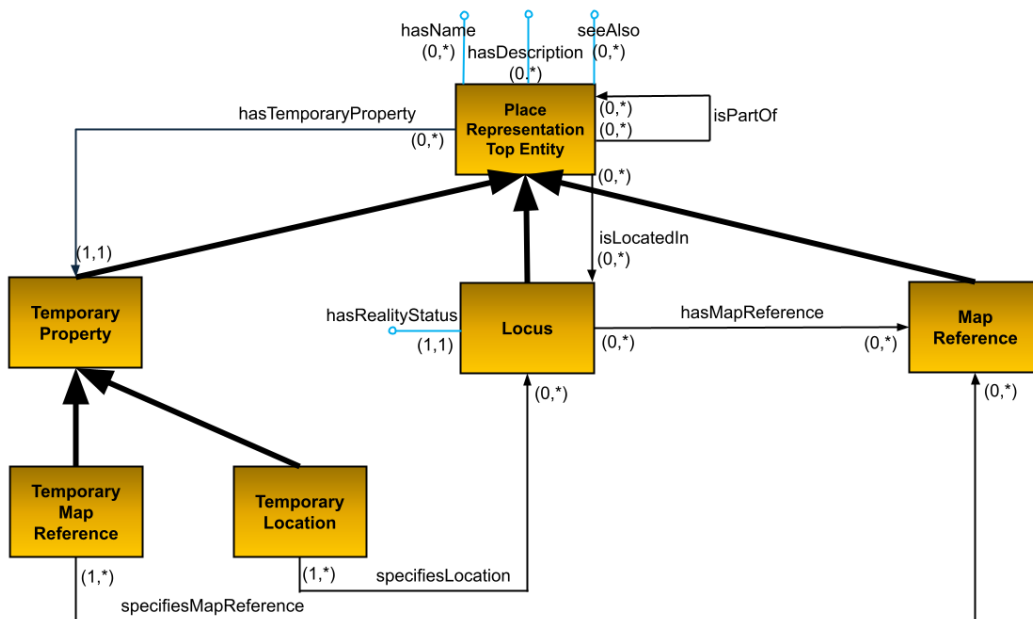


Figure 2: Film Locus Ontology: The Locus Class and its Specific Properties

Finally, in the third ontology (Fig. 3), we introduced the central notion of narrative place representation, which represents the specific representation of a narrative place that has been expressed in a particular film with a specific camera placement and by displaying a specific place. To this end, we defined both *Single Narrative Place Representation*, which represents the relationship between narrative place (i.e., a Locus) and displayed place (i.e., a Locus), and *Representation Of Narrative Places* entity, which model the relationship between film, camera placement (i.e., a Locus) and *Single Narrative Place*

Representation. We decided to add *Single Narrative Place Representation* because of the magnitude and the diversity of elements and places that can concur in representing a narrative place (e.g., the scene in which Frodo sees *Rivendell* for the first time in *”The Lord of the Rings: The Fellowship of the Ring”*, we have two different loci (plural of locus) that participate in the representation of Rivendell, which are the real shooting scene, i.e., the balcony, and the miniature of the elven palace in the background). All these newly introduced entities are subclasses of *Place Representation Top Entity* and they inherited all *Temporary Properties* defined above. Moreover, *Narrative Place Representation* entities are characterized by a set of attributes (e.g., *Weather conditions in Narrative* and *Season in Narrative*) which are significant under a bibliographic perspective (i.e., details about the film production) and a representational perspective (i.e., details about the representation of a specific place under certain conditions).

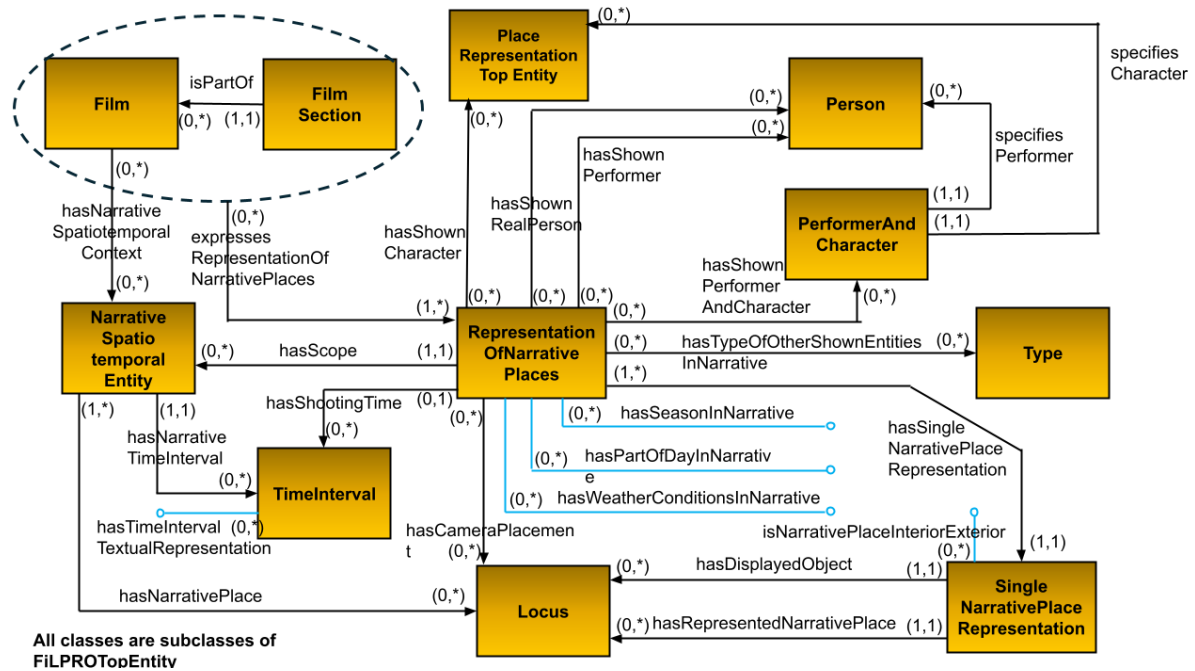


Figure 3: Place Representation Ontology: Representation of Narrative Places and Other Notions

Within the three conceptual models, we represent narrative places as multifaceted entities. While traditionally these entities are barely considered (i.e., their representation is limited to a label with their name and the corresponding shooting location), we address their representation by focusing on diverse aspects. First, we modelled the spatial dimension of narrative places, corresponding displayed places and camera placement places, giving them a geographical localisation and extension. Then, we consider the temporal context by using Temporary Properties, which allows the ontology to capture both the evolution of real places that appear in films and the different representations of narrative places over time. Finally, we consider the compositional aspect of places by exploiting the relationships ”is Part Of” and ”is Located In”, which allows us to represent not only places as a whole but also by starting from their components, as described in the examples above.

5. Case Study - Italian silent cinema

As proof of concept, we applied these ontologies to the real-world use case RevIS project: Revisualizing Italian Silentscapes 1896-1922 (RevIS) - Landscapes and locations of the first Italian cinema one hundred years later¹¹, which focused on investigating how Italian films, images, and narrations produced between 1896 and 1922 represented territories and landscapes [18]. Since the proposed model did not include

¹¹<https://silentscapes.eu>

the representation of film as bibliographic resources, as its focus was on narrative places as they appear in films, we extended the core model with standard bibliographic metadata, such as title, synopsis, and director, among others, to characterize the archive object of study. The extended model has been used to represent films and places as catalogue resources, which have been stored in a digital archive after a cataloguing process carried out by film studies cataloguers. Since the cataloguing process started, 280 films and 900 different places from the Italian silent cinema of the early twentieth century have been inserted into the digital archive and they can be accessed through a dedicated web platform¹².

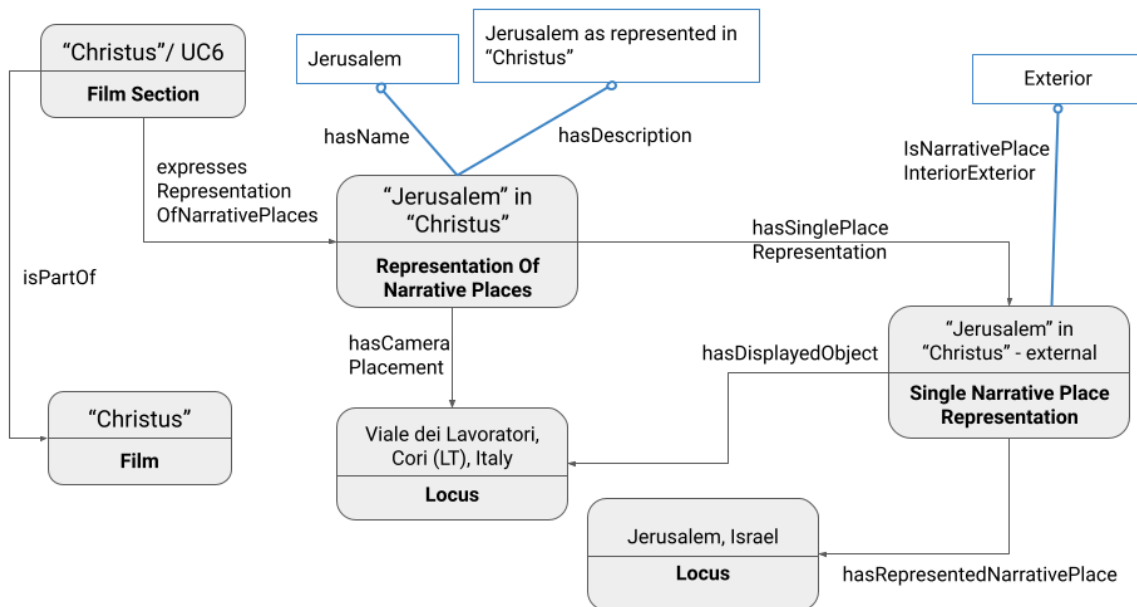


Figure 4: Example of a catalogue unit from the film *Christus* (1916), which represents Jesus going to Mount Calvary, carrying its cross, with Jerusalem in the background.

We observed that the model was able to effectively represent all the films in the digital archive, despite the use case project focused mostly on bibliographic aspects. Notably, it successfully describes both the narrative places and their cinematographic representation, in relation to real-world locations. In this regard, we propose an example extracted from the digital archive. Fig. 4 shows our conceptual model applied to a catalogue unit (i.e., Catalogue Unit 6) from the film *Christus* (1916) in which an ancient Jerusalem is represented as the narrative place. Even if the narrative place here is real, in the cinematographic realisation of this film another place has been used (i.e., Viale dei Lavoratori, Cori, Latina, Italy) and the model effectively captures that.

During and after the application of our model to the RevIS project, thanks to the constant dialogue with the film studies research group, we were able to find out both the strengths and possible limitations of our work. By moving the focus from the particular film to a broader context, it became possible to appreciate and understand how narrative places are represented, in terms of different locations and different cinematographic contexts, and how real-world places change over time. Moreover, introducing Temporary Properties in the model proved to be an efficient way to characterize how real places that appear in films often lack continuity in representation, as there can be a gap of up to 10 years between appearances. Giving them temporary properties, allows us to specify a set of statements that can be considered true in a specific time but with no specific temporal boundaries. On the other hand, concepts such as Locus, which embraces concepts of narrative place, displayed place and camera position, and Single Narrative Place Representation, although they successfully represented the relationship between narrative and real places, faced some resistance from film scholars at the beginning of the cataloguing

¹²<https://app.silentscapes.eu/>

process, due to the novelty and the complexity of the model. Referring to external thesauri, such as Getty Art & Architecture Thesaurus, also was troublesome and initially met some resistance, as film scholars often need to associate additional labels to the selected resources that can better fit the film domain. This possibly highlights the need for domain-specific thesauri for films, which could concern aspects such as set pieces and scenic objects.

6. Conclusion and future works

The paper presented the current state of the art of cataloguing practices for the traditional and digital preservation of films as bibliographic resources. We identified a possible gap in the existing literature concerning the lack of methods for representing (narrative) places in the film studies and archival domain. After exploring current practices and other representational resources (e.g., CRMGeo and GeoNames Ontology), we addressed the existing gap by implementing a conceptual model to represent narrative places as a whole in the filmographic context. In particular, we introduced concepts such as Locus to model narrative places, displayed places and camera placement places, and we introduced the notion of Temporary Property to address the change over time of such entities. Finally, we applied our conceptual model to a real-world use case project, with positive outcomes.

Developing an adequate metadata schema required considerable effort. However, collaboration with film scholars reveals its strengths and the potential for a broader application. In this sense, we plan to promote this framework to museum institutions for use beyond the experimental archive in the scope of the RevIS project. Doing so will require enriching the model to address a finer representation of cinematographic resources in archives by introducing more specific notions related to the film domain (such as Framing or Camera Settings, among others). Moreover, we aim to delve into the formal characterization of more general notions related to performing and visual arts, increasing the set of domains in which this model could be applied. From this perspective, it is also possible to extrapolate the core model and reuse it not only to represent narrative places in the film domain or similar contexts but also to represent more complex entities, such as landscapes and their evolution over time.

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