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A conceptual model for an OWL ontology to represent the knowledge of transmedia storytelling.

Abstract

This paper proposes a conceptual model and an OWL ontology for the representation and knowledge organization of transmedia narratives and the creation of RDF datasets. The authors have adopted an approach based on the development of a flexible conceptual model for the management and representation of information accessible in a network environment. The conceptual model identifies a series of entities, attributes and relationships to describe, organize and interrelate the knowledge of transmedia contents. From the conceptual model an OWL ontology has been developed in which SKOS has been widely used in the ontology to separate the conceptual description of resources. The conceptual model allows the design of architectures for the consumption of contents and the ontology offers a first conceptual level for the organization of knowledge of transmedia narratives.

1. Introduction

Digital platforms for audiovisual content are changing the concept of this type of products. The contents related to movies and television series posted on blogs, wikis and social networks reflect a high level of participation by readers. Consequently, users expand the narrative environment by developing content about characters, events, places, etc. (Warren, Wakefield and Mills, 2013, 69).

Audiovisual content can be based on literary works, comics, video games. Also, they are a source to extend the narrative structures, creating authentic fictional micro-universes with a high degree of complexity and plot coherence (Long, 2007, 21).

Transmedia storytelling uses multiple platforms to develop new narrative resources with external contributions and adapted to the nature of the medium in which they are published (Jenkins, 2003, 2011). Transmedia storytelling also includes theatrical performances, meetings, exhibitions and other types of social and artistic live events (Edmond, 2014) becoming an authentic cultural phenomena that transcend the original content itself.

The participation of the audience is essential to create transmedia storytellings and resources associated with content (Deuze, 2006; Scolari, 2009) creating a dynamic in which the user becomes a prosumer, that is, producer and consumer of content simultaneously (Fernández , 2014).

The interrelation of content is defined from descriptive metadata. The capacity of the systems for the exchange, description and information retrieval is based on the level of syntactic, structural and semantic interoperability (Veltman, 2001, 161). The Semantic

Web offers a multilevel architecture for a high semantic expressiveness of the data. For this, various technologies are used: RDF data model and serialization formats, RDF Schema, OWL, SPARQL, etc.

This work defines a conceptual model to formalize and describe transmedia storytelling and an OWL ontology for its representation as Linked Open Data datasets. Through this proposal it would be possible to exchange this type of information between systems, create comparative studies of transmedia storytelling or publish datasets for consumption by web services or multiplatform applications.

2. Proposal for a conceptual model of transmedia storytelling

The use of tools to represent and formalize scripts is an idea explored in the editing processes of some cinematographic productions. Examples such as those of The Matrix and Prometheus are paradigmatic in this regard (Kallay, 2013, 86-95). The processing and exploitation of this information in digital environments requires structured data, based on conceptual models, to represent abstractions of ideas or objects from the real world (Solodovnik, 2011, 5). An example of these models in the audiovisual field are EBUCore / EBU-CCDM (EBU, 2016, 2017).

Some authors have analyzed the different elements associated with the conceptualization of contents elaborated by transmedia storytelling (Rampazzo, 2013). Most of these works establish that an audiovisual resource in digital format can be described under a multilevel approach. This allows defining different scenarios to reuse descriptive metadata associated with different levels of granularity.

The proposed model describes, at a basic level, resources, some narrative elements (places, characters, actors, periods, events) and different types of transmedia storytelling relationships between works and audiovisual content. Entities, attributes and relationships are identified to describe and organize content resources. The aspects regarding the production, distribution or commercialization of content are outside of this proposal.

2.1. Resource

The entity "Resource" represents any type of object, such as a "Creative Work" or an "Event". In this context, a creative work is understood as a film, television series, book, comic, website, document, etc. The events include any type of activity, such as theatrical performances, exhibitions, festivals, etc. The resources can be published by an editor ("Publisher") and classified by category ("Category"). It is possible to define semantic relationships between the categories. Resources can also be associated with a specific context, such as a franchise, brand or narrative universe ("Context"). The relationship "has related resource" represents associative relationships between resources, while "has part" is used for part-whole relationships. Creative works and

events are linked to each other with the relationship "has event". The model allows to define and organize different types of creative works and events by assigning categories and themes (see Figure 1).

Figure 1: Diagram D-1 with entities an relations for the representation of resources. Source: own.
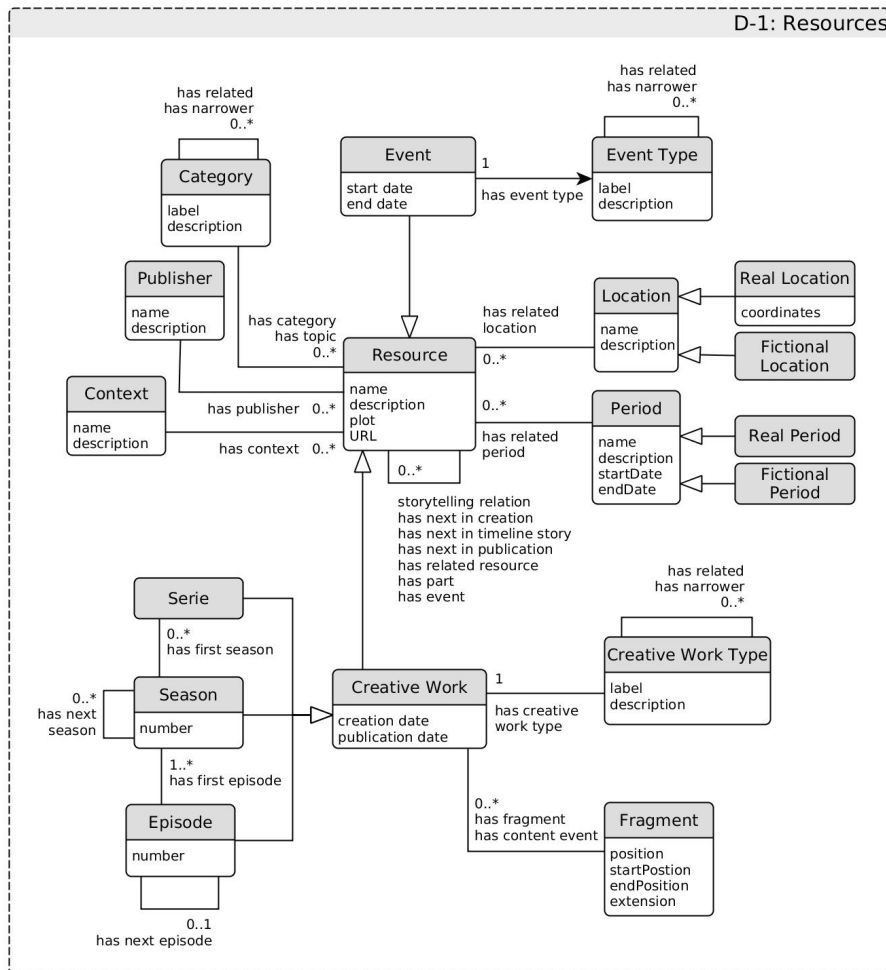
The organization of the TV series is represented by the sub-entities "Series", "Season" and "Episode". A series is linked to the first season through the relationship "has first season". The sequence between seasons is defined with the relation "next season". In a similar way the relations between seasons and episodes are defined using "has first episode" and "has next episode" respectively.

A relevant aspect is the narrative relationships between resources that define transmedia methods to expand the story universe of content. The conceptual model represents this characteristic through "storytelling" relation. Based on the work of Jung and O-Joun (2017), this relationship can be specialized in more specific ones.

The sequential organization of the creation, publication and development of narrative timelines of content resources is defined by the relations "have next in creation", "have next in publication" and "have next in timeline story", respectively.

The model defines the sub-entity "Fragment" to establish divisions within a work. It is also possible to refer to a certain event of content (usually significant) that takes place during the narration of a content.

2.2. Users

Users are an essential part of the conceptual model, since transmedia storytelling require user interaction as a prosumer. The "User" entity identifies individual users that can be organized into groups or communities ("User Group"). The entity "Participation" links users with resources in various ways. The type of participation is defined using the "have participation type" relationship and the entity "Participation Type". This mechanism allows to indicate when a user makes comments, evaluations, suggestions, collaborations or when he is spectator of an event or consumes a content.

Figure 2: Diagram D-2 entities to represent the interaction of users with resources. Source: own.
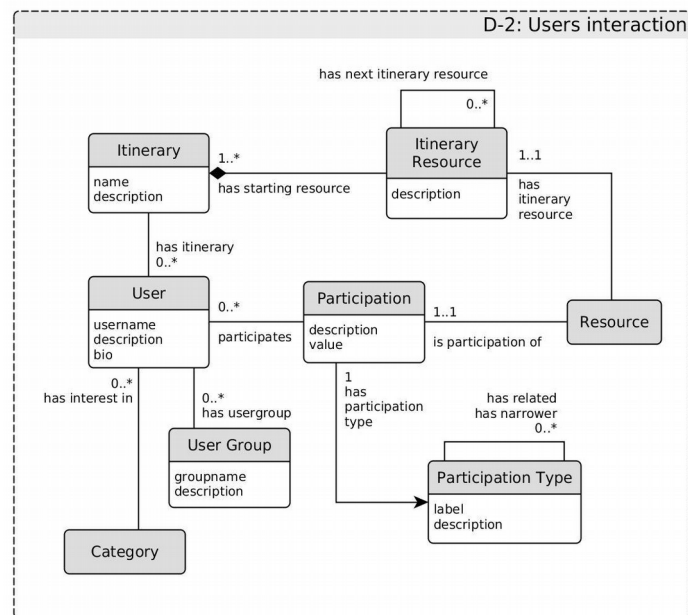
The model (see Figure 2) contemplates that the user defines routes or itineraries (entity "Itinerary") to consume resources. Through this feature, the user could make a selection of resources to start exploring a narrative universe and establish multiple paths of visualization or consumption of resources. It would also be possible to define itineraries pre-established by the publishers so that the user only selects the one in which they are most interested according to the type of resource, length, etc. A possible application of this feature can be found in some TV series with a main narrative line that develops in certain chapters and others that are outside of that line.

2.3. Agents, Cast and Contributions

In the proposed model, an agent is any person or organization, real or fictitious, that forms part of the argument or participates in its creation (see Figure 3). In this sense, the conceptual model distinguishes four types of agents: persons (entity "Person"), groups or organizations (entity "Group"), characters (entity "Character") and factions, organizations or fictitious groups (entity "FictionalGroup").

Figure 3: Diagram D-3 to represent agents, distribution and contributions. Source: own.
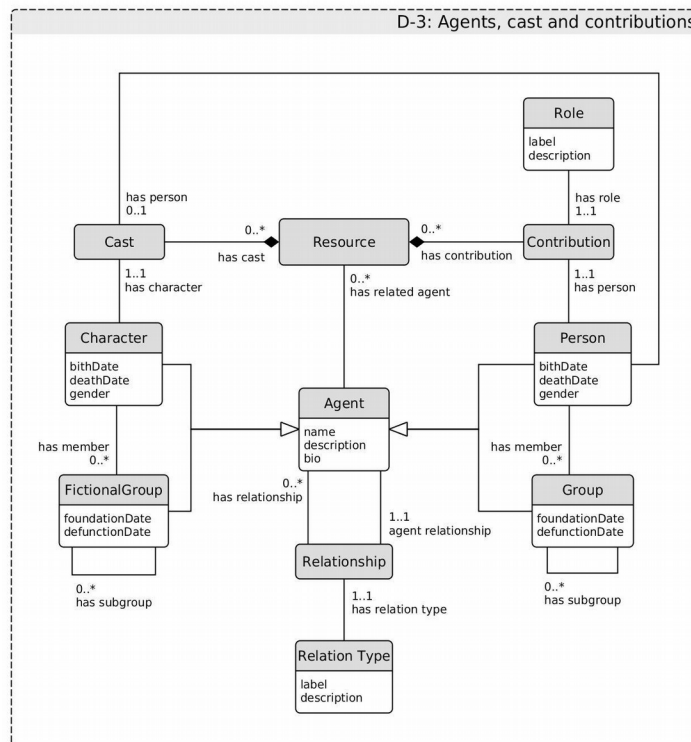
Individual agents ("Person" and "Character" entities) can be grouped using the relationship "has member". In turn, hierarchies can be defined among group agents using the relationship "has subgroup".

Agents have a direct relationship with content resources (property "related agent") or through a relationship depending on whether they are part of the cast or team of creators and collaborators. This is the function of the entities "Contribution" and "Cast". While the first defines the contributions of people based on the function (role) they have played, the second allows to establish the cast indicating the character and the actor that interprets it. On the other hand, it is possible to define relationships between agents. This type of relationship can be used to define kinship ties, professionals, etc. between different agents.

3. OWL Ontology for the publication of transmedia storytelling datasets

Ontologies provide a logical-conceptual model for a domain of knowledge, defining, at different levels of formalization, the meaning of the classes of objects, the relationships between them and the properties that describe them.

There is an intensive use of ontologies in the context of the semantic web, and some of them, such as SKOS (Miles and Bechhofer, 2009) or the Dbpedia ontology (Lehmann et al., And others, 2015) are fundamental elements in the development of applications and Linked Open Data datasets. Ontologies also follow the principles of interoperability and reuse, which frames the logical aspects of the description of resources and the interrelationships between them.

The authors have developed an OWL ontology from the conceptual model, whose namespace (also valid for downloading) is http://purl.org/umu/tso/ and its documentation is available at http://skos.um.es/TR/tso/.

SKOS has been used to represent the entities of vocabularies and controlled terms (categories, roles, types of events and works, types of user participation). The use of SKOS thesaurus or classifications for the definition of typologies provides greater flexibility and efficiency of use to the ontology.

Figure 4 shows an RDF graph with an example of the use of ontology. The corresponding prefixes have been used to simplify their reading. The prefix "tso" has been used to represent the elements of the proposed ontology. The prefix "ex" has been used to represent resources in a fictitious dataset.

The classes of the resources are indicated in parentheses under the corresponding IRI. The book "The Community of the Ring" by J.R.R. Tolkien has been defined as part of "The Lord of the Rings" using the property tso:hasPart. Peter Jackson's film of the same title is defined as a version of that book with the prequel (tso:hasPrecuel) "The

Hobbit: An Unexpected Journey". Two fragments (tso: Fragment) have been defined, both in the novel and in the film "The Community of the Ring". In the first case the fragment refers to book II, chapter 5 of the novel. The relationship between the movie and its corresponding fragment is defined as an event using the tso:hasEvent property. Its initial and final position is indicated with the properties tso:startPosition and tso:endPosition respectively. To define a relation between both fragments the property tso:hasRelatedResource is used. The characters of Gandalf and Balrog are related to the fragment of the book by tso:hasRelatedAgent. The resource ex:castGandalf" allows to link Gandalf with Ian McKellen, the actor who plays the character, and relate that interpretation to the movie.

Figure 4: Graph RDF with an example of application of the ontology. Source: own.
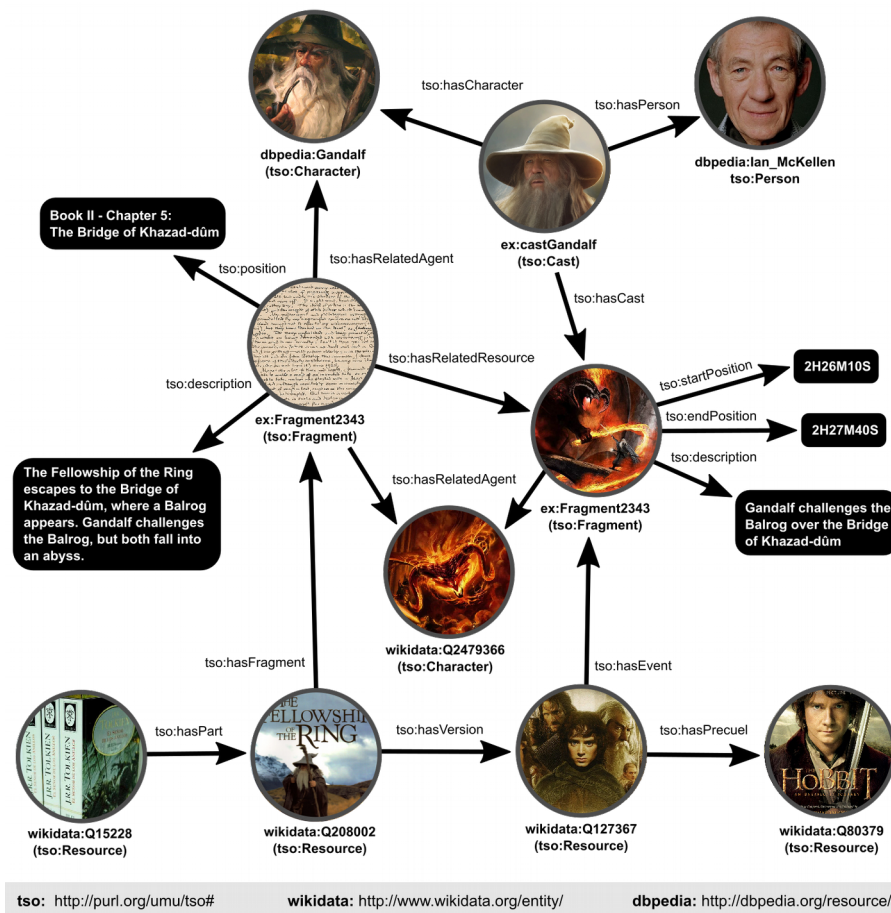
4. Conclusions: towards an architecture for consumption of transmedia data and content

In the context of transmedia storytelling, the advantages of structured data are centered on its reuse in a multiplatform context. The exploitation and enrichment of these datasets offer possibilities that extend the information of the original data. Therefore, the combination of audiovisual digital content platforms and external datasets based on RDF (Urakawa et al., 2016) is of great interest.

The development of semantic platforms is a field that has been working for years (Speicher, Arwe and Malhotra 2015). However, the incorporation of transmedia content can offer new tools that integrate streaming video services with added value information during the reproduction of the contents. The standardization of such information would be essential between producers and consumer services.

It is an architecture of consumption of transmedia contents and data that defines and formalizes the interconnections. In this architecture, the audiovisual contents, the users, the events and the objects of the socio-cultural heritage of the real world are the origin of these narratives. The digital context allows the deployment of content access and consumption platforms and also allows the publication of structured, interoperable and, preferably, open data. This data can lead to all kinds of content, applications and services on the web and, ultimately, could give access to streaming content. A fundamental element is the structured data warehouses that would be connected to the contents. They could also be published as linked open data for their availability by third parties for the development of applications. In the same way, the web is a source for the enrichment of metadata, from the definition of links to web resources or with other RDF datasets, such as DBpedia, Wikidata or Geonames.

The proposed conceptual model and OWL ontology define a first level in the description and interoperable representation of transmedia storytelling. In this level, the description of the basic elements of the resources are the basis for much more detailed descriptions. As a line of future research, a second level could be developed to represent the most elaborated plot aspects that allow to design and develop plots, characters, complex interactions with users, etc.

There are many tools used to design transmedia storytelling such as Twine, Mapstory, Zeega, Klynt, Moveable Feast, If This Than That, etc. The exchange of interoperable data between different software would allow the creation and application of semantic standards since the first moment of the creative process.

In the near future, the integration of content and data structured by semantic technologies could offer more efficient and usable platforms and services. The transparent and integral application of systems would result in a better user experience, which is a key condition for the success of any technology.

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