Models for Narrative Information: A Study

Udaya Varadarajan* and Biswanath Dutta**

Documentation Research and Training Centre, Indian Statistical Institute Bangalore Centre,
8th Mile, Mysore road, 560059, India,
*<udayav@drtc.isibang.ac.in>, **<bisu@drtc.isibang.ac.in>

Udaya Varadarajan is a research fellow at the Documentation Research and Training Centre (DRTC), Indian Statistical Institute, India. She is a doctoral student in the Department of Library and Information Science at the University of Calcutta, Kolkata, India. Ms Varadarajan earned a master's degree in Library and Information Science at the Indian Statistical Institute. Her current research interests are in ontologies and knowledge graphs.

Biswanath Dutta is an Associate Professor at DRTC of the Indian Statistical Institute Bangalore, India. He holds a Ph.D. in LIS from the University of Pune for his research conducted in ISI Bangalore. He was a Post-Doctoral Fellow at the Department of Information Engineering and Computer Science of the UniTn, Italy (2009-2012). He worked as a research assistant at the Department of Computer Science, Dalhousie University, Canada. He actively worked on EU-funded research projects. Currently, he is handling a research project on "COVID-19 and knowledge graph" (https://www.isibang.ac.in/~). He provides consultancy services to industries. He has published more than 70 scientific articles in national and international journals and conferences. He has four books to his credit. His current research interests lie in ontology, metadata, knowledge graph, data science, and semantic technologies.

Varadarajan, Udaya and Biswanath Dutta. 2022. "Models for Narrative Information: A Study." *Knowledge Organization* 49(3): 172-191. 53 references. DOI:10.5771/0943-7444-2022-3-172.

Abstract: From the literature study, it was observed that there are significantly fewer studies that review ontology-based narrative models. This motivates the current work. A parametric approach was adopted to report the existing ontology-driven models for narrative information. The work considers the narrative and ontology components as parameters. This study hopes to encompass the relevant literature and ontology models together. The work adopts a systematic literature review methodology for an extensive literature selection. The models were selected from the literature using a stratified random sampling technique. The findings illustrate an overview of the narrative models across domains. The study identifies the differences and similarities of knowledge representation in ontology-based narrative information models. This paper will explore the basic concepts and top-level concepts in the models. Besides, this study provides a study of the narrative theories in the context of ongoing research. It also identifies the state-of-the-art literature for ontology-based narrative information.

Received: 21 June 2021; Revised 18 June 2022; Accepted 18 July 2022

Keywords: ontologies, narrative information, modelling

1.0 Introduction

The narrative has gained significance in the 21st century. It gained access to several domains, such as politics, cognitive sciences, medicine, archaeology, and so on, with immense importance to professionals, academics, and practitioners (Herman 2007). Schwabe, Richter, and Wende (2019) explain the uses of narrative in fields ranging from business to software development. Narrative also plays a role in learning about museum exhibits and artefacts. This encourages visitors to infer the meaning of the museum artefacts rather than looking at them as mere exhibits (Kelly 2010). Despite its presence in several domains, narrowing it into a singular definition of narrative is tricky. One reason is that various schools on narrative define it in multiple ways. For example, Abrams (2012) describes it as "a story, whether told in prose (novel or short stories) or verse (epic or poems), involving events, characters, and what the characters say and do". Prince (2003) defines narrative as "the representation of one or more real or fictive events communicated by one,

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

two or several narrators to one, two or several narratees". Genette (1982) defines narrative as "the representation of an event or a sequence of events". Another reason is that seeping of the term narrative into other domains has diluted the meaning attributed to the term. However, it is evidence of the term's acceptance across disciplines. For example, 'narrative' is used instead of 'explanation', 'evidence', or 'ideology' because it is more tentative, less scientific, and less judgmental. Contrary to this dilution, Lyotard (1997) states that any discourse (theories, laws, politics etc.) is a mere collection of stories.

This philosophy enables us to capture, modify and infer knowledge as narrative. There are multiple ways to represent knowledge. It can be hierarchical (classification/taxonomy) or descriptive (glossary/dictionary) (Kwasnik1999). The authors restrict this investigation to the ontology-based model. This is because ontology in general, helps to (1) identify implicit relations, (2) allow navigation, (3) support reasoning ability, (4) represent a formal computable model for machine understandability, (5) query from a graph structure, and so on (Dutta, 2017). In the narrative domain, ontology is used to (1) extract genres and media types, (2) support narrative reasoning, (3) act as an initial step in the development of an Artificial Intelligence (AI) based system and (4) express, comprehend, and reason the event sequence in the models (Bartalesi et al. 2016; Damiano and Lieto 2013; Khan et al. 2016; Winer 2014).

The authors performed a literature search and encountered significantly fewer studies on ontologies created for capturing and reasoning the narrative information. This aspect has been described in the related work section. The primary objective of this work is to study and report the existing ontology-driven models for narrative information. The aim is to analyse the ontology-driven models that structure the narrative in various domains. Also, the work intends to explore the model's basic and top-level concepts. The major goal of this work is to bring the relevant literature and ontology models under one umbrella and do a parametric study. This study contributes to:

- identifying and analysing the existing ontological models for representing the narrative information in various domains;
- providing a study on select theories of narratology relevant to the research;
- identifying the differences and similarities of knowledge representation across disciplines in the case of ontology-based narrative information modelling;
- gathering the appropriate state of the art models.

The work is organised as follows. The next section provides the background of the study. Section 3 describes the systematic methodology adopted for this work. Section 4 describes the models, their significant classes and relations. This is followed by model review in section 5 and a discussion in section 6. Finally, section 7 concludes the paper by mentioning possible future research.

2.0 Background

2.1 Narrative Information and narrative theories

Narrative information "concerns the account of some real-life or fictional story (a 'narrative') involving concrete or imaginary personages" (IGI Global 2020). According to Herman (2007), major components of narrative information are: story (actions that always move forward in time), plot (sequence in which the events occur within the story), and narration (the production of narrative by a narrator).

Kelly (2010) quotes, "There is a metaphorical heart missing, a manifest passion, and flair, for the telling of our history. What better way to reclaim this territory than through the power of narrative?". (Hiner 2016) highlights the importance of narrative information in medicine. The author stresses that selecting and check-marking items from a drop-down list cannot capture sufficient information to treat a patient. These observations illustrate the importance of narrative information in addressing real-world issues, for example, in medicine or museums for knowledge interaction. The narrative has gained popularity in medicine and led to the new medical practice of narrative medicine (what the patient recounts about oneself, how the doctor or nurse retells this or interprets the events that occur in the "hospitals, clinics and operating rooms" (Wood 2005)).

Many eminent narratologists propose some theories of narratives. These theories are in no way exhaustive. But detailed here are the ones that are considered canonical in the domain of narrative studies. Aristotle identified the elements as exposition (initial situation in a narrative), crisis (disturbances in the initial situation), and denouement (resolution of the crisis leading to new exposition) (Klarer 2013). Propp proposed 31 functions and roles, as elements of a fairytale. According to him, in any fairytale, there is an introduction of the hero. The hero is manipulated by the villain, prompting the hero to action. The hero emerges victorious and is recognised. The villain is defeated and punished (Propp 2009). Greimas's contribution to the narrative has been to propose six actants (the actantial model). They are paired as binary units. The six actants are-subject/object, sender/receiver, helper/opponent. Some tasks are performed by the actants. They are search, aim, desire (by subject/object), communication (by sender/receiver), and support or hindrance (by helper/opponent) (Hébert 2020). There are canonical notions of a plot (what happens), characters (figure presented in a literary text), narrative situation (who speaks (speaker), who sees (audience) and setting (where and when an event takes

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

place) (Klarer 2013). A plot can be of three types: linear (event as it unfolds), flashback (a telling of an earlier event or scene that interrupts the normal chronology of a story), and foreshadowing (the telling of the future event that interrupts the normal chronology of the story) (Klarer 2013). There are three major types of speakers or narrators: authorial (unspecified narrator with a God-like presence), first-person (specific narrator who participates in the actions of the story and is a protagonist), and figural (narrator who participates in the action but is the third person) (Klarer 2013). Similarly, there are three types of audience for the story. The types of audiences are: zero focalisation (sees the whole story), internal focalisation (character sees what is happening at the point of time), and external focalisation (character sees what is happening at the point of time in the third person) (Klarer 2013). These theories, from classical to modern, have split narrative into their various components. For the study, the authors chose canonical elements of narrative for evaluation. This is elaborated in Step 1 of Phase II in the methodology section.

2.2 Related works

It is essential to examine previously published works formally. There is a literature that has analysed and reviewed ontologies. The review is based on various parameters in various domains and on different types of ontologies. The authors encountered few studies that reviewed ontologies created for capturing and reasoning narrative information. The findings of the literature study are detailed in this section.

Ontology is an explicit specification of a shared conceptualisation (Guarino et al. 2009). A parametric approach by Sinha and Dutta (2020) reviewed flood ontologies based on parameters such as ontology type, representation language, methodology, and so on. They found that most ontologies were built around a task and hence have a data-based approach. Suryana et al. (2018) studied ontologies of the Holy Quran with parameters such as outcomes of previous studies, language used for ontology development, the scope, datasets, tools to perform ontology development, ontology population techniques, approaches used to integrate the knowledge into ontology, ontology testing techniques, and limitations from previous research. This work identifies four major issues involved in Quran ontology, namely availability of Quran ontology in translation, ontology resources, the automated process of relationship extraction, and instances classification. Review work by Gyrard et al. (2018) studied the state of the art of ontology-based software for semantic interoperability. They analysed four major tools to perfect the software. The work reduces the learning curve in the discovery of tools for semantic interoperability. A review of methodologies by Iqbal et al. (2013) involved a set of evaluation criteria. The study found that most of the methodologies evaluated lacked maturity. The work by Shamsfard and Barforoush (2003) discussed state of the art in ontology learning (OL). They developed a framework for classifying and comparing 50 OL systems. The aspects of the framework consist of what to learn, where to learn, and how it may learn. It also includes features of the input, the methods of learning, knowledge acquisition, the elements learned, the resulting ontology, and the evaluation process. The work described the dimension's differences, strengths, and weaknesses. This could act as a guideline in the future for choosing the appropriate features to create or use an OL system. State of the art review work on ontology generation was done with seven parameters. The parameters are source data, methods for concept extraction, relation extraction, ontology reuse, ontology representation, associative tools and systems, and other special features (Ding and Foo 2002).

Work by Varadarajan and Dutta (2021), though does not review the ontology models, rather they list the ontology-based models for narrative information. The article by Winer (2014) is the closest published work to the current work. That work details the ontology-based storytelling devices. Winer describes the storytelling devices with a major focus on the narrative component of the devices. There are 12 devices that the paper explains. For example, the Art-e-fact ontology supports creating a mixed reality; MuseumFinland, a system that integrates three databases, schemas, and a collection management system with a semantic search engine and the game ontology project was initiated to dismember and identify the game elements using ontologies. There are works that have evaluated ontologies on their various aspects (like interoperability, ontology learning, ontology generation and methodology). But an analytical and comparative study of the ontologies on the backend of these storytelling devices is missing. This study aims to bridge this gap.

3.0 Methodology

A systematic approach is adopted to identify, describe and analyse the ontologies. The Systematic Literature Review (SLR) is primarily inspired by Camacho and Alves-Souza (2018). This methodology was tweaked to suit the current work. There are two independent phases to this methodology. Phase I involves steps for the selection of the model. Phase II comprises the steps for evaluating the model, including the parameter selection. Figure 1 illustrates the step-by-step process.

3.1 Phase I: Ontology selection

3.1.1 Step 1: Formulating the research question

This step derives the relevant research question based on the objectives of the work. The objective of the work is to iden-

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

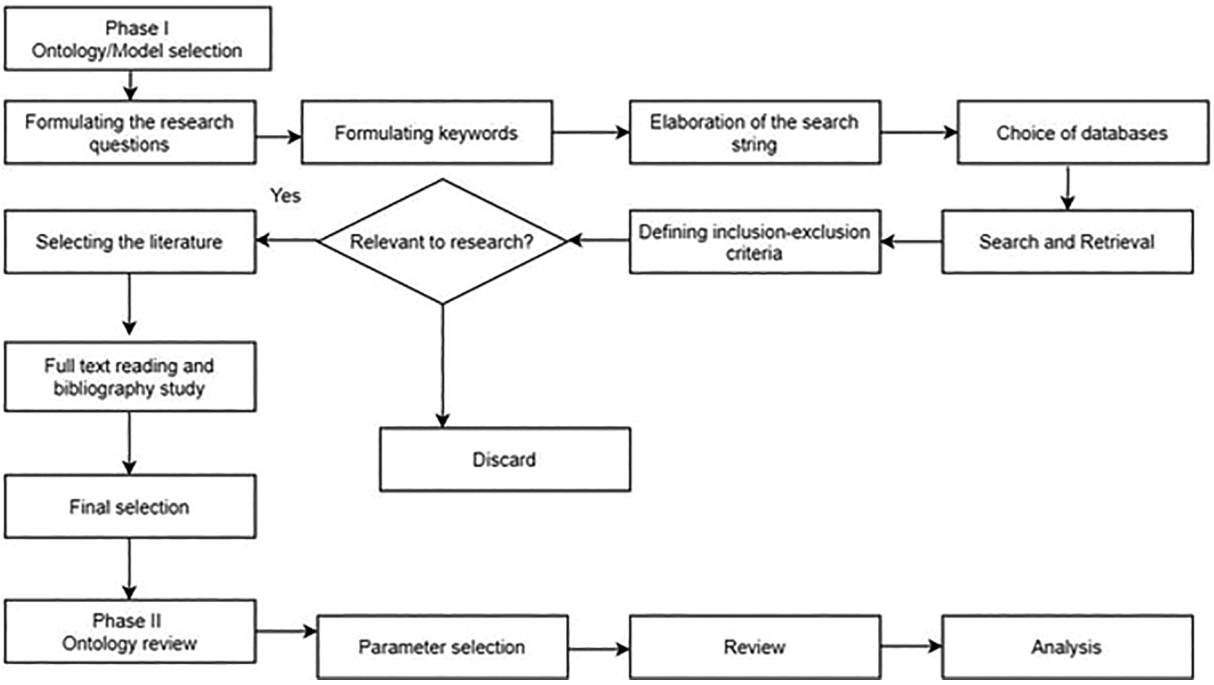

Figure 1. The methodology workflow.

tify and analyse the existing narrative ontology models. Q1 and Q2 correspond to this objective. Another goal was understanding the differences and similarities of knowledge representation across domains for narrative ontologies. Q3 was formulated with this objective in mind. The framed research questions are listed below (Q1-Q3).

- Q1 What are the ontology-based models for narrative information?
- Q2 Are narrative information represented using ontologies?
- Q3 What domains use ontology-based narrative information?

3.1.2 Step 2: Formulating keywords

In this step, we prepare a set of keywords from the questions developed in step 1. These keywords will help search for relevant literature through various scholarly databases. The keywords derived from the questions are listed below (K1-K4).

- K1 narrative information
- K2 ontology
- K3 storytelling
- K4 narrative model

3.1.3 Step 3: Elaboration of search string

Keywords from step 2 are formulated into search strings for ease of search and retrieval. Using various combinations of the keywords, search strings were developed. These search strings act as guidelines. The search strings developed are listed below.

- S1 ontology based narrative model
- S2 “narrative” AND “ontology”
- S3 “narrative information” AND “ontology”
- S4 ontology model for storytelling

3.1.4 Step 4: Choice of databases

This step is performed to choose the database for querying the search strings. For selecting the databases, the authors have considered these aspects: the availability (or subscription by institution or organisation), credibility, and subject covered. Databases chosen for this work are IEEE Xplore (ieeexplore.ieee.org), Taylor and Francis (www.tandfonline.com), Scopus (https://www.scopus.com/) and ScienceDirect (https://www.sciencedirect.com/).

3.1.5 Step 5: Search and retrieval

This step is to search for relevant literature using the search strings in the chosen databases. Depending on the search format of the database, the search strings may have to be

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

modified. For example, the search string S1 was changed as 'ontology AND based AND narrative AND model' in the Scopus database. S3 was modified as narrative AND information AND ontology in Taylor and Francis database. From the database listed in step 4, a total of 1265 documents were retrieved. After the removal of duplicates, the titles were reduced to 373.

3.1.6 Step 6: Inclusion and exclusion criteria

Search engines and databases retrieved the query, sometimes with irrelevant results. This step helps narrow the resource to the most relevant by considering criteria. The criteria identified were publication type, period of publication, and language. The works published in journals or conferences were only selected. These documents were the most indexed in the databases chosen, making it easier for literature identification and selection. The period of publication ranged from 2004 to 2019. The literature had to exclude the works from languages other than English. This is to avoid complexity and confusion with unfamiliar languages. The criteria are tabulated in Table 1. Applying the inclusion and exclusion criteria narrowed the number of items to 80.

3.1.7 Step 7: Relevance to research

The results from the previous step were further studied for their relevance. In conducting the study, certain problems were observed. The first issue was the definition of the term ontology in the literature. We came across some literature where ontology was described and understood from the philosophical perspective only. Likewise, if the literature included ontology from the modelling perspective, it was not the primary focus. In such literature, ontology models were part of larger applications. Similarly, the literature also included ontology models that did not align with the objective of narrative information modelling. Finally, certain literature were found to be not relevant to the research as detailed in step 1 of phase I. These problems were transformed into features. These features were used to perform another stage of filtering. The features are in Table 2.

The results that fulfil the feature are selected. The features were applied to the 80 results from step 6. There were only 11 results that matched the features. If results did not satisfy the parameters, they were discarded.

3.1.8 Step 8: Full-text reading and bibliographic study

Once the items were reduced, it was now easier to analyse. The bibliography of the literature selected may have relevant works, and it is crucial to study them. The authors read the literature chosen from the previous step. The authors referred to the bibliography of 11 works. The items chosen thus were scrutinised with the help of parameters in steps 6 and 7. 12 more references were identified that were relevant to the study. The collected works (23 documents) were identified as the core literature about the study of ontology models for narrative information.

Criteria	*Inclusion Criteria*	*Exclusion Criteria*
Publication type	Literature published in journals and conferences	Unpublished literature, literature as book chapters, patents, PhD thesis, master's dissertations
Period of Publication	2004-2019	Works published before 2004 and after 2019.
Language	Literature from the English language	Other than the English language

Table 1. Inclusion and exclusion criteria.

Features	*Inclusion*	*Exclusion*
Perspective regarding ontology	Which describes it from the engineering point of view, i.e., ontology as a concept that defines sets of properties and relations in a domain	Where ontology has philosophical to anthropological perspectives, i.e., ontology as the study of being and its existence
Availability of description	Ontology described explicitly	No description of the ontology
The function of the ontology	That models narration or narrative information	Ontology functions as a descriptive ontology
Relevance	Answers the research questions	It doesn't answer the questions

Table 2. Parameters for quality determination.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

3.1.9 Step 9: Final selection

Since the work aimed to get a representative sample rather than be exhaustive, a stratified random sampling technique was applied (Patwari 2013). The stratified sampling technique is a method where the population is divided into non-overlapping subgroups. The sample is chosen randomly from the categorised subgroups (Kothari and Garg 2019). The 23 items were categorised domain wise, for the current work. The domains were digital libraries, international relations, cultural heritage, literature and domain independent. From this, for evaluation, papers were selected randomly. From 23, a total of 11 documents were collected for the study. They are detailed in Table 3.

Model name	*Title*	*Author*	*Year of publication*	*Subject/ domain*	*Exercised in system*
M1	Storytelling Ontology Model using RST	Arturo Nakasone and Mitsuru Ishizuka	2006	Domain Independent	Not available*
M2	Steps Towards a Formal Ontology of Narratives Based on Narratology	Valentina Bartalesi, Carlo Meghini, and Daniele Metilli	2016	Digital Libraries	Not available*
M3	IREvent2Story: A Novel Mediation Ontology and Narrative Generation	VenuMadhav Kattagoni and Navjyoti Singh	2018	International Relations	Applied in IREvent2Story system
M4	Ontological Representations of Narratives: A Case Study on Stories and Actions	Rossana Damiano and Antonio Lieto	2013	Cultural Heritage	Labyrinth System allows users to explore a digital archive by following the narrative relations among the resources contained in it.
M5	Story Fountain: Intelligent support for story research and exploration	Mulholland, Paul, Trevor Collins, and Zdenek Zdrahal	2004	Cultural Heritage	Bletchley Park tour guidance system
M6	A Fabula Model for Emergent Narrative	Ivo Swartjes and Mari¨et Theune	2006	Literature	Not available*
M7	StoryTeller: An Event-based Story Ontology Composition System for Biographical History	Jian-hua Yeh	2017	Literature	The ontology knowledge construction process of the Mackay biography is implemented in Mackay Digital Collection Project Platform
M8	Leveraging a Narrative Ontology to Query a Literary Text	Anas Fahad Khan, Andrea Bellandi, Giulia Benotto, Francesca Frontini, Emiliano Giovannetti, and Marianne Reboul	2016	Literature	Not available*
M9	A Description Logic Ontology for Fairy Tale Generation	Federico Peinado, Pablo Gerv´as, Bel´en D´ıaz-Agudo	2004	Literature	Not available*
M10	Representing Transmedia Fictional Worlds Through Ontology	Frank Branch, Theresa Arias, Jolene Kennah, Rebekah Phillips, Travis Windleharth, Jin Ha Lee	2016	Literature	Not available*
M11	The ontology of drama	Rossana Damiano, Vincenzo Lombardo and Antonio Pizzo	2019	Literature	Not available*

Table 3. The list of literature identified (*Whether the model deployed in any system, was not available).

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

3.2 Phase II: Ontology review

3.2.1 Step 1: Parameter selection

Parameters are required to review or compare anything. Many factors define a system and determine (or limit) its performance (WordNet 2020). Since the work is to evaluate the models for representing the narrative information, there are two evaluation perspectives. The first is to study them from the ontology engineering perspective, where the parameters chosen describe ontologies. The second is to evaluate the ontologies from the narrative point of view.

To evaluate from the ontology engineering perspective, vocabularies that describe the ontologies were identified. Standards such as MOD: Metadata for Ontology Description and Publication (Dutta et al. 2017), Ontology Metadata Vocabulary (OMV) (Hartmann et al. 2005) and Ontology Metadata (Sowa 2000) describe ontologies and ontology related document by using RDF technology. These vocabularies conform to brevity, clarity and reuse. These reduce the development effort, cost, and time and improve the original ontology's quality. A unique list of parameters was prepared by collecting elements from these vocabularies. They are listed in Table 4.

Parameters such as the domain and purpose describe the discipline and the use across fields. Since this work involves ontologies, parameters like the level of formality, knowledge representation (KR) formalism, methodology, tools used to design ontology, the syntax used, and the language used to construct the model were necessary to capture as they are significant facets of an ontology (Dutta et al. 2017).

To evaluate from the narrative perspective, the canonical components of narration, i.e., plot, narrative situation (who speaks (speaker), who sees (audience) and setting (where and when an event takes place) (Klarer 2013) were selected. Elements of Aristotle discuss only the events, while Propp's is a mixed approach where events and characters are inseparable. Griemas's model tends to be abstract, making it suitable for modelling rather than evaluation. Therefore, the authors chose the canonical components as parameters. The parameter also identifies the theoretical principle the model is based on. The parameters are tabulated in Table 5.

3.2.2 Step 2: Review

Once the parameters are finalised, the next step is evaluating the ontologies selected in the previous phase. Using a spreadsheet to tabulate and capture the data will be easier. The ontology models were first assessed against the ontology engineering parameters and then narrative parameters. The data was collected in Microsoft Excel and tabulated in tables 11 and 12.

Parameter	*Description*
Domain	An area of knowledge or a field of study that an ontology deal with
Purpose	The main aim of the model
Ontology Design Language	A knowledge representation language using which an ontology is written
Level of Formality	The degree or level of formality of an ontology
Ontology Design Methodology	The method by which ontology was created
Knowledge Representation Formalism	A KR formalism followed to create an ontology
Ontology Design Tool	A tool that is used to create an ontology
Ontology Syntax	A syntax that is used to implement an ontology

Table 4. Parameters from the perspectives of ontology engineering.

Parameter	*Description*
Narrative Situation	It describes who speaks (the narrator in any story) and who sees (to whom the narration is addressed) in any story
Plot design	Considering how the events are organised
Settings	It denotes the space and time of the story
Theory	Theories from narratology

Table 5. Parameters from the narrative perspective.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

3.2.3 Step 3: Analysis

The final step in phase II of the methodology is the analysis. The data from step 2 is reviewed. This step will help to gauge the existing narrative ontology models. The findings will help in identifying the differences and similarities in narrative ontology models across domains.

4.0 Overview of the selected narrative ontology models

A primary objective has been identifying and analysing the existing ontological models for representing the narrative information in various domains. This section details the models identified. This section discusses the selected 11 ontology models for the narrative information as depicted in table 3. Top-level classes or major elements of the models are briefly discussed, along with the relations and properties that connect them.

4.1 Domain independent model

The ontology (Nakasone and Ishizuka 2006) (M1) is constructed with the generic aspects of storytelling as the founding philosophy. The purpose of a domain independent model was to provide coherence to the events in the story. The relations in the ontology are based on the theory of Rhetorical Structure Theory (which defines the relations among the events) (Mann et al. 1989). A glimpse of the top-level classes and properties is given in Figure 2. As shown in the figure, the top- level classes are Concept, a specific topic that is a story or a part of it; Event is a single piece of meaningful information. The next class is Relation which binds two entities; the nucleus and satellite form an Act. The nucleus contains essential information, while the satellite includes additional information about the nucleus. The Scene is a set of acts under a single concept. The class Agent is an actor that takes part in a scene by being part or executing events, and Role is the part that the Agent plays during a scene.

4.2 Digital library model

This model (M2) (Bartalesi et al. 2016) aims to be a formal model for narratives by "introducing a conceptualisation of narratives" and mathematical expressions for the same. The model was derived with the help of the classical theory of narratology. The model looks at the narrative from a computational perspective. The conceptual elements and relations are given in Tables 6 and 7.

4.3 International relations

Mediation ontology (M3) (Kattagoni and Singh 2018) helps in event detection and classification in international organisations, corporations, and individuals), social structures relations. In the domain, actors (for example, interna-

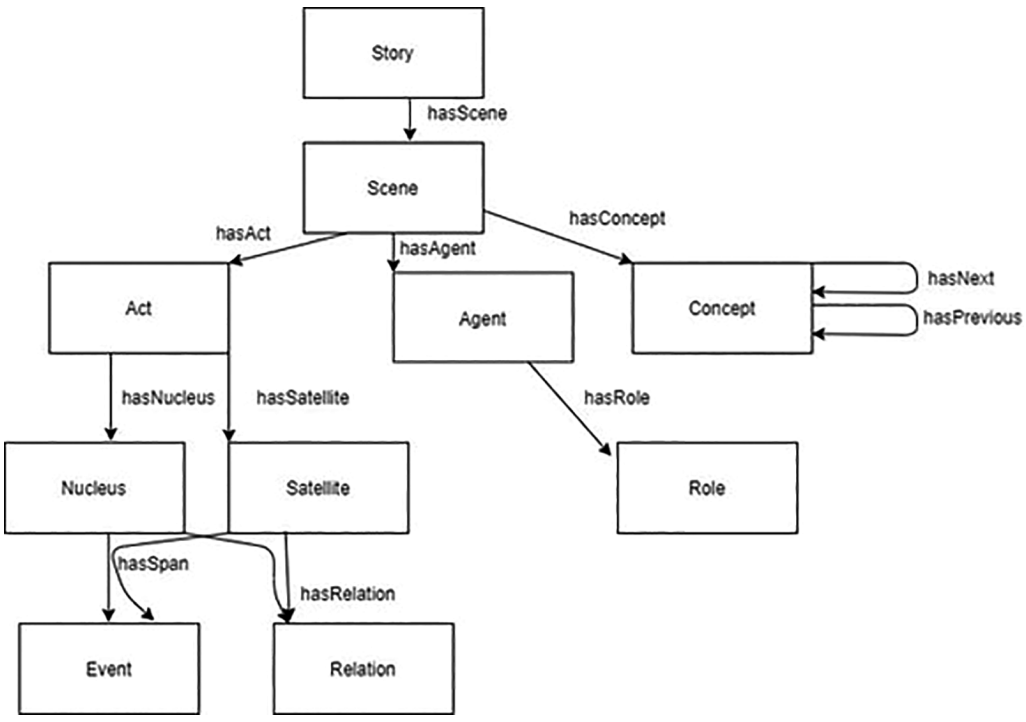

Figure 2. Top-level classes for the model M1.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

Element Name	*Description*
Fabula	A sequence of events in the chronological order
Narration	Texts that narrate the fabula
Narrative Fragments	A portion of text that narrates an event
Event	Something that happens at a time and place
Action	A subdivision of event, the action is doing something (eating, slapping)

Table 6. Elements of the digital library model.

Element	*Property*	*Description*
Relations for Events	Mereological relation	Relates events to sub-events, e.g., the birth of Dante Alighieri is part of the life of Dante
	Temporal occurrence relation	Associates each event with a time interval during which the event occurred.
	Causal dependency relation	Relates events that have a cause- effect relationship in the narrator's opinion, e.g., the Eruption of the Vesuvius destroyed Pompeii.
Relation for Narration	Authored by	Describes the Narrator of the Fabula
A relation for Narrative Fragments	Reference	Bridges the Narrative Fragments with Events

Table 7. Relations in model M2.

tional and processes (like economics, culture, and politics) and geographical and historical elements are the major components. Mediation is a technique for dealing with conflicts (Zartmann and Rasmussen 1997). The main goals of the model are to classify the events and generate narration. The ontology is used to derive meaning from the news data corpus. The ontology revolves around the actors and various event types associated with the mediation process. Different event types are (1) pronouncements involving (a) declining any act, appealing for material or diplomatic cooperation (c) express intent to cooperate (2) engaging, including (a) consulting,(b) diplomacy (3) responding in the form of yield, investigate, (4) forcing any type of posture, relations, assault, violence. To facilitate the narrative generation aspect, attributes such as date-time, location, actors, media-source, event-title, source-url, sentence, action (verb) and action-type (eventtype) are extracted from the news source. IREvent system uses the ontology at the backend to visualise the data extracted.

4.4 Cultural heritage

The Archetype Ontology (M4) (Damiano and Lieto 2013) discussed in this work is built to explore the digital archive via narrative relations among the resources. Major philosophies are based on iconological classification, imitation and remediation (Bolter and Grusin 2000) and Propp's theory of functional roles (Propp 2009). The model was constructed on the basis that the narrative situation (Klarer 2013) needs characters and objects which form a larger story once connected. It describes the archetype, maps media resources and their relations while providing reasoning services. Ontologies reused to develop the model are: Ontology for media resources (Lee et al. 2012), FRBR ontology (Davis and Newman 2005) and Drammar ontology (Lombardo et al. 2014). Figure 3 illustrates the top classes and the relations, for example, the property evokes connects Artifact and Archetype. The property displays connect Artifact to Entity. The class Artifact links the Dynamics with the relation describeAction and the Dynamics isdynamicsof story. A Story recall Archetype, and Story hascharacter Entity. Note that the classes of archetype ontology are created under the owl: Thing.

The ontology (M5) (Mulholland et al. 2004) provides intelligent support for exploring digital stories of a heritage site. A simple search engine supports information within pages and not reasoning across pages. Story Fountain is a tool developed with the help of ontology, heritage resources, and a reasoning engine. The system aims to provide navigational support by explicitly denoting the conceptual structure of the stories and domain representation. The ontology thus developed describes the stories and the theme related to the story. For the construction of this model, the story "is

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

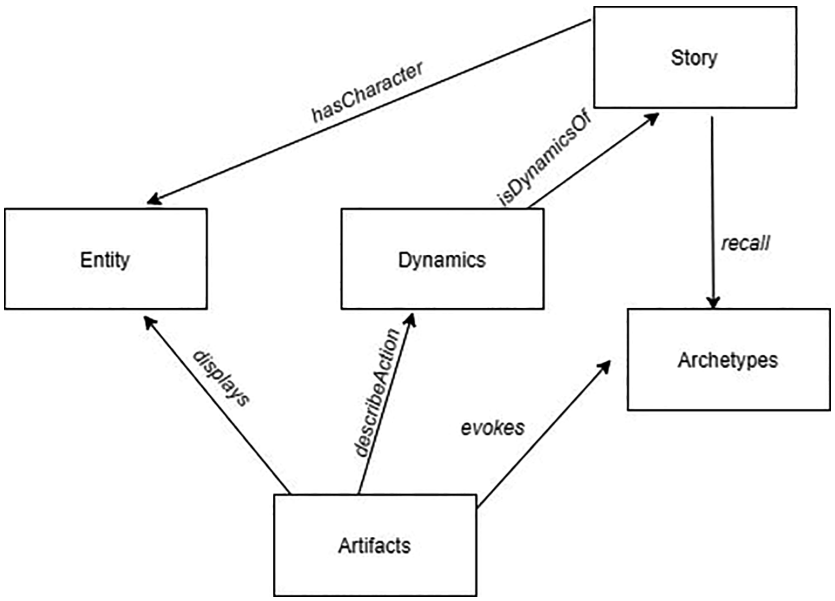

Figure 3. Top-level classes of Archetype Ontology.

Class (M4)	*Description*	*Class (M5)*	*Description*
Archetype	Themes which a story can refer to	Theme	Subject matter in the story
Artifact	Media objects, organised according to the FRBR model (as in the FRBR ontology)	Physical objects	Objects that are involved in the events
Dynamics	It describes the actions, process and state of affairs	Events	It refers to the activities that occurred in the particular time and place
Entity	Characters and objects involved in a story	Central actors / Actors	People involved in any event
Story	Collection of stories	Story	Story is described as that which consists of events, actors and objects
DescriptionTemplates	Derived from Drammar ontology, it contains the role schema	-	-
Format	Format and the type of media resources	-	-
GeographicalPlace	Contains the spatial information	Location	It contains the information with regard to space
TemporalCollocation	Contains the temporal information	Time specification	It describes the time period

Table 8. Major classes of narrative ontology for cultural heritage domain (- Indicates that there is no corresponding element).

the conceptual representation of what is told", and narrative is "how it is told". The target users of the system are tourist guides and curious tourists. The information needs of both the users are different. But the ontology-based system allows the set of stories to have both perspectives. The various exploration facilities are (1) providing a view of the conceptual structure of a story (Story Understanding), (2) collecting together all stories that contain a selected concept or theme (Concept Understanding), (3) selecting stories related to multiple concepts so that they can be compared (Concept Comparison), (4) provide pathways between concepts via the events contained in the stories (Concept Connection), (5) provide a structure related to Story Network Analysis (Story Mapping) and (6) works to provide a structure with the use of properties of events rather than stories (Event Mapping). The major classes of the model M4 and M5 are listed in Table 8, drawing parallels.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

4.5 Literature Model

A character-centric Fabula model (M6) (Swartjes and Theune 2006) is developed to represent the event sequencing. The General Transition Network (GTN) identifies six elements and the causal relations that are important in analysing a story subjectively, i.e., through each character's viewpoint. The present model was theorised based on the GTN model, but with a single, objective narration framework.

Top-level elements of the Fabula model are: Goals, Action, Outcome, Event, Perception, and Internal Element. The properties of the model are: Physical causality, Motivation, Psychological causality, and Enablement. They are tabulated in Tables 9 and 10. The causal relations among the elements are given in table 8. For example, the class Goals

	Name	*Description*
Top-level elements	Goals(G)	Desire to attain, maintain, leave or avoid certain states, activities or objects
	Action(A)	Any goal driven; an intentional change brought by the characters.
	Outcome(O)	When the goal is fulfilled, the character believes to have a positive outcome (for a goal), otherwise believes to have a negative outcome.
	Event I	Change in the world (of the story/narration) that is not planned by any character's action
	Perception (P)	Any element that is perceived in the personal network of the Character Agents
	Internal Element (IE)	Anything that happens within a character for example emotions, feelings etc.
Properties	Name	Description
	Physical causality (∅)	When an event or action happens and causes something else to happen, the relationship is physical.
	Motivation (m)	Intentional causality within the mind of the agent
	Psychological causality (φ)	Unintentional causality within the mind of the agent
	EnablemeI(e)	If element A enables B, then B is possible because of A. Then A and B are said to be in an enablement causality.

Table 9. Top-level elements and properties of the Fabula Model.

Relations	*The relation between top-level elements*	*Examples*
∅	A causes E	The action of stabbing a dragon cause the Event death of a dragon
	E causes E	Event of tree falling causes the Event ground to break
	E or A cause P	The action of stabbing a dragon causes Perception
m	G_1 motivates $G_{1.1}$	Goal to kill a dragon motivates the goal of finding the dragon
	G motivates A	Goal to save the country motivates the Action of stabbing the dragon
	IE motivates A	Internal Element of fear motivates the Action of Screaming
φ	P causes IE	Perception of a carcass of dragon causes the Internal Element of a belief that the country is safe
	IE causes IE	Internal Element of a belief that a country is safe causes the Internal Element of peace
	IE causes G	Internal Element of peace causes the Goal to kill a dragon
e	IE enables A	Internal Element of belief enables Action

Table 10. Causal relationship with the top-level elements of Fabula model.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

motivates another goal or motivates an Action. Similarly, Internal Element, the class, causes (psychological causality) Goal.

Biographical Knowledge Ontology (BK onto) (M7) (Yeh 2017) was created to capture biographical information. The ontology was deployed in the Mackay Digital Collection Project Platform (http://dlm.csie.au.edu.tw/) for linking the event units with the contents of external digital library and archive systems so that more diverse digital collections can be presented in the StoryTellerSystem. There are four central ontologies deployed: storyline ontology, event ontology, historical ontology, and timeline ontology. The schema layer contains major classes: StoryLine related via contains to the Event class, linked to the class LocationStamp by PlaceAt and TimeStart and TimeEnd to the TimeStamp class.

The instance layer in Figure 4, models the actual data as an example. Here the "Legend of ackey" is the story which contains events such as Marriage, Dental treatment, Fund Oxford College, etc. The event has a start and an end time. Here, the funding event has TimeStart and TimeEnd. The event also takes PlaceAt a place, Tamsui.

The ODY-Onto (M8) (Khan et al. 2016) was constructed to represent narration in a literary text. The ontology developed is part of a system built for querying information from literary texts. The vocabularies TIMEPLUS and OWLTIME (Cox and Little 2016) along with the upper-level ontology, Proton (http://proton.semanticweb.org/) was used to model the ontology. The ODY-Onto structure given in Figures 5 and 6 depicts the top-level classes of the Proton Ontology and ODY Ontology, respectively. The linking between them occurs through the classes Ody Event, via Temporal Event, and temporalPartOf property.

The work (M9) (Peinado et al 2004) is an OWL based ontology developed towards automatic story generation based on Propp's Morphology of the Folk Tale. The ontology is used to measure the semantical distance between narrative functions. Structured domains, like that of formal poetry, contain syntax that helps automatically generate elements. The major classes of the ontology are

1. Roles (example, agent, donor, hero, etc.),
2. Place (city, country, etc.),
3. Character (animated objects, animal, human),
4. Description (family, human and place),
5. Symbolic object (ring, towel, etc.).

Model M10, Transmedia ontology (Branch et al. 2016) allows users to search for and retrieve the information of the fictional worlds. The model takes a lead towards standardising the elements in fictional worlds. The ontology will help infer connections between transmedia parts such as characters, the power associated with characters, items, places, and events. The ontology contains 72 classes and 239 properties. A glimpse of the model is shown in Figure 7. The Transmedia Creative Work connects the works to Transmedia Properties, Story Worlds, and Storylines. Story Worlds is a single consistent canon of work. Storylines are works related within a single narrative that can be in more than one canon. The classes are connected to Transmedia Property through a hierarchical web of relationships. This web of relations allows reasoning and the AI system to explicitly identify Story Worlds and the narrative belonging to them. The properties and classes of this model are borrowed from the other ontologies such as Schema.org (https://schema.org/), the Comic Book Ontology (Petiya 2020), Ontology of Astronomical Object Types Version 1.3 (Cambresy et al. 2017), and SKOS (https://www.w3.org/TR/skos-reference/skos-xl.html#). Such reuse of the ontologies allows interoperability.

M11 is Drammar ontology (Damiano et al. 2019) developed to represent the elements of drama independent of the media and task. Drama is evolving as a domain, but there is a concrete manifestation of drama in screenplays, theatrical

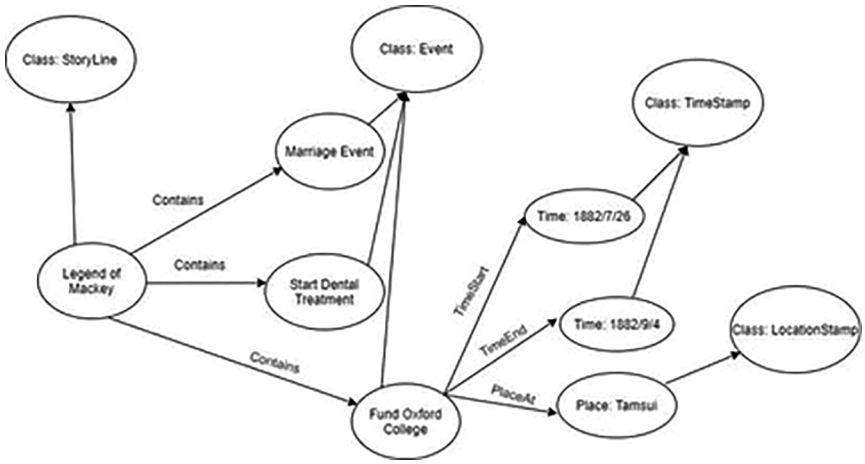

Figure 4. Instance layer of BK Onto.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

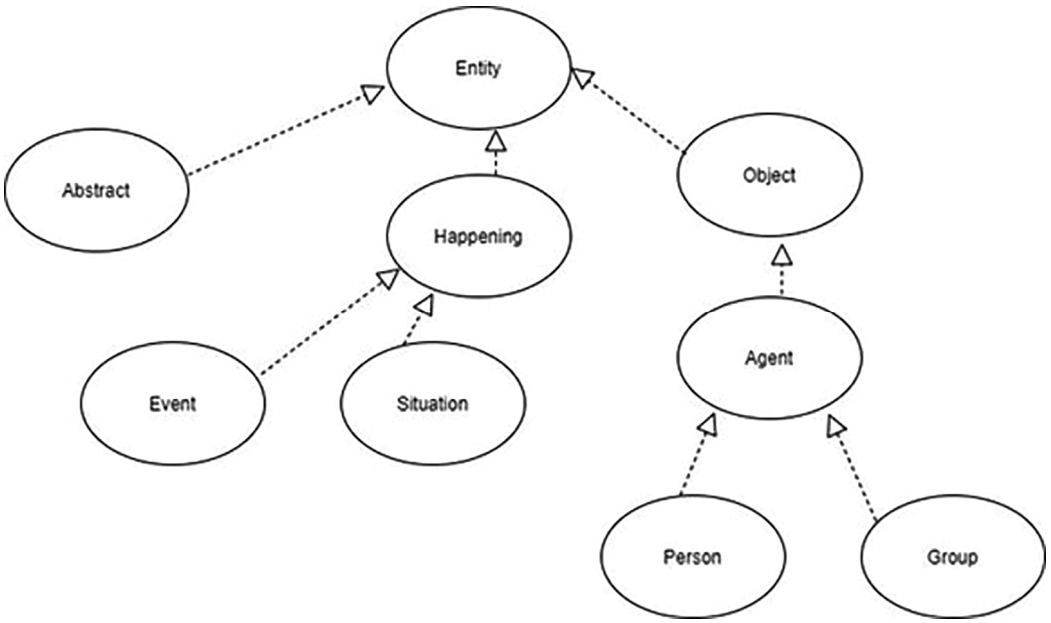

Figure 5. ODY Onto top level.

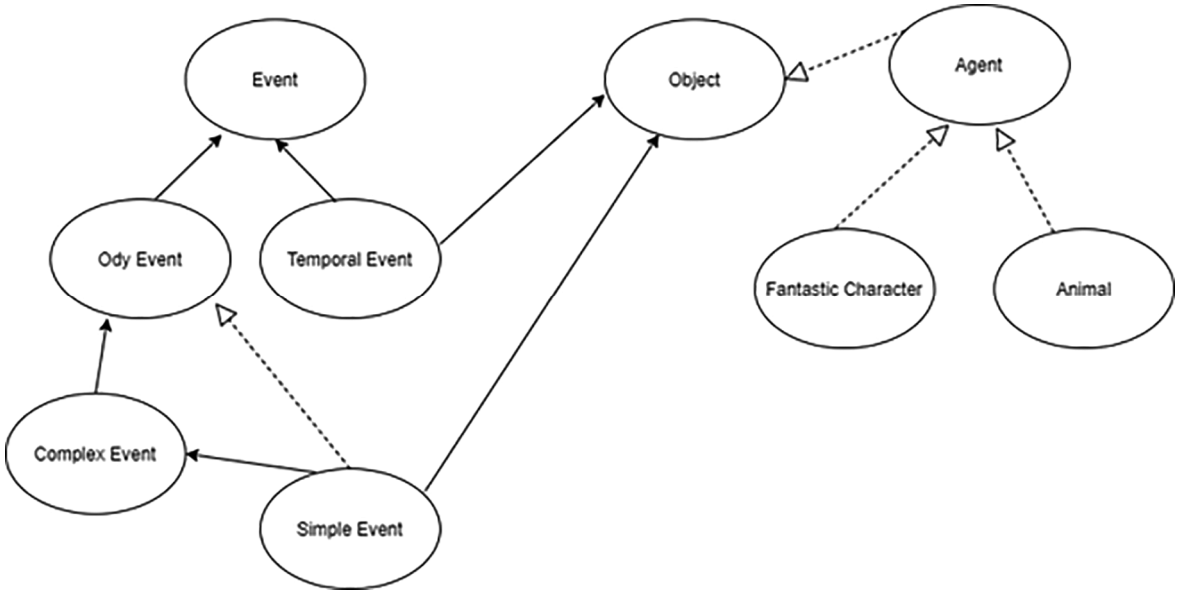

Figure 6. Narrative Ontology linked to the ODY Onto.

performances, radio dramas, movies, etc. The target users benefit from the formal encoding of drama and the realisations of drama (such as text and authorship) as defined by the drama studies. An automatic reasoning tool that identifies the qualities of the media for the scholar in AI, the availability of a formal specification for processing and generation tools, for the community of drama scholars and professionals, the availability of a theoretical model of drama, unambiguously described in standard terms are the benefits of the model. The top four classes of the dramatic entities are (1) DramaEntity is the class of the dramatic entities, i.e. the entities that are peculiar to drama, (2) DataStructure is the class that organises the elements of the ontology into common structures, (3) DescriptionTemplate contains the patterns for the representation of drama according to role-based templates (4) ExternalReference is the class that bridges the description of drama to common sense and linguistic concepts situated in external resources.

The evaluation of the 11 models brought the relevant models to a single platform. This enabled identification of

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

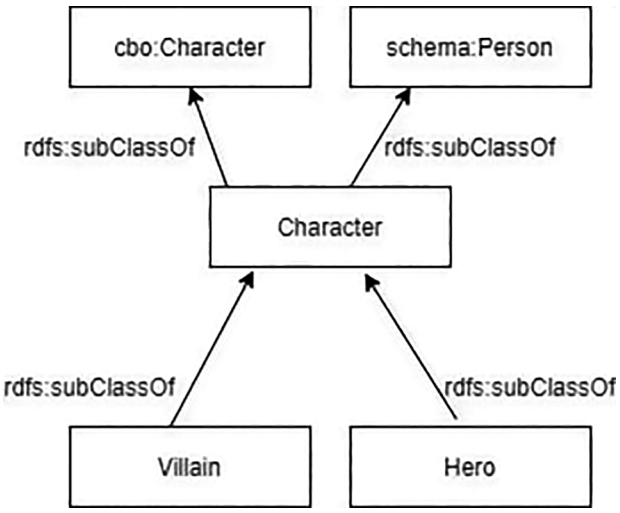

Figure 7. A glimpse of the Transmedia Ontology.

differences and similarities of knowledge representation across domains. The models were categorised into domains (domain independent, cultural, literature, digital library etc.) with the emphasis on the fact that factors such as class and property representation within a domain remain similar. The selected ontology models were evaluated using the parameters. The findings of this evaluation is given below.

5.0 Findings

Table 11 summarises the selected 11 models. It is evident from the state of the art and the analysis provided that the narrative ontologies are primarily applied in cultural heritage and literary works. But there are models that are domain independent, in international relations and digital libraries. The authors identified the significant objectives of the models. They are listed below.

- to link the various cultural artifact and their narrative relations (in model M4);
- support the discoverability, exploration, and retrieval of resources through narration (M2, M8, M7, M6,M5, M10);
- build a generic storytelling model based on the organisation of events (M1);
- for narrative generation (M3, M9);
- describe the elements in the domain of narrative (e.g., actors, locations, situations etc.) (M11).

Knowledge Representation languages used were OWL (M4, M7, M6, M1, M9, M10, M11) and its variant, OWL lite (M8). All models, except M1, M5, M3 and M10 were formally built. The majority of the selected systems have followed ad-hoc steps. M11 follows the NeON methodology. The formalism was available for three models. The formalisms were Description Logic (M7, M9) and First Order logic (M4). From the analysis, Protégé (M8 & M9), NeOn Toolkit (M11) and TopBraid (M10) are the ontology design tools used. The data for the other models were not available. RDF/XML is the most used ontology syntax, though M11 uses Turtle.

Table 12 describes the narrative perspective in the ontology. Models M4, M8, M1, M5, M9, M10, and M11 take the authorial narrator's point of view. The data for the rest of the models were not available. The audience for the story is zero focalisation for majority of the models (M1, M4, M5, M6 M8, M9, M10, and M11). M3 has external audience. Data was not available for models M2 and M7. Most models have taken a linear approach in modelling the plot design (models M4, M2, M1, M6, M3). Only two models have considered both time and space (model M4, M7, M5, M9, and M10), while time was the only component in models M2, M8 and M11. Data for the rest of the models were unavailable. Five models have constructed the ontology keeping in mind certain theories, namely model M4, M2, M1, M5, and M9. The theories followed are narrative as content descriptor, classical theory, rhetorical structure theory, story network analysis and Propp's theory. Model 11 traverses through the theories from Aristotle, Varela (2016), Ciottini (2016).

6.0 Discussion

This section discusses the findings. The purpose of the work was to have an overview of the existing models in narrative information, the domains and the top level classes. With this overview, the study contributes to the knowledge in the area of ontology development for narrative infor-

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

Model No:	*Name of the ontology*	*Purpose*	*Domain*	*Knowledge Representation Formalism*	*Level of Formality*	*Ontology Design Language*	*Ontology Design Methodology*	*Ontology Design Tool*	*Ontology Syntax*
M1	Ontology model for storytelling	To build a generic storytelling	Domain independent	Not available	Not available	OWL	Not available	Not available	Not available
M2	Formal Ontology of Narratives	To support the discoverability of resources through narration	Digital libraries	Not available	Formal	Not available	Not available	Not available	Not available
M3	Mediation Ontology	To classify events and for narrative generation	International Relations	Not available	Informal	Not available	Not available	Not available	Not available
M4	The Archetype Ontology (AO)	To link the various cultural artifact by their narrative relations	Cultural Heritage	First Order Logic	Formal	OWL	Not available	Not available	RDF/XML
M5	Ontology for Story Fountain	Exploration of digital heritage and the construction, and sharing of stories	Cultural Heritage	Not available	Informal	Not available	Not available	Not available	Not available
M6	Formal Model of Fabula	Express narration for the story generation process	Literature	Not available	Formal	OWL	Not available	Not available	Not available
M7	BK Onto	To model the biography of any person	Literature	Description Logics	Formal	OWL	Not available	Not available	RDF/XML
M8	ODY-ONT	To describe the actors, locations, situations and explicit formal representation of the timeline of the story found in any text	Literature	Not available	Formal	OWL-Lite	Not available	Protégé	RDF/XML
M9	DL Ontology for FairyTale Generation	To aid in story generation	Literature	Description Logic	Formal	OWL	Not available	Protégé	Not available
M10	Transmedia Fictional Worlds Ontology	To allow users to search and retrieve transmedia information	Literature	Not available	Informal	OWL	Not available	TopBraid	RDF/XML
M11	Drammar Ontology	Formalise drama independent of media and task	Literature	Not available	Formal	OWL	NeOn	NeOn Toolkit	Turtle

Table 11. Review of the selected models based on parameter for ontology.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

Model no	*Narrative situation*		*Plot design*	*Settings*	*Theory*
	Who speaks	Who sees			
M1	Authorial	Zero focalisation	Linear	Not available	Rhetorical structure theory
M2	Not available	Not available	Linear	Expresses time	Classical narrative theory
M3	Figural	External	Linear	Not available	Not available
M4	Authorial	Zero focalisation	Linear	Expresses both time and place	Narrative as a content descriptor
M5	Authorial	Zero focalisation	Not available	Expresses both time and place	Story network analysis
M6	Not available	Zero focalisation	Linear	Not available	Not available
M7	Not available	Not available	Not available	Expresses both time and place	Not available
M8	Authorial	Zero focalisation	Not available	Expresses time	Not available
M9	Authorial	Zero focalisation	Not available	Expresses both time and space Propp's	
M10	Authorial	Zero focalisation	Not available	Expresses both space and time	Not available
M11	Authorial	Zero focalisation	Not available	Expresses time	Uses multiple theories

Table 12. Review of the selected models based on parameter for narrative theory.

mation. There is an interesting result that domains such as literature and cultural heritage make use of the narrative ontologies. But disciplines such as international relations and digital libraries, which are conventionally not considered close to the narrative domain, still used narrative ontologies. A conclusion drawn is that domains that involve events and characters can use ontologies. They can be used to organise the content, classify or aid in search and retrieval of the information. For example, in cricket, the commentary can be auto generated with the help of ontologies and AI technologies. This discussion achieves the primary goal of identifying the models in various domains. The major objective of most of the models is information retrieval. Other purposes are to express the narration or narrative relations for story generation and artifact description. This is an indicator that ontologies are used for what is conventionally expected of them, i.e., to assist in organisation, classification, definition and as an initial step towards AI.

Most models are formally built, meaning they are machine interpretable and readable. Only three models, M4, M7 and M9, have explicitly mentioned the logic used in modelling the ontology. In the semantic layer cake, logic is almost at the top. A logic layer to the constructed ontology helps application development and integration across various systems. The language used for ontology construction is OWL and its variants. This can be attributed to the fact that it is the W3C recommended standard and has greater machine interpretability than XML, RDF, and RDF Schema (RDF-S). Systematic steps should be taken for the construction of ontologies. NeoN was one of the methodologies used by model M11 due to the flexibility and ease of describing the drama elements. The rest of the models have ad hoc methodologies. It was observed that most of the work proceeds with an initial domain analysis, followed by ontology construction. As such, these are the generic steps followed while constructing ontologies, but the models fail to state principles or theories that aid in the systematic steps followed. Ontology design tool used are Protégé (since it is open, free, has community support and tutorials), NeoN toolkit was used in M11 to assist with the NeoN methodology adopted. From Table 11, it was found that RDF/XML is the most preferred syntax for ontology. An exception is model M11 which uses the Turtle format for representation.

From the narrative perspective, most of the model has adopted authorial narration. It is because this perspective provides an overall omniscient picture of the whole story. M11 uses figural narration to describe the event from a

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

third person view. This means that the actors/characters watch events but don't participate. This is justified since the model is created to aid in the mediation between agents (people, organisations or countries) involved in a conflict. Zero focalisation and external focalisation are two audience perspectives used in the models. Zero focalised audience sees the whole story from the bird's eye view. The external focalised character sees what is happening at the point of time in the third person. This perspective throws light on whether the view was biased or not. The plot design is linear in most work (M4, M2, M6, M1, M3). They have modelled the story as it has occurred in the timeline. It is because flashbacks and foreshadowing pose a challenge in constructing the model. The data for the rest of the models were not available. The location and the historical time are two factors critical to the story. The characters, actions, and other details influence their time and space. These are general factors related to any event or story. Some models, such as M4, M7, M5, M9 and M10 have both temporal and spatial factors in their model. This is because of specific model requirements, while certain models have only the temporal aspect.

Works (M4, M2, M1, M5, M9 and M11) are based on the theories from narratology. Such a principled and theoretical background to the model will allow for conflict resolution, if any. An appropriate theory will also guide in better modelling by clarifying the concepts and the relations involved. M4 uses the idea of narrative as a content descriptor. This theory makes it possible to search across platforms using the narrative associated with the artifact. M2 uses the traditional notions of plot, characters, narrative situation and setting. Rhetorical Structure Theory (RST) guides ontology M1. RST defines the relations among the events (Mann et al. 1989). M5 represents the sequence of events rather than of characters in what is known as Story Network Analysis. The work M9 uses the Propp's Morphology of folktale, which proposes 31 functions and roles present in the fairy tale (Propp 2009). M11 uses a combination of theories. Theories used are (Bazin and Gray 1967), (Szondi 1983), Aristotle's Poetics (Klarer 2013), and (Ciotti 2016).

Another observation was the similarities and differences of the models across domains. The similarities across the domains are the major classes across the 11 selected models. They are (1) story or storyline: that discusses the whole story (2) actors/characters/agent/author: person present in the story (3) events and event properties: something happening (4) Spatial factors: space or location where an event occurs (5) temporal factors: the time in which event occurs (6) theme or the key terms in a story: the overall idea (7) relations or attributes: connections between classes (8) acts or actions or scenes: something that agent do that causes an effect. These elements act as a framework for modelling narrative across various domains. They differ due to the domain specificity. From the observations, it was found that classes and properties used to model a literary domain act as the basic framework. Alterations on this framework can be done to suit the storytelling in various domains. For example, the domain independent model was aimed to have a generic model, the classes include 'concept', which is a generic class to associate the story's theme. The other two classes are 'nucleus 'and 'satellite', which give basic information about the object and additional property about the object, respectively. The model rooted in the cultural heritage domain focuses on representing the artifact and the type of objects in the domain. The model under the study has 'artifact' class that contains the objects. Another important class is the 'format' class, which describes the object's format and type. This unique feature allows the users to identify the type and format of the resources concerning a cultural artifact. The main feature of the models from the literary domain is that they aim to capture the stories (M5). The domain of digital libraries uses narrative elements to assist the search and retrieval of resources. Such a model goes a step further and describes the content within the resource to help in navigation. From the model M2, the concepts of narrative fragments describe the portion of text that narrates an event, making it discoverable.

7.0 Conclusion and future work

A systematic review methodology was adopted to identify and analyse 11 models with 12 parameters for the present study. The aim of collating state of the art literature on models was satisfied and is detailed in section 4. The findings and discussion describe the existing ontological models for narrative in various domains and the differences and similarities between their elements. One of the aims of the study was to provide a survey of theories in narratology relevant to the current study. The aim was not to be exhaustive nor to analyse the theories deeply. This objective was partially achieved.

In future, the work will be expanded to include more models and more parameters of evaluation. The work will also be expanded to include more narrative theories and its components. These principles can be incorporated when modelling narrative information. The common classes identified will be a framework for our future works in modelling narration.

It is interesting to note that the application of narrative information has great significance in medicine. But from the literature, it is observed that, so far, there exists no narrative ontology model. In the future, the authors will investigate this for medicine. The unstructured text in the patient records lack structure. If the text is structured, the machine can infer new information from narrated story. Such a system will help in better treatment for the patients. This claim will be proved in future works.

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

References

Abrams, Meyer H. and Geoffrey Galt Harpham. 2012. *A Glossary of Literary Terms*. Boston, MA: Thomson Wadsworth.

Bartalesi, Lenzi Valentina, Carlo Meghini and Daniele Metilli. 2016. "Steps Towards a Formal Ontology of Narratives Based on Narratology." In *7th Workshop on Computational Models of Narrative, CMN 2016, July 11-12, 2016, Kraków, Poland,* edited by Ben Miller, Antonio Lieto, Rémi Ronfard, Stephen G. Ware and Mark A. Finlayson. OASICS 53. Wadern/Saarbruecken: Dagstuhl Publishing, 1- 10.

Bazin André and Hugh Gray. 1967. *What is Cinema?: Essays Selected and Translated by Hugh Gray*. Los Angeles: University of California Press.

Bolter, J. D. and R. Grusin. 2000. *Remediation: Understanding New Media*. Cambridge, MA: MIT Press.

Branch, Frank, Theresa Arias, Jolene Kennah, and Rebekah Phillips. 2016. *Knowledge Organization in Transmedia Fictional Worlds: A Study of Harry Potter, Lord of the Rings, Marvel Universe, and Star Wars.* https://digital.lib.washington.edu/researchworks/handle/1773/36214

Camacho, Lesly Alejandra Gonzalez and Solange Nice Alves-Souza. 2018. "Social Network Data to Alleviate Cold-Start in Recommender System: A Systematic Review." *Information Processing & Management* 54: 529–44. https://doi.org/10.1016/j.ipm.2018.03.004

Cambrésy Laurent, Derriere Sébastien, Paolo Padovani, Andrea Preite Martinez and Alexandre Richard. 2017. "Ontology of Astronomical Object Types." International Virtual Observatory Alliance. http://www.ivoa.net/Documents/latest/AstrObjectOntology.html

Ciotti, Fabio. 2016. "Toward a Formal Ontology for Narrative." *Matlit Revista do Programa de Doutoramento em Materialidades da Literatura* 4, no. 1: 29–44. https://doi.org/10.14195/2182- 8830_4-1_2

Cox, Simon, and Chris Little (Eds.). 2016. "Time Ontology in OWL." W3C. https://www.w3.org/TR/owl-time/

Damiano, Rossana and Antonio Lieto. 2013. "Ontological Representations of Narratives: a Case Study on Stories and Actions." *In CMN'13 (Computational Models of Narratives), satellite workshop of the 35th Meeting of the Cognitive Science Society CogSci 32.* Wadern/Saarbruecken: Dagstuhl Publishing. Doi: 10.4230/OASIcs.CMN.2013.76

Damiano, Rossana, Vincenzo Lombardo and Antonio Pizzo. 2019. "The Ontology of Drama." *Applied Ontology* 14: 79–118. https://doi.org/10.3233/ao-190204

Davis, Ian, and Richard Newman. 2005. "Expression of Core FRBR Concepts in RDF." vocab.org. http://vocab.org/frbr/core.html

Ding, Ying and Schubert Foo. 2002. "Ontology Research and Development. Part 1 - A Review of Ontology Generation." *Journal of Information Science* 28: 123–36. https://doi.org/10.1177/016555150202800204

Dutta, Biswanath. 2017. "Examining the Interrelatedness between Ontologies and Linked Data." *Library Hi Tech* 35: 312–31. https://doi.org/10.1108/lht-10-2016-0107

Dutta, Biswanath, Anne Toulet, Vincent Emonet and Clement Jonquet. 2017. "New Generation Metadata Vocabulary for Ontology Description and Publication." In *Metadata and Semantic Research*, edited by E. Garoufallou, S. Virkus, S., R. Siatri and D. Koutsomiha, D. *Communications in Computer and Information Science* Vol 755. Cham: Springer. 173–85. https://doi.org/10.1007/978-3-319-70863-8_17

Genette, Gérard, Marie-Rose Logan and Alan Sheridan. 1982. *Figures of Literary Discourse*. New York: Columbia University Press.

Guarino, Nicola, Daniel Oberle and Steffen Staab. 2009. "What Is an Ontology?" In *Handbook on Ontologies*, edited by S. Staab and R. Studer. Berlin; Heidelberg Springer, 1 –17. https://doi.org/10.1007/978-3-540-92673-3_0

Gyrard, Amelie, Soumya Kanti Datta and Christian Bonnet. 2018. "A Survey and Analysis of Ontology-Based Software Tools for Semantic Interoperability in IOT and Wot Landscapes." *2018 IEEE 4th World Forum on Internet of Things (WF-IoT)*. IEEE, 86-91. https://doi.org/10.1109/wf-iot.2018.8355091

Hartmann, Jens, Raúl Palma, York Sure, M. Carmen Suárez-Figueroa, Peter Haase, Asunción Gómez-Pérez and Rudi Studer. 2005. "Ontology Metadata Vocabulary and Applications." In *On the Move to Meaningful Internet Systems 2005: OTM 2005 Workshops. OTM 2005,* edited by R. Meersman, Z. Tari and P. Herrero. *Lecture Notes in Computer Science, Vol 3762.* Berlin; Heidelberg: Springer, 906–15. https://doi.org/10.1007/11575863_112

Hébert, Louis. 2020. *An Introduction to Applied Semiotics: Tools for Text and Image Analysis.* London: Routledge.

Herman, David. 2007. "Introduction." In *The Cambridge Companion to Narrative*, edited by David Herman. Cambridge: Cambridge University Press, 3–21. https://doi.org/10.1017/ccol0521856965.001

Hiner, Chad. 2016. *SayIt Supports Gastroenterologists by Capturing the Patient Narrative*. https://sayit.nvoq.com/sayit-supports-gastroenterologists-by-capturing-the-patient-narrative/

Iqbal, Rizwan, Masrah Azrifah Murad, Aida Mustapha and Nurfadhlina Mohd Sharef. 2013. "An Analysis of Ontology Engineering Methodologies: A Literature Review." *Research Journal of Applied Sciences, Engineering and*

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

Technology 6: 2993–3000. https://doi.org/10.19026/rjaset.6.3684

Kattagoni, Venu Madhav and Navjyoti Singh. 2018. "IREvent2Story: A Novel Mediation Ontology and Narrative Generation." In *Text2Story@ECIR (2018).* CEUR Workshop Proceedings. http://ceur-ws.org/Vol-2077/paper1.pdf

Kelly, Lynda. 2010. "The Role of Narrative in Museum Exhibitions." *The Australian Museum* (blog). https://australian.museum/blog-archive/museullaneous/the-role-of-narrative-in-museumexhibitions/

Khan, Anas Fahad, Andrea Bellandi, Giulia Benotto, Francesca Frontini, Emiliano Giovannetti and Marianne Reboul. 2016. "Leveraging a Narrative Ontology to Query a Literary Text." *HAL Open Science*. https://isidore.science/document/10670/1.w8vgvy

Klarer, Mario. 2013. *An Introduction to Literary Studies*. London: Routledge.

Kothari, C. R. and Gaurav Garg. 2019. *Research Methodology: Methods and Techniques*. New Delhi: New Age International.

Kwasnik, Barbara H. 1999. "The Role of Classification in Knowledge Representation and Discovery." *Library Trends* 48, no. 1: 22–47.

Lee, WonSuk, Werner Bailer, Tobias Bürger, Pierre-Antoine Champin, Jean-Pierre Evain, Véronique Malaisé, Thierry Michel et al. 2012. "Ontology for Media Resources 1.0." *W3C*. http://www.w3.org/TR/2012/REC-mediaont-10-20120209/

Lombardo, Vincenzo, Rossana Damiano, Antonio Pizzo, Antonio Lieto and Cristina Battaglino. 2014. *Drammar Ontology*. http://www.di.unito.it/~vincenzo/FTP_SWJ/drammar_info.html.

Lyotard, Jean-Francois. 1997. *The Postmodern Condition: a Report on Knowledge*. Manchester: University Press.

Mann, William C., Christian Matthiessen and Sandra A. Thompson. 1989. *Rhetorical Structure Theory and Text Analysis*. Marina del Rey, CA: University of Southern California, Information Sciences Institute.

Mulholland, Paul, Trevor Collins, and Zdenek Zdrahal. 2004. "Story Fountain." *IUI '04. Proceedings of the 9th International Conference on Intelligent User Interface.* New York: ACM, 62-9. https://doi.org/10.1145/964442.964455

Nakasone, Arturo and Mitsuru Ishizuka. 2006. "Storytelling Ontology Model Using RST." *2006 IEEE/WIC/ACM International Conference on Intelligent Agent Technology*. IEEE, 163-9. https://doi.org/10.1109/iat.2006.114

Patwari, Rahul. 2013. *Sampling 03: Stratified Random Sampling.* https://www.youtube.com/watch?v=rsNCCQhkKN8.

Peinado, Federico, Pablo Gervás and Belén Díaz-agudo. "A Description Logic Ontology for Fairy Tale Generation." In *Fourth International Conference on Language Resources and Evaluation: Workshop on Language Resources for Linguistic Creativity*. LREC Vol. 4, 56–61.

Petiya, Sean. 2020. *Comic Book Ontology*. https://comicmeta.org/cbo/

Prince, Gerald. 2003. *A Dictionary of Narratology*. Lincoln: University of Nebraska Press.

Propp, V. Ja. 2009. *Morphology of the Folktale*. Austin: University of Texas Press.

Schwabe, Gerhard, Alexander Richter and Erik Wende. 2019. "Special Issue on Storytelling and Information Systems." *Information Systems Journal* 29: 1122–5. https://doi.org/10.1111/isj.12258

Shamsfard, Mehrnoush and Ahmad Barforoush Abdollahzadeh. 2003. "The State of the Art in Ontology Learning: A Framework for Comparison." *The Knowledge Engineering Review* 18: 293–316. https://doi.org/10.1017/s0269888903000687

Sinha, Prasant Kumar and Biswanath Dutta. 2020. "A Systematic Analysis of Flood Ontologies: A Parametric Approach." *Knowledge Organization* 47: 138–59. https://doi.org/10.5771/0943-7444-2020-2-138

Sowa, John F. 2000. "Ontology, Metadata, and Semiotics." In *Conceptual Structures: Logical, Linguistic, and Computational Issues. ICCS 2000*, edited by B. Ganter and G. W. Mineau. Lecture Notes in Computer Science. Vol 1867. Berlin; Heidelberg: Springer, 55–81. https://doi.org/10.1007/10722280_5.

Suryana, N., Mohd Sanusi Azmi and Fandy Setyo Utomo. 2018. "Quran Ontology: Review on Recent Development and Open Research Issues." *Journal of Theoretical and Applied Information Technology* 96: 568-81.

Swartjes, Ivo, and Mariët Theune. 2006. "A Fabula Model for Emergent Narrative." In *Technologies for Interactive Digital Storytelling and Entertainment. TIDSE 2006*, edited by S. Göbel, R. Malkewitz and I. Iurgel. *Lecture Notes in Computer Science* Vol. 4326. Springer, Berlin, Heidelberg: Springer, 49–60. https://doi.org/10.1007/11944577_5

Szondi, Peter and Michael Hays. 1983. "Theory of the Modern Drama, Parts I-II." *Boundary 2* 11, no. 3: 191-230. https://doi.org/10.2307/303010

Varadarajan, U. and Dutta, B. 2021. "Towards Development of Knowledge Graph for Narrative Information in Medicine." In *Knowledge Graphs and Semantic Web. KGSWC 2021*, edited by B. Villazón-Terrazas, F. Ortiz-Rodríguez, S. Tiwari, A. Goyal and M. Jabbar. *Communications in Computer and Information Science* Vol 1459. Cham: Springer, 290-307. https://doi.org/10.1007/978-3-030-91305-2_22

Varela, Miguel Escobar. 2016. "Interoperable Performance Research: Promises and Perils of the Semantic Web."

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -

TDR/The Drama Review 60, no. 3: 136–47. https://doi.org/10.1162/dram_a_00574

"What Is Narrative Information." *IGI Global*. https://www.igiglobal.com/dictionary/using-rules-narrative-knowledge-representation/19878 (Accessed October 12, 2020.)

"What Is WordNet?" Princeton University. The Trustees of Princeton University. https://wordnet.princeton.edu/ (Accessed December 11, 2020.)

Winer, Dov. 2014. "Review of Ontology-Based Storytelling Devices." In *Language, Culture, Computation. Computing of the Humanities, Law, and Narratives*, edited by N. Dershowitz and E. Nissan. *Lecture Notes in Computer Science* Vol 8002. Springer, Berlin, Heidelberg: Springer, 394–405. https://doi.org/10.1007/978-3-642-45324-3_12

Wood, James Hunter. 2005. "Interventional Narratology: Form and Function of the Narrative Medical Write-Up." *Literature and Medicine* 24: 283–96. https://doi.org/10.1353/lm.2006.0016

Yadav, Usha, Gagandeep Singh Narula, Neelam Duhan, Vishal Jain and B. K. Murthy. 2016. "Development and Visualization of Domain-Specific Ontology Using Protege." *Indian Journal of Science and Technology* 9, no. 16: 1-7. https://doi.org/10.17485/ijst/2016/v9i16/88524

Yeh, Jian-hua. 2017. "Storyteller: An Event-Based Story Ontology Composition System for Biographical History." *2017 International Conference on Applied System Innovation (ICASI)*. https://doi.org/10.1109/icasi.2017.7988448

Zartmann, William I., and Louise Rasmussen. 1997. "Peacemaking in International Conflict: Methods & Techniques." *Choice Reviews Online* 35, no. 08. https://doi.org/10.5860/choice.35- 4769

https://doi.org/10.5771/0943-7444-2022-3-172 - am 24.01.2026, 08:24:58. https://www.inlibra.com/de/agb - Open Access -