

Story Summarization using an RST based Ontology Model

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ABSTRACT

Storytelling models are usually constrained to the applications they are implemented in because of the particular characteristics of the data used to define story events and the way those events are linked. In order to develop a more generic model to create storytelling applications, we need to focus the solution not on the data itself, but on the manner this data, in the form of events, is organized and conveyed to the user. In this paper we present an application that performs story generation in the form of summaries using our generic ontology model based on rhetorical relations

Keywords

Storytelling, Rhetorical Structure Theory, Story Ontology, OWL

INTRODUCTION

In order to develop a more generic model to create storytelling applications, we need to focus the solution not on the content itself, but on the manner the content, in the form of events, is organized and how this organization can be conveyed to the user in the context of a narrative experience. In this paper, we present our proposal for a generic storytelling ontology model using OWL based on the organization of events using the relations proposed by the Rhetorical Structure Theory (RST) [4] and how narrative principles are applied to these RST relations.

ONTOLOGY CLASS MODEL

We propose an OWL based ontology model that deals with the generic aspects of storytelling. The classes in this model were defined taking into account the many different definitions that researchers gave to their story components, but associating each class with a more general meaning that encompasses all those different definitions. The classes defined for this version of the ontology model are:

Concept: A Concept defines a specific topic that a story or part of it may refer about.

Event: An Event is defined as a single piece of meaningful information worthy of being shown. Due to the generic property of the model, an Event can hold a reference to

piece of text, video clip, image, game scene, character scripts, etc.

Relation: A Relation is a rhetorical binding between two entities, which refers to a specific rhetorical function. As specified in RST, entities in a Relation can be both Nucleuses (which is defined as a Multinuclear Relation Type), or a Nucleus – Satellite pair (which is defined as a Nucleus-Satellite Relation Type)

Act: An Act is defined as a hierarchical structure composed of Nucleus and Satellite entities, joined by Relations. This class describes the minimum level of story organization in which a story may arise. An Act is a recursive structure, which means that Nucleus and/or Satellite entities can contain an Event or another Act object.

Scene: A Scene is defined as a set of Acts, which are grouped in the context of a single Concept.

Agent: An Agent is an actor that takes part in a Scene by executing or being part of one or more Events.

Role: A Role is a part that an Agent plays during a Scene.

The complete ontology diagram is shown in Figure 1.

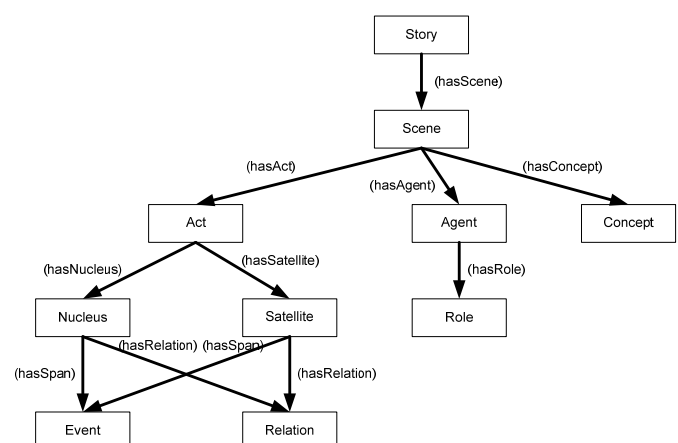


Fig. 1: Storytelling Ontology Model

STORYTELLING ENGINE

Based on Jerome Bruner's work on narrative and its characteristics [2], we have devised general rules and concepts that introduce narrative quality to the storytelling process. Given that a general story is constructed around a Conflict and its resolution [1], we created the following story template, based on this schema and how RST relations fit into the conflict and resolution phases.

- Present Background Information
- Conflict Presentation through the use of Conflict Relations (Consequence, Elaboration, Solutionhood, Contrast and Sequence)
- Conflict Resolution, which is achieved when the information on the other side of the relation is stated. In order to build up narrative tension, relations must be chosen following this pattern:
 - Context Explaining Nodes
 - Circumstance, Purpose
 - Multinuclear / Temporal Nodes (Content Explaining Nodes)
 - List, Temporal_Before, Temporal_SameTime, Temporal_After
 - Result Nodes
 - Result, Cause
 - Presentational Nodes (User's belief alteration nodes)
 - Evidence, Enablement
- Restatement or Evaluation. If both are available, the Evaluation relation will come first, since it is assumed to contain more narrative tension than the Restatement relation

APPLICATION DESIGN

In this section, we will explain about the different modules that integrate our web based application used to test our ontology model. The design diagram for our application is shown in Figure 2. The application was implemented using .NET technology, Visual C#, and Java and consists on 3 main modules:

Text Services Module

The Text Services Module is the module that is in charge of dealing with text processing and format conversions into the input needed by the system. Since creating the OWL text data can be a cumbersome process, this module facilitates the work of creating these files by processing LISP formatted files obtained with the RSTTool [5]. Even though the RST annotation process must still be done with this tool, the conversion process into OWL files is greatly simplified.

Visual Services Module

This module deals with the presentation of the OWL annotated content and acts as the interface of the application.

Ontology Services Module

This module acts as a proxy between the OWL Reasoner module (in this version of the application, a reasoner called Kaon2 [3] has been used due to its simple interface) and the Visual Services module. It is in charge of loading the ontology definitions and data into the reasoner, and retrieve events based on the narrative rules specified by the ontology. Since this module maintains the whole status of the story at any moment, it can be deployed using any visual interface through a socket connection.

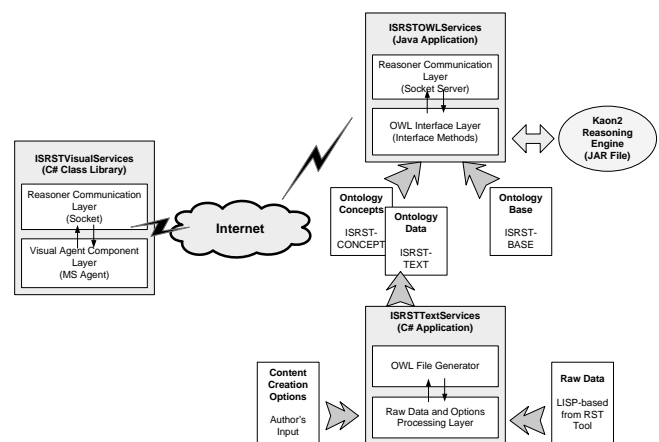


Fig. 2: Application Design Diagram

CONCLUSIONS

We have taken into consideration the most important story components and narrative rules to be included in the ontology. Nevertheless, since our model is based on rhetorical relations that come from natural text analysis, definitions like the Act class structure are still constrained to this textual domain. In order to refine our storytelling ontology model, we will study the following issues regarding class organization and user interactivity.

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