

## A Knowledge Based Approach for Story Generation From Ontology

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**Abstract:** A story is a message that tells the particulars of an act or occurrence or course of events are presented in the form of writing. The Simple story is expanded into an initial situation, an active event and final situation. Ontology specifies the rich description of terminology, concepts and relation between concepts and rules relevant to a particular domain and defines a formal semantics for information allowing information processing by a computer. This study focuses on the extraction of story from the ontology.

**Key words:** Ontology, information extraction, story generation

### INTRODUCTION

Story is a natural language description of objects, their attributes, relationships, beliefs, behaviors, motivations and interactions. Interesting stories arises from theme, structure and language<sup>[1]</sup>. A simple story is expanded into an initial situation, an active event and a final situation. The active event is divided in to five-part structure consisting of motivation, plan, qualification, action and resolution. The story generation must draw not only on the general story structure model and the story world model, but also aspects of the audience, the author, the medium of expression and the cultural context<sup>[2,3]</sup>.

This study concentrates about the story model, which generates the story based on the story grammar from the ontology. In the Story generation process, extraction of information from the ontology and Language generation takes a vital role. The information are extracted from the ontology and assigned to language generation. A theory of story structure for the purposes of language generation must be situated within a broader theory of story production, which can be described in terms of the sorts of knowledge, which contribute the creation of story.

**Need for ontology in construction of story:** Ontologies are content theories about the sorts of objects, properties of objects and relations between objects that are possible in a specified domain of knowledge. They provide potential terms for describing our knowledge about the domain. Ontologies are useful in NLP in two ways. First, domain knowledge often plays a crucial role in disambiguation. Well-designed domain ontology provides

the basis for domain knowledge representation. In addition, ontology of a domain helps to identify the semantic categories that are involved in understanding discourse in that domain. For this use, the ontology plays the role of a concept dictionary. In general, for NLU, we need both a general-purpose upper ontology and a domain-specific ontology that focuses on the domain of discourse in addition to domain-specific knowledge<sup>[4]</sup>.

The need for ontology in construction of story is to<sup>[5]</sup>

- To share common understanding of the structure of information among people or software agents
- To enable reuse of domain knowledge
- To make domain assumptions explicit
- To separate domain knowledge from the operational knowledge
- To analyze domain knowledge

**Architecture for extraction of story from the ontology:** Ontology is nothing but explicit specification of a shared conceptualization<sup>[6,3]</sup>

Conceptualization:

Abstract model of some area of interest (domain) by identifying *relevant* concepts of that domain

Consists of:

Relevant concepts of a domain  
 Relations between concepts  
 Axioms about these concepts and relations

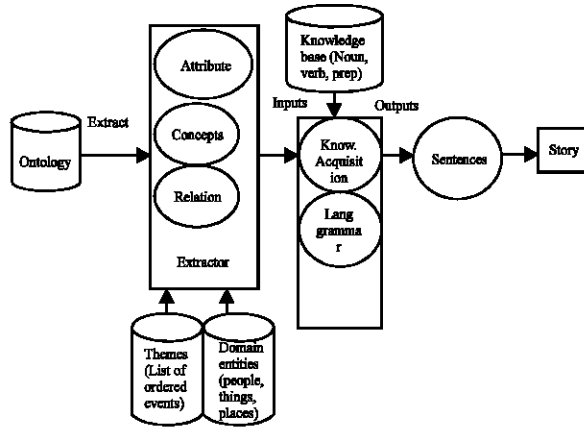


Fig. 1: Shows the extraction of story from the ontology

Explicit:

Types of concepts used and constraints are explicitly defined

Shared:

Ontology captures consensual knowledge  
 Ontology is not private to some individual

It typically consists of [7]

- Hierarchical description of important concepts in domain
- Descriptions of the properties of each concept
- Degree of formality can be quite variable (NL-logic)
- Increased formality and regularity facilitates machine understanding

Ontology conceptualizes a domain into a machine-readable format.

The above Fig. 1 shows the extraction of story from the ontology. The information from ontology is extracted<sup>[8,7]</sup> in the form of attribute, concepts and relation, which is given as an input for language generator. Meanwhile the theme is instantiated and the domain entities are identified in extractor. All these are given as input to the language generator. The noun, verb and preposition are identified in knowledge base and the sentences will be generated based on the sentence grammar.

**Working of language generator:** The language generator is a computational device that distinguishes the grammatical from the ungrammatical sequence of words. The noun, verb, preposition are used to frame the meaningful sentence as per sentence grammar<sup>[5]</sup>.

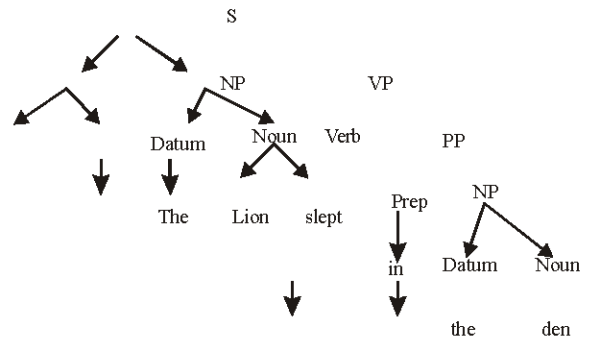
**Sentence = noun verb prep noun/pronoun:** All kinds of past, present and future tenses are considered for language generation. Noun, verb and preposition are retrieved from the database and generate according to the sentence grammar. The natural language generation can generate over subset of defined grammatically correct sentence types. These are with generative sentence grammar. The language is described in various levels. group of words should form valid phrases. Words can be phrased based on the sentence grammar and a group of sentences together is called a paragraph and one or more paragraph constitutes a story. A grammar for a simple sentence is given as

$$\begin{aligned}
 S &\rightarrow NP VP & NP &\rightarrow Datum Noun \\
 VP &\rightarrow verb PP & PP &\rightarrow prep NP
 \end{aligned}$$

For ex, consider the sentence

The Lion slept in the Den)

Tree structure representing the sentence with its grammar



**process of story generation:** The program has a very limited understanding of the English language. When it converts the events generated by the characters into natural language, it uses sentences of uniform grammatical structure to convey the story<sup>[2]</sup>. Basically the story is generated based on the simple story grammar, which is given below<sup>[9]</sup>

- Story → setting + theme + resolution
- Settings → characters+ location + time
- Theme → (Event)\* + goal
- Resolution → Event\* goal

**Construction of sample stories from ontology:** The simple lightweight ontology is constructed and is given below<sup>[10]</sup>

The sample stories which are generated from the above ontology<sup>[11]</sup>

**Story1:**

- Lion is sleeping in the den
- Lion has ears.



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