An Agent-based Annotation Model for Narrative Media

(Extended Abstract)

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ABSTRACT

In this paper, we present an agent-based annotation model for narrative media. This model borrows from agent theories to describe the behavior of characters in stories, with the long-term goal of building annotated resources for the evaluation, design and editing of virtual agents.

Categories and Subject Descriptors

J.5 [**ARTS AND HUMANITIES**]; I.2.m [**ARTIFICIAL INTELLIGENCE**]: Miscellaneous; I.2.1 [**ARTIFICIAL INTELLIGENCE**]: Knowledge Representation Formalisms and Methods

General Terms

Management, Theory, Human Factors

Keywords

Computational models of story, BDI model, Semantic annotation

1. INTRODUCTION

Stories contain a huge repository of engaging behaviors, designed by authors with originality and creativity. Dramatic stories in particular are a source of well tested connections between goals and actions, due to the need of creating motivated behaviors. In fact, a character's action is believable only if rooted in a deliberative and emotional process [4, 5].

In this paper, we present an agent-based annotation model for narrative media, designed with the goal of building annotated resources for the specification, design and evaluation of virtual agents. In the perspective of interoperability with agent systems, the annotation model borrows from the basics of the BDI agent model, and integrates them with emotions and values [2, 7] The model and the related annotation system are part of the Cadmos (Character-based Annotation of Dramatic Media ObjectS) project.[1]

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2. ENCODING CHARACTERS IN STORIES

The annotation of stories relies on the basic assumption that a narrative media object, be it a screenplay text or a video fragment, can be segmented into narratively meaningful units, and that these units can be semantically annotated for subsequent retrieval and reuse. The annotated units, then, can be searched and navigated based on a formal description of the characters' behavior: what actions they do and why.

Drama, a "cultural object" developed along two millennia, is based upon the Aristotelian notion of action (drama as "imitation of praxis"), where _emotional characters_ engage in _conflicts_ that necessarily arise from their deliberative processes [3]. The characters' motivations are mainly rooted in their moral values, put at stake by the dramatic premise of stories [9].

The top level of the ontology consists of five main classes (see Figure 1: `Unit`, `Entity`, `Dynamics`, `Relation` and `DescriptionTemplates`). `Unit` is the core of the annotation, since it models the discretization of the story into fragments, that bring about some relevant change in the story world through unintentional events or characters' actions, and are actualized in some media object (text, video, etc.). Units can have different granularity, so that, along with a horizontal organization of units into sequences, a vertical organization of the units in a hierarchical structure can emerge in stories. When goals are in conflict, the unit becomes a `DramaUnit`. The `Dynamics` of drama encompasses the occurrence of incidents (`Action` and `Event` calsses) and the states (`State` class) that result from them. States occur both in the story world and in the mental states of the characters. Characters' motivations and emotional states are modeled by the `MentalState` class, further subdivided in `Belief`, `Goal`, `Emotion` and `Value`. The `Goal` class is further specialized into goal types to account for the goal taxonomy described by [8]. The `Relation` class encompasses the structural relationships among units (`StructuralRelation` class) and the qualities of agents and objects in a specific Unit (`DramaRelationType` class). Finally, the `DescriptionTemplates` class establishes the connection of the representation of incidents with some external representation of processes in some reference ontology and in some natural language lexicon.

In Figure 2 we illustrate the use of the annotation model by resorting to a well-known example, the Aeschylus' _The Suppliants_. In this tragedy, the Danais' daughters flee to Argo and implore King Pelasgus for shelter, so as to be free from the obligation to marry Aegyptus' sons. The Danais are modeled here a collective subject (through the `Agent`

Figure 1: The ontology of story and character.

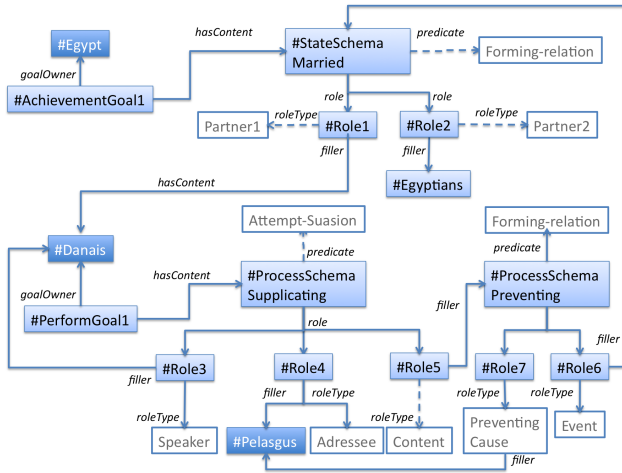Figure 2: The annotation of the dramatic situation realized in Aeschylus' *The Suppliants*.

class). Their goal is a perform goal (`PerformGoal1`) and its content is described as the act of "supplicating" (through the `ProcessSchema` class). The content of both goals (included Aegypt's achievement goal that the Danais' daughters marry his sons, `AchievementGoal1`) has been described by using FrameNet: for each frame, its FrameElements are employed to assign `Roles` the participants to the action. This example also shows how the proposed annotation model permits to model complex goals and actions by providing a recursive schema: the goal of the Suppliants' action is that another character, Pelasgus, assumes the goal to shelter them.

The conceptualization of the actions, events and entities involved in units relies on the YAGOSUMO project [6]; their description relies on FrameNet [1].

3. CONCLUSIONS

In this paper, we have proposed the annotation of stories with the behavior of characters as a means to gather a large knowledge base for the validation, specification and testing of virtual agents. The annotation relies on computational ontologies, to allow reasoning over processes and to limit the arbitrariness of the annotation terms.

Future work includes the testing of the annotation model on a larger corpus of narrative works, belonging to different genre and media types.

4. REFERENCES

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