An Ontological Model for Inferring Psychological Profiles and Narrative Roles of Characters

Mattia Egloff[1], Antonio Lieto[2], and Davide Picca[1]

[1]Department of Language and Information Sciences, University of Lausanne, Switzerland
[2]Department of Computer Science of the University of Turin, Italy and ICAR-CNR Institute, Palermo, Italy

1   Introduction

The modeling of the inner world of narrative characters and the ability to capture and formally shape their deep psychological characteristics are at the center of the reflection of a part of literary criticism and remains, today, an open challenge in the Digital Humanities. In this paper, we present an ongoing work of a preliminary version of the Ontology of Literary Characters (OLC), that allows to capture and inference psychological characters' traits starting from their linguistic descriptions as they appear in literary texts.

2   The ontology of literary characters

The ontology of literary characters (OLC) integrates different ontological models already available in conceptual models literature. In particular, it integrates the ontology framework LEMON (The Lexicon Model for Ontologies, [MSC11]) and the Ontology of Emotion (OE) [PBL15] (encoding affective knowledge in emotional categories based on both Plutchik's [Plu97]) and Hourglass's models in [CLH12]) with two additional models:

- a preliminary ontology of narrative roles

- a model of psychological profiles relying on the model of the Big 5 personality traits [Dig90].

In our ontology, the word level is encoded in our model as Lexical Entry in the LEMON module. Lexical Entries are linked to their corresponding Emotion through the property *describes emotion*. The different set of Emotions is represented with the OE model that currently includes 32 emotional concepts. Each of such concept, as specified above, is connected to the word level and, in addition, is connected with specific concepts represented the micro-ontology of the Big Five Personalty Traits. The latter integrated model allows to categorize the psychological profiles of the characters along the axes of Openness to experience Conscientiousness, Extraversion, Agreeableness and Neuroticism. Finally, the concepts of Big Five micro-ontology are connected with those represented in an additional module that allows to represent the narrative roles played by the characters in a given story. Such integrated micro-ontology of narrative roles has been based on the archetypes of HERO, ANTI-HERO and VILLAIN which are commonly used in the narrative realm [LD14]. Regarding the HERO class is represented with the following relevant narrative features: e.g. the fact that it is characterized by his/her fights against the VILLAIN of a story, the fact that his/her actions are necessarily guided by general goals to be achieved in the interest of the collectivity, the fact that they fight against the VILLAIN in a fair way and so on. The ANTI-HERO, on the other hand, is described as characterized by the fact of sharing most of its typical traits with the HERO (e.g. the fact that it is the protagonist of a plot fighting against the VILLAIN of the story); however, his/her moves are not guided by a general spirit of sacrifice for the collectivity but, rather, they are usually based on some personal motivations that, incidentally and/or indirectly, coincide with the needs of the collectivity. Furthermore the ANTI-HERO may also act in a not fair way in order to achieve the desired goal. A classical example of such
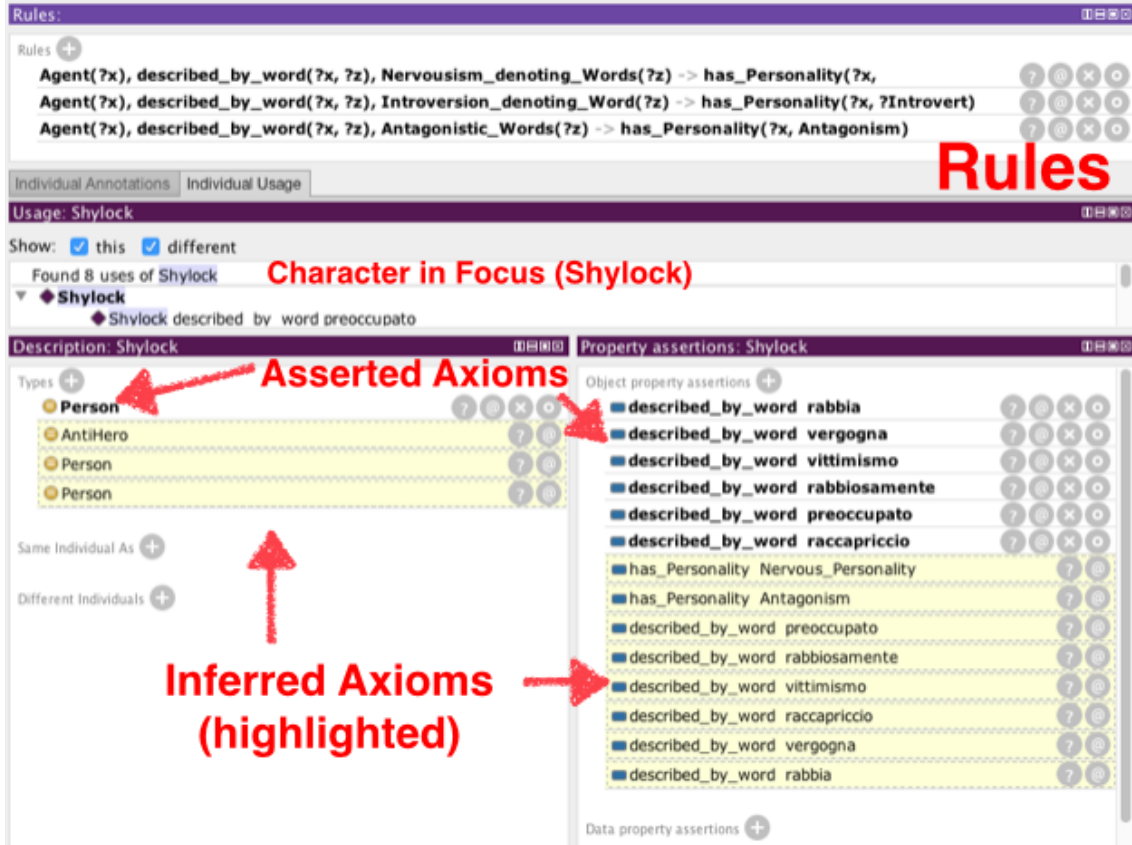
Figure 1: Example of the type of narrative inferences captured by our Ontological Model. Here the focus is on the character Shylock, from the Merchant of Venice.

archetype is Shylock which is described with the words "rabbia"/"anger", "vergogna"/"shame", etc (See Figure 1) . Each of these words is associated with a specific emotion of the OE ontology. In addition, each emotion is linked in the ontology to a particular Psychological Profile from the Big Five Model. Finally, each Personality of the Big Five Model is semantically connected with a particular narrative role. Finally the VILLAIN is represented as a classic negative role in a plot and is characterized as the main opponent of the protagonist/HERO.

The overall integrated ontological model allowed us to show how a given character (e.g. Shylock in figure 1) described in the text with some particular psychological-denoting words (e.g. described by the words "rabbia"/"anger" . . .) can be automatically associated to one of the 5 classes of the personality traits of the Big Five and, as as consequence, also to the corresponding narrative role played in a story. Such semantic association is performed by using the ontological connections between the lexical level and the Emotional Concepts and an additional layer of SWRL rules connecting specific types of Words to specific Personality Traits, (See Figure 1).

3   Conclusion

In this paper, we presented an ongoing work on a first version of the Ontology of Literary Characters (OLC),As already observed by [MDK] this ontology highlights the close relationship between character and language. In particular, where words play a significant role is crafting what we would now call the "personalities" in literature. As a result of these semantic connections it is possible to infer, starting from the natural language description of a given character, which is his/her psychological profile and his/her role played in the plot. In the case of Shylock, the system automatically infer that this character plays the role of ANTI-HERO in the plot. This ontological approach offers a new mean to scholar in order to isolate and analyze these verbal features of character going from natural language description of literary characters to the automatic assignment of their narrative role.

References

[CLH12] Erik Cambria, Andrew Livingstone, and Amir Hussain. The hourglass of emotions. *Cognitive behavioural systems*, pages 144–157, 2012.

[Dig90] John M Digman. Personality structure: Emergence of the five-factor model. *Annual review of psychology*, 41(1):417–440, 1990.

[LD14] Antonio Lieto and Rossana Damiano. A hybrid representational proposal for narrative concepts: A case study on character roles. In *OASIcs-OpenAccess Series in Informatics*, volume 41. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, 2014.

[MDK] Egloff Mattia, Picca Davide, and Curran Kevin. How ibm watson can help us understand character in shakespeare: A cognitive computing approach to the plays. In *In Digital Humanities 2016: Conference Abstracts*. Jagiellonian University and Pedagogical University, Kraków.

[MSC11] John McCrae, Dennis Spohr, and Philipp Cimiano. Linking lexical resources and ontologies on the semantic web with lemon. In *Extended Semantic Web Conference*, pages 245–259. Springer, 2011.

[PBL15] Viviana Patti, Federico Bertola, and Antonio Lieto. Arsemotica for arsmeteo. org: Emotion-driven exploration of online art collections. In *FLAIRS Conference*, pages 288–293, 2015.

[Plu97] Robert Plutchik. The circumplex as a general model of the structure of emotions and personality. 1997.