THE SOCIAL NETWORK OF DANTE’S INFERNO

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Abstract

This work aims to approach the phenomenon of culture through the development of new methods and more powerful tools to capture the content of digitally stored literary material. The authors chose as a test bed Dante’s characters of al di là, a domain consisting in a set of data and relations complex enough to sharpen existing tools. The methods of investigation under development should help scholars of a literary text to concretize part of their interpretative intentions. For this purpose, the authors adopt advanced methodologies suitable to obtain a rich representation, expressing the multi-relational network inherent in the text.

A literary text is a complex organism in which many logical and knowledge entities interact in both an implicit and an explicit way. In particular, new methods and more powerful tools are needed to capture the content of digitally stored literary material. We do believe that complex network analysis and visualization can provide some of these methods. For demonstration, we chose as case study Dante’s characters of al di là, a domain consisting of a set of data and relations complex enough to meet the above requirements. It is well known among Dante scholars that the interpretation of the Commedia requires the evaluation of many types of knowledge regarding both the structure of the text as well as the general context within which the text has been generated. The context includes the whole set of historical, political, social, philosophical and cultural experiences of Dante, which have been explicitly or implicitly involved in the production of his Commedia.

We adopt both analytical and visual methodologies suitable to obtain a rich representation of the textual content, extracting and depicting what we call a multidimensional social network. A social network is a structure in which two social entities are connected by links according to one particular criterion [1]. In a multidimensional, or multi-relational, network the links are typed according to particular disjoint criteria.

System Specifications

A system able to analyze and interpret a text in a relational way must adapt itself to scholarly behavior, by expressing informative intentions regarding many aspects of a text. Consequently, such a system must exhibit the necessary expressive power able to analyze and understand complex multi-relational problems a scholar may formulate. This may require the retrieving and the representation of a vast set of interacting concepts in the framework. And it may lead to a global representation of micro and macro phenomena which actually represent the inner structures of a text – presumably chosen by an author consciously, or on the basis of external social constraints.

It furthermore requires that the network-building procedure is able to produce structured results consisting of interacting entities in multi-relational network form, computed with respect to all available data, by far surpassing what can be held in the memory of a human scholar. In addition it is clear that the latent knowledge emerging from the analysis of the complex informative structure of the text is incomplete. Many preconditions to the interpretation of the Commedia are external to Dante’s text. It is necessary to take the knowledge on Dante and his time into consideration for a full interpretation. Our method tries to consider both the structure of the text and part of the external knowledge in a two-level structure. Doing so, new complex paths of interacting concepts emerge naturally, providing different points of view towards the literary data.

To this aim, we represent the text as a multi-dimensional or multi-relational network, including at different levels the literary context together with a suitable representation of the inherent context – historical, social, political, etc. Although the present paper focuses on social examples, the same analysis can be performed including any or all other dimensions.

Building the Network

We build the respective network using both the dialog relation (i.e. who talks to...
DANTE'S CHARACTERS

In the main social network the entities are the characters of the Inferno. A weight is assigned to link according to the number of verses in which one character talks to another. The whole social network of the dialogues is represented in the left part of Fig. 1.

There are two additional information levels attached to this social network. First, we have “temporally annotated” the connections according to the part of the Inferno in which the dialogue appears. Subsequently it is possible to visually grasp the evolution of the flow of information present in the Inferno. Fig. 2 gives an impression of this dynamic evolution, showing four snapshots corresponding to four of the original divisions in the Canti – VI, X, XVI, and XXII.

Second, we have linked each character to concepts in an ontology. For example, consider the character Catalano dei Malavolti, an historical character who is a medieval Guelph politician present in the Cerchio Chapter VIII. Therefore, the character node “Catalano dei Malavolti” is connected to the concept node “Historical” in the ontology using the link “character type,” to “Medieval” in using the “historical period” link, and to “Guelph” using the link type “political faction”, etc.

With this additional information we enable users who are interested in studying the interplay among different concepts and characters to navigate and explore such relations. Initially, we visualize the main social network without the ontology information. Then the user can select one particular character and focus on all the concepts related to him, restricting the visualization to immediately relevant concepts and further characters sharing the very same concepts. Since these networks are centered on a particular entity, we call them “ego networks” [4]. The process is depicted symbolically in Fig. 1, where at right we show two possible results of two different selections: the ego network of Malacoda and Catalano dei Malavolti.

Fig. 3. The workflow of our work: from the plain text to the complex network. (© Michele Coscia)

References and Notes

* This paper was presented as a contributed talk at 
  Arts | Humanities | Complex Networks – a Leona
do satellite symposium at NetSci2010. See 
  <http://artshumanities.netsci2010.net>