Guided Semantic Annotation of Comic Panels with Sewelis

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Abstract. UTILIS (Updating Through Interaction in Logical Information Systems), introduced in a research paper at EKAW'12, is an interactive process to help users create new objects in a RDF graph. While creating a new object, relaxation rules are applied to its current description to find similar objects, whose properties serve as suggestions to expand the description. UTILIS is implemented in Sewelis, a system that reconciles the expressiveness of querying languages (e.g., SPARQL), and the benefits of exploratory search found in faceted search. The same interaction principles are used for both exploration and creation of semantic data. We illustrate the UTILIS approach by applying Sewelis to the semantic annotation of comic panels, reusing the dataset that was used for a user evaluation.

1   Motivation

As discussed in the related EKAW'12 research paper [2], authoring Semantic Web (SW) data is crucial to take into account information that cannot be extracted automatically from existing documents (e.g., multimedia data, subjective judgements). This is, however, tedious and in practice data from the SW are rarely directly produced by users. In the Web 2.0, users, nevertheless, significantly contribute to the production of data, thus, motivation is not a problem. Models exist to bridge the gap between the SW and the Web 2.0, for example by linking tags created by users with SW vocabulary [3]. There are, however, still difficulties to integrate the Web 2.0 data in SW, for example to automatically align users tags and resources of the SW. Moreover, SW data is richer than user tags. SW indeed allows a more complex representation of data, as well as more elaborate queries. It is therefore important to allow users to directly create data in a SW format.

There exists a number of editors that can guide users in the production of semantic data. They can be dedicated tools (e.g., Protégé, OKM, Gino, QuiKey) or integrated into Wiki environments (e.g., SMW (Semantic Media Wiki), KiWI, ACEWiki). Their interface can be based on forms (e.g., Protégé, OKM, SMW), on natural language (e.g., Gino, ACEWiki), or only allow for the creation of one triple (or semantic link) at a time (e.g., KiWI, Quikey). Those editors have
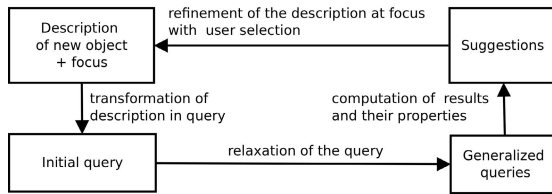
Fig. 1. Interactive refinement of the description of a new object

a number of limits regarding their applicability or their guiding. First, many editors require the definition of a schema or an ontology to make any suggestion (e.g., defining domains and ranges of properties). However, defining an ontology may be even harder than describing instances. Second, most editors only use the ontology axioms, not the facts, to compute suggestions. However, existing instances could serve as models for new instances, possibly in a more precise way than ontology axioms. Other editors hardly use known information about the new instance to compute suggestions. Third, most editors require users to enter at least a few letters to give suggestions, because their suggestions are not fine-tuned to the new instance.

The main contribution of our approach, UTILIS (Updating Through Interaction with Logical Information Systems), is to provide an interaction process that helps users to consistently create new objects by suggesting properties and values finely adapted to the very object being created. The already known properties of a new object are used to suggest others. Let us assume that a user annotates a new comic panel, and has already specified its collection. It is likely that this panel and those of the same collection have characters in common, which should then be suggested before other characters. The process uses a set of relaxation rules, inspired by the work of Hurtado et al. [9], and an efficient algorithm for computing suggestions. An advantage of our approach is that the definition of an ontology is not necessary to compute the suggestions, although UTILIS may use ontology axioms to improve its suggestions when they are available.

2   UTILIS : An Interactive Guidance

UTILIS searches for objects similar to the description of a new object, i.e., objects having common properties and values. Figure 1 illustrates the interactive process to refine the description of a new object. The initial query is obtained from the current description of a new object and from a focus which is an element of the description that the user wants to complete. This description is transformed into a query. That query is used as a starting point to obtain generalized queries using relaxation rules. The initial and generalized queries allow similar objects to be retrieved. Those objects and their properties are used as suggestions to complete the new description. After refinement, the new description will be used to define a new query and so on. For more information on the approach, and a user evaluation, see [2].

Fig. 2. Screenshot of Sewelis. On the left side, the description of the new object is shown, here panel K is a panel from the *Ma vie à deux* Collection, with *Missbean* and *Fatbean* as characters, it has a speech bubble said by someone. On the right side, suggested resources for the focus are listed, here the speakers.

3   Implementation in Sewelis

UTILIS is implemented in Sewelis[1]. Sewelis has been designed for the exploration of a RDF base, and is based on Query-based Faceted Search (QFS) [1]. It guides users in the construction of complex queries by suggesting query transformations that play the role of navigation links. The guidance avoids that users fall in dead-ends (i.e., empty results), and offers an expressiveness close to SPARQL.

When Sewelis is used to edit of a RDF base, the current query becomes the current description of the new object, and suggested transformations are computed according to the UTILIS approach, as presented in the previous section. To present suggestions to the user and allow him to complete the description of the new object, the interaction mechanisms of Sewelis, initially dedicated to navigation, have been reused to support creation. By default, only the suggestions at the smallest distance are displayed, then the list can be enlarged to bigger distances upon user's request, until all objects compatible with the searched element are proposed. At any time, users can manually enter what they want to add. That is necessary for the new values. An alternative way to find existing values is through auto-completion.

Figure 2 shows the user interface. The current description is on the left side, here panel K is a panel from the *Ma vie à deux* Collection, with *Missbean* and *Fatbean* as characters, it has a speech bubble said by someone. On the right

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[1] `http://www.irisa.fr/LIS/softwares/sewelis`

side, suggested resources for the focus are listed, here the speakers. Suggested classes and properties are in the middle part. Above that area, the number of similar objects is displayed and a *More* button allows them to be expanded to larger distances. From there on, the user can continue the description of the panel and when he decides that it is complete, he adds it to the base with the *Assert* button.

4   Demonstration

The demonstration develops an edition scenario of a comics knowledge base that is initially only partially annotated. It consists of 362 individuals, including 89 panels, divided into 16 classes and connected by 20 properties. The base describes a subset of the panels by their characters, bubbles, places, and other elements; it describes bubbles by their speakers, recipients, and text. In the user evaluation we organized, the subjects had to complete the knowledge base by annotating the not-yet-described panels along the lines of the already-described panels. The demonstration will consist in re-playing this task, and participants will be able to try UTILIS. The various situations that can occur will be illustrated:

- a description element (i.e., a class, a property or a value) is found in the set of suggestions,
- a description element is found by performing a few enlargments of the set of suggestions,
- a description element is found through auto-completion,
- a new value is created,
- a new class is created,
- a new property is created.

The UTILIS suggestions favor the reuse of existing elements upon the creation of new ones, which favors the consistency of the knowledge base by avoiding the creation of duplicates. It also favors the completeness of the base by encouraging users to fill all properties used for previous objects.

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