FrameNet OWL and the Lexical Linked Data Cloud

Aldo Gangemi
Semantic Technology Lab
ISTC-CNR, Roma
contributors: Andrea Nuzzolese, Valentina Presutti
Lexical Linked Data
Overview on semantic technologies

- **Semantic technologies** make it emerge a lot of information from the Web and local information systems (data silos) ➤ Also social networks like FaceBook are data silos …
- **Data integration**, through reengineering (e.g. triplify), or querying (e.g. D2R)
- **Linking** of heterogeneous data sources, either at schema or instance level
- **Extraction** of new data (machine learning, NLP) from documents, and their semantic representation
- **Reasoning** on those data, extracting more implicit information
- **Presentation** of data on the simplest platform: the Web, and so enabling sharing,
Reengineering
Subframing as composition
Other resources
MultiWordNet schema
MultiWordNet sample

<table>
<thead>
<tr>
<th>URL</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.ontologydesignpatterns.org/ont/mwn/common_relation/a_00001740/n_04047716/%3D">http://www.ontologydesignpatterns.org/ont/mwn/common_relation/a_00001740/n_04047716/%3D</a></td>
<td>vocab:common_relation_id_source = a#00001740, vocab:common_relation_id_target = n#04047716, vocab:common_relation_type = =, rdfs:label = common_relation #a#0...</td>
</tr>
<tr>
<td>itasyn:a_00001740</td>
<td>vocab:italian_synset_id = a#00001740, vocab:italian_synset_word = able intelligente..., rdfs:label = italian_synset #a#00...</td>
</tr>
<tr>
<td><a href="http://www.ontologydesignpatterns.org/ont/mwn/common_relation/a_00001740/n_04349777/%3D">http://www.ontologydesignpatterns.org/ont/mwn/common_relation/a_00001740/n_04349777/%3D</a></td>
<td>vocab:common_relation_id_source = a#00001740, vocab:common_relation_id_target = n#04349777, vocab:common_relation_type = =, rdfs:label = common_relation #a#0...</td>
</tr>
</tbody>
</table>
Linking and automated reasoning
• Basic linking uses SKOS
  – exactMatch, closeMatch
  – links partly present in Colorado bank, partly in WordNet mappings

• More reasoning requires some expressivity
  – semiotics.owl knowledge pattern, D&S
  – property chains
Some semiotic assumptions
Refactoring
A sample recipe
Semantic issues: objects

- Semantic frames/verb classes as twofold creatures
  - intensional polymorphic relations (aka descriptions) + situation types
  - Desiring(?, experienter, ?, theme, ?, time, ?, loc, ?)

- Frame elements/VN arguments as complex creatures
  - (semantic) roles + concepts

- Semantic types are a mixture
  - concepts, grammatical types, etc.

- Lexical units/VN class members as hybrid creatures
  - lexically-oriented semantic frames
  - bridges between semantic frames and word senses
  - FN lex units belong to diverse parts of speech

- Annotated sentences contain syntactical realizations of semantic frames ("exemplifications")
  - syntactic frames in VN, valences in FN
Semantic issues: relations

- Inheritance in FN and VN is classic, can hold for situation types safely
  - needs to be treated jointly with semantic role representation
  - subFe also classic
- Subframes in FN are conceptual compositions (“parts of descriptions” in D&S), intensional in nature
  - similarly for “excludes” and “requires” holding for FE
- Frame “usage” in FN is partial inheritance, hard to digest for situation types
- Selectional restrictions in VN maybe too tough for situation types
- Selectional preferences absent in resources, but probability would be an added value
- Core vs. peripheral vs. unexpressed are interesting but tough: “characteristic”, hidden optionality, etc.