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A Controlled Natural Language Interface for Semantic MediaWiki

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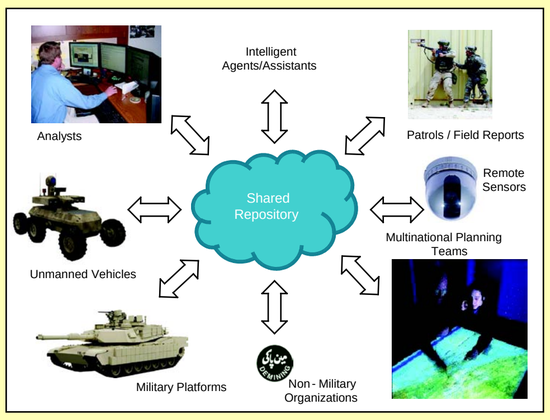
Motivation

Combine the power of Semantic Wikis and Controlled Natural Languages (CNL) for building a shared repository

Semantic MediaWiki

- multi-user content creation and editing
- browser-based, easy to use
- Support semantic Annotations for better search and integration



- Production of knowledge without using a formal logic.
- Comprehension benefits

CNL

Challenges

➢Usability
- in a collective environment, knowledge engineers may find it difficult to understand other's contributions.
- users may prefer different languages styles of even different languages.

➢Automatic content integration
- sometimes content needs to be automatically imported without user intervention

➢Expressivity constraints
- semantic wikis do not always support the full range of OWL modeling formalisms and axioms

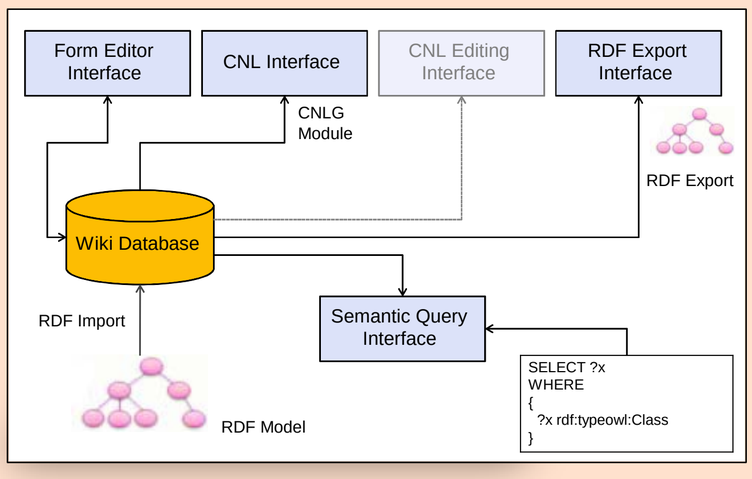
Solutions

➢Usability
- use CNLs for production and understanding benefits
- multiple OWL-compliant CNLs: e.g. Rabbit (English, Chinese), ACE-OWL

➢Automatic content integration
- develop an RDF import mechanism for SMW

➢Expressivity constraints
- extend SMW with an OWL meta-model

Architecture

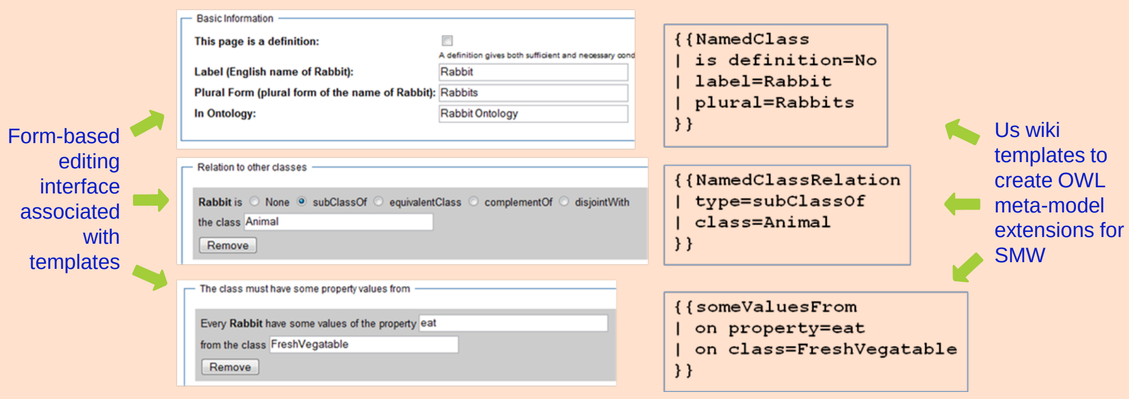


Prototype system: http://tw.rpi.edu/proj/cnl

SMW OWL Meta Model

OWL Abstract Syntax:

```
Class(Rabbit partial intersectionOf (Animal
        restriction(eat someValuesFrom(FreshVegatable))))
```



CNL Generation

```
{{#vardefine:label|{{CNL.getLabel|{{{1}}} }} }}
{{#vardefine:super |
        {{#ask: [[:{{{1|{{FULLPAGENAME}}}}}]]
        |?Category= |mainlabel=-|format=list|link=none
}} }}
{{#if: {{#var:super}}
        |{{#arraymap:{{#var:super}}|,|xxx|<li>Every
        [[:{{{1}}}{{!}}{{#var:label}}]] is a kind of
[[:xxx|{{CNL.getLabel|xxx}}]] }}|}}
```

Use SMW query to retrieve knowledge statements in OWL meta model

Construct sentence according to the syntax of the target CNL

Multiple CNL Support

"Category:Agent" in "Rabbit" Controlled English

Agent is a concept, plural Agents.
- Every **Agent** is a kind of Affiliated Entity.,
- Every **Agent** is a kind of Conceptual Thing.
- Every **Agent** has static location only Spatial Location or nothing.
- Every **Agent** influences only Influence or nothing.
- Every **Agent** has role only Role or nothing.
- Every **Agent** has static location at least 0.
- Every **Agent** has role at least 0.

"Category:Agent" in "Ace" Controlled English
- Every **Agent** is a Affiliated-Entity.,
- Every **Agent** is a Conceptual-Thing.
- Everything that a **Agent** has-static-location is some Spatial-Location.
- Everything that a **Agent** influences is some Influence.
- Everything that a **Agent** has-role is some Role.
- Every **Agent** has-static-location at least 0.
- Every **Agent** has-role at least 0.

Accommodating new CNLs requires relatively minor changes to the wiki script