AceWiki: Controlled English in a Semantic Wiki

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AceWiki

- AceWiki is a new kind of semantic wiki
- Goals:
  - **Good usability** (even for completely untrained people)
  - **High expressivity** (OWL and beyond)
- Approach:
  - Articles are written in **controlled English**
Attempto Controlled English (ACE)

- Attempto Controlled English (ACE) is a **controlled natural language**, concretely a subset of English.
- Can be translated **automatically and unambiguously** into various logical notations, e.g. first-order logic, OWL, SWRL.
- Supports a relatively large subset of natural English:
  - Proper names, nouns, verbs, adjectives, singular/plural, relative phrases, anaphoric references, existential and universal quantifiers, negation, conditional sentences, question, and much more...
AceWiki: Screenshot

- Every continent is an area.
- Every continent is a part of the Earth.
- There are exactly 7 continents.
- What is a continent?
  - Africa
  - Antarctica
  - Asia
  - Australian Continent
  - Europe
  - North America
  - South America
- Every continent that is not Antarctica contains at least 2 countries.
- No island is a continent.
- Every continent borders a sea.
AceWiki: Words

- Proper names stand for **individuals**, e.g. Switzerland, Bob Dylan

- Nouns stand for **classes**, e.g. country, person

- Transitive verbs, of-constructs, and transitive adjectives stand for **binary relations**, e.g. owns, contains, part of, friend of, located in, used for
AceWiki: Reasoning

- ACE is more expressive than OWL
- Since AceWiki currently uses an OWL reasoner, not all ACE statement can be used for the reasoning:
  - No country borders every country.
  - If Liechtenstein is a country then Andorra is a country.
  - If a country contains an area and does not control the area then the country is an unstable-country.
- The reasoner is used for consistency checking, individual classification, class hierarchy extraction, and query answering
AceWiki: Consistency Check

- Each time a new sentence is added, AceWiki checks whether it contradicts the current ontology.

  - Every country is a part of exactly 1 continent.
  - Every country that borders Switzerland is a part of Europe.
  - Germany borders Switzerland.
  - Germany is a part of Asia.

- If there is a contradiction then the sentence is displayed in red font and not added to the ontology (i.e. not used for reasoning).

- No reasoning without consistency!
Queries in AceWiki

- In AceWiki, articles can contain inline queries expressed as ACE questions

- Some examples:
  - Which continents contain more than 10 countries?
  - Zurich is a part of what?
  - Switzerland borders which country that borders Spain?
  - Which rivers flow through a country that borders Germany?

- Such questions are answered automatically by the reasoner:
  - Which cities are located in Switzerland?
    - Berne
    - Geneva
    - Lucerne
    - Zurich
AceWiki: Predictive Editor

- ACE sentences are easy to understand, but writing statements in ACE is more complicated because the language restrictions have to be considered.
- AceWiki provides a predictive editor that helps the users to create syntactically correct sentences.
- The predictive editor “looks ahead” and shows word-by-word all possible continuations of a partial ACE sentence.
AceWiki: Editor

Every area is
AceWiki: Technical Details

- AceWiki is currently in its alpha stage
- The reasoner Pellet is used (version 1.5.2)
- The ontology can be exported in OWL 2 format
- AceWiki is written in Java using the Echo Web Framework making use of modern AJAX technologies
- Some important features are still missing: history/undo facility, user management, ontology import, ...
- AceWiki and the ACE parser are available under the LGPL license
AceWiki: Evaluation

- A usability experiment has been performed in order to find out how easy or complicated it is to use AceWiki.
- The participants were asked to add general and verifiable knowledge to the wiki.
- No instructions how to deal with AceWiki.
- 80% of the created sentences were correct and sensible.
- 61% of the correct sentences were complex (i.e. contained a negation or an implication).
That's all, folks!

- Thank you for your attention!
- More information can be found on the AceWiki website:
  - http://attempto.ifi.uzh.ch/acewiki/