AceWiki

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• AceWiki is a semantic wiki
• Articles are written in Attempto Controlled English (ACE)
• These sentences are internally translated into the Semantic Web language OWL
• An OWL reasoner is built in to answer questions and detect inconsistencies
• Special editor for writing ACE statements
• Stable implementation, but some important features are still missing
From Wikipedia: A planet, as defined by the International Astronomical Union (IAU), is a celestial body orbiting a star or stellar remnant that is massive enough to be rounded by its own gravity, is not massive enough to cause thermonuclear fusion, and has cleared its neighbouring region of planetesimals.

- Every planet is a celestial-body.
- No planet is a star.
- No planet is a dwarf-planet.
- No planet is a moon.
- Every planet orbits a star.
- Every planet that does not orbit the Sun is an extrasolar planet.
- Which planets orbit the Sun?
  - Earth
  - Jupiter
  - Mars
  - Mercury
  - Neptune
  - Saturn
  - Uranus
  - Venus
- Every planet is a terrestrial planet or is a gas giant.
Writability Problem

Writing CNL statements is much harder than reading them:

- For writing statements in a CNL, users have to know the restrictions of the language
- The restrictions of sophisticated CNLs like ACE are quite complex
- Users need support for writing CNL statements!

There are several approaches:

- Error messages
- Conceptual authoring: users do not directly change the text, but trigger modification actions
- Predictive editors
Predictive Editors: Challenges

A predictive editor shows all possible continuations of a partial text.

Challenges:

- Potentially high number of possible words
- Sentence creation should be quick (not much more than one mouse click per word)
- Novice versus experienced users
- Creation of new words
- Suitable grammar notation and parser
Every country that is located in Europe is ...

function word
a
an
every
everybody
everything
no
nobody

transitive adjective
the capital of
larger than
located in
the national-language of
registered at
smaller than

new variable
X
Y
Z

proper name
Africa
Aland
Alberta
America
Andorra
Angela Merkel

passive verb
built by
contained by
cultivated by
flown through by
governed by
grown by

reference
the country

OK
Cancel
Articles, Words and Statements

Articles ⇔ Words. Every word has an article.

- Proper names (Individuals)
- Nouns (Concepts)
- Of-constructs (Relations)
- Transitive Verbs (Relations)
- Transitive Adjectives (Relations)

Statements. Every article consist of a list of statements.

- Declarative ACE Sentences (Assertions)
  - considered for reasoning: blue triangle
  - too complex for reasoning: red triangle
- ACE Questions (Queries)
- Comments (Informal Notes)
Consistency Checking

Consistency of the knowledge base is very important, because it is a prerequisite for all other reasoning tasks.

AceWiki ensures consistency by checking every new statement:

- Malta is a country.
- Malta is an island.
- Maltese is an official language of Malta.
- Maltese is a semitic language.
- English is an official language of Malta.
- Malta is a member of the European Union.
- No semitic language is an official language of a country that is a part of the European Union.
Question Answering

AceWiki supports simple *wh*-questions with exactly one *wh*-word:

- **Which countries are a member of the European Union?**
  - France
  - Germany
  - Malta
  - Slovakia
  - Spain

- **Which country that is a part of Europe is not a member of the European Union?**
  - Switzerland

- **Which languages are an official language of a country that is a member of the European Union?**
  - English
  - French
  - German
  - Maltese
  - Spanish
Evaluation

Two small usability experiments with earlier versions of AceWiki:

- Altogether 26 untrained participants
- Task: Collaborative creation of a knowledge base

Results:

- 78%-81% of the sentences were correct and sensible
- 61%-70% of them were complex (containing negation, implication, disjunction or number restriction)
- Creation of a correct sentence every 5–6 minutes
- Definition of a new word every 5–7 minutes

→ Even untrained users can effectively use AceWiki
Expressiveness versus Efficiency

Trade-off: Expressiveness/Complexity $\Leftrightarrow$ Decidability/Efficiency

- First-order logic: expressive, undecidable, very inefficient
- Description Logics, OWL: less expressive, decidable, inefficient
- OWL Profiles (RL, EL, QL): even less expressive, decidable, efficient

AceWiki can use full OWL or an OWL profile for reasoning. Sentences that are more complex get a red triangle and are ignored for reasoning:

- Every trip that starts at X and that ends at X is a round-trip.
Future

Within the MOLTO project, the AceWiki approach should be extended to a **multilingual** semantic wiki.

Users should be able to access (view and edit) the same knowledge base in different languages in a fully synchronized way.
That’s it from my side

Now, Kaarel will tell you more about what is going on under the hood of AceWiki