FOAM

A Framework for Ontology Alignment and Mapping

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What is FOAM?

- is a tool to fully or semi-automatically align two or more OWL ontologies

- based on heuristics (similarity) of the individual entities (concepts, relations, and instances)

  - realized with KAON2 Infrastructure for management of the OWL-DL and F-Logic ontologies

  - additional libraries (WEKA, WordNet, GoogleAPI) for similarity computation

- the result are pairs of aligned entities with a similarity measure

Requirements of FOAM

- high quality results

- efficiency

- optional user interaction

- flexibility with respect to use cases

- easy adjusting and parameterizing
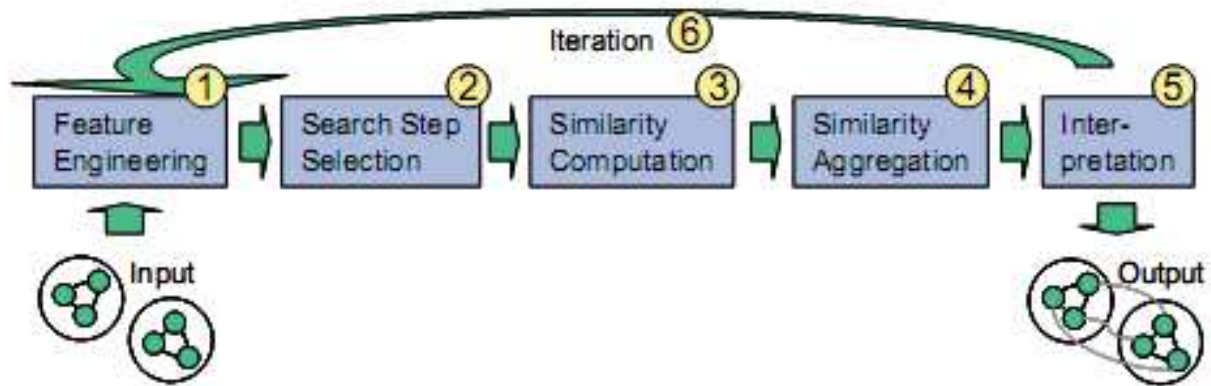
Ontology Alignment Process 1/2

Figure 1: the general ontology aignment process

Ontology Alignment Process 2/2

1. **Feature Engineering** determines a list of features

2. **Search Step Selection** choose entities from the ontologies to compare

3. **Similarity Computation** determines similarity values of canditate mappings

4. **Similarity Aggregation** aggregate the multiple similarity assessments into a single value

5. **Interpretation** aggregated numbers are compared to a threshold to propose the alignment

6. **Iteration** several rounds for more sophisticated structural similarity measures

WEKA

Weka is a collection of machine learning algorithms for data mining tasks. The algorithms can either be applied directly to a dataset or called from your own Java code. Weka contains tools for:

- data pre-processing

- classification, regression

- clustering,

- association rules, and

- visualization

Weka is also well-suited for developing new machine learning schemes.

WordNet

- a large lexical database of English ($\approx 10^6$ concepts)

- nouns, verbs, adjectives and adverbs are grouped into sets of cognitive synonyms (synsets) where each expressing a distinct concept

- can be interpreted and used as a lexical ontology

- JWNL Java WordNet Library for accessing the relational directory

GoogleAPI

- searching Google from within the foam application

- a wrapper around the Google Web API's SOAP interface

- is used for advanced label comparison

- develop Google Services need a Google API key

Conclusion

- alignment and mapping works

- research work for proof of concept - still in progress

- tradeoff between quality of mapping results and run-time complexity

- not free of bugs i.e. parameters

- hardcode the additional APIs into the source

- free available for own use

References

[1] EHRIG, STAAB: *QOM - quick ontology mapping*, Proceedings of the Third International Semantic Web Conference (ISWC2004), 2004

[2] EHRIG, SURE: *FOAM - Framework for Ontology Alignment and Mapping*

[3] KOAN2: *KOAN2 Infrastructure for managing ontologies - http://kaon2.semanticweb.org/*

[4] WEKA: *Weka Data Mining Software in Java - http://www.cs.waikato.ac.nz/ml/weka/*

[5] WORDNET: *WordNet a lexical database for the English language - http://wordnet.princeton.edu/*

[6] JWNL: *Java WordNet Library - http://sourceforge.net/projects/jwordnet*

[7] GOOGLEAPI: *GoogleCode - http://code.google.com*