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 alignment 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 candidate 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


