Extracting Similar Flavors in the Spaghetti of Biomedical Ontologies

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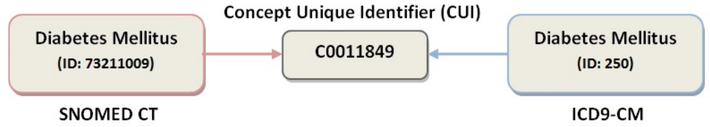
Motivation

Ontology Uses: Knowledge management, semantic search, data annotation, data integration, exchange, decision support and reasoning

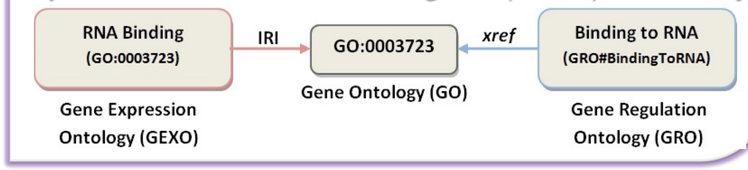
Advantages of Reuse

- Reduce engineering costs
- Avoid building existing ontology structures
- Enable semantic interoperability,
- Support use of terminologies in EHRs
- Query multiple, heterogeneous knowledge sources

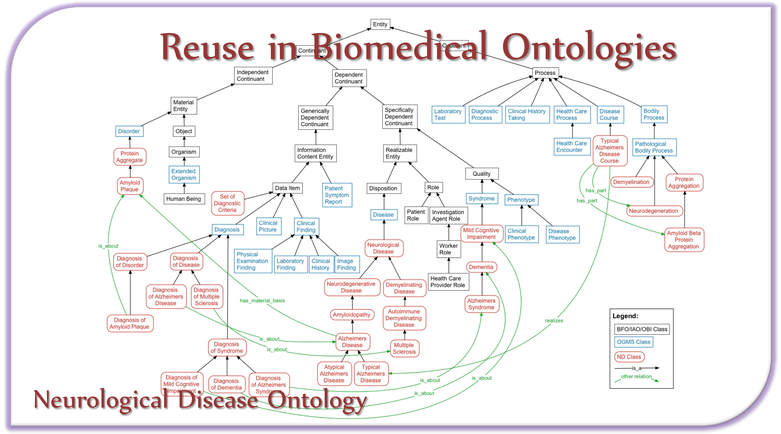
Unified Medical Language System (UMLS)



Open Biomedical Ontologies (OBO) Foundry

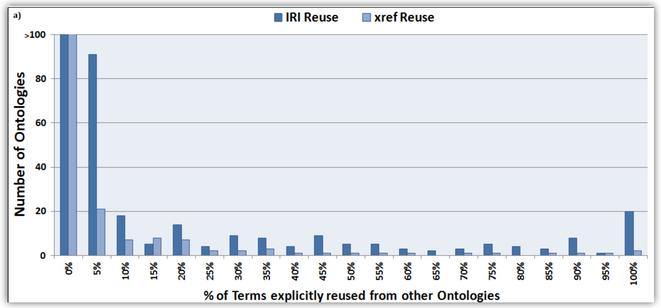


Reuse in Biomedical Ontologies

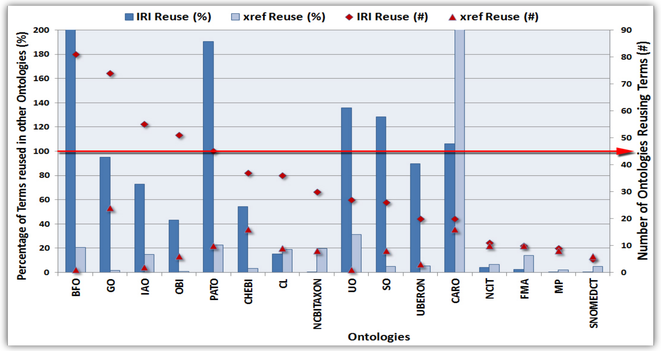


Results: Term Reuse

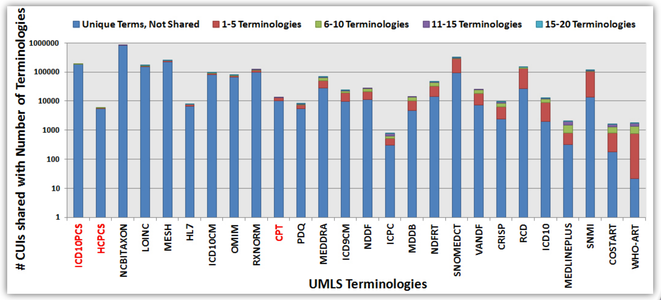
Total Term Reuse using all 3 constructs: 8.6%



Most ontologies reuse <5% Terms

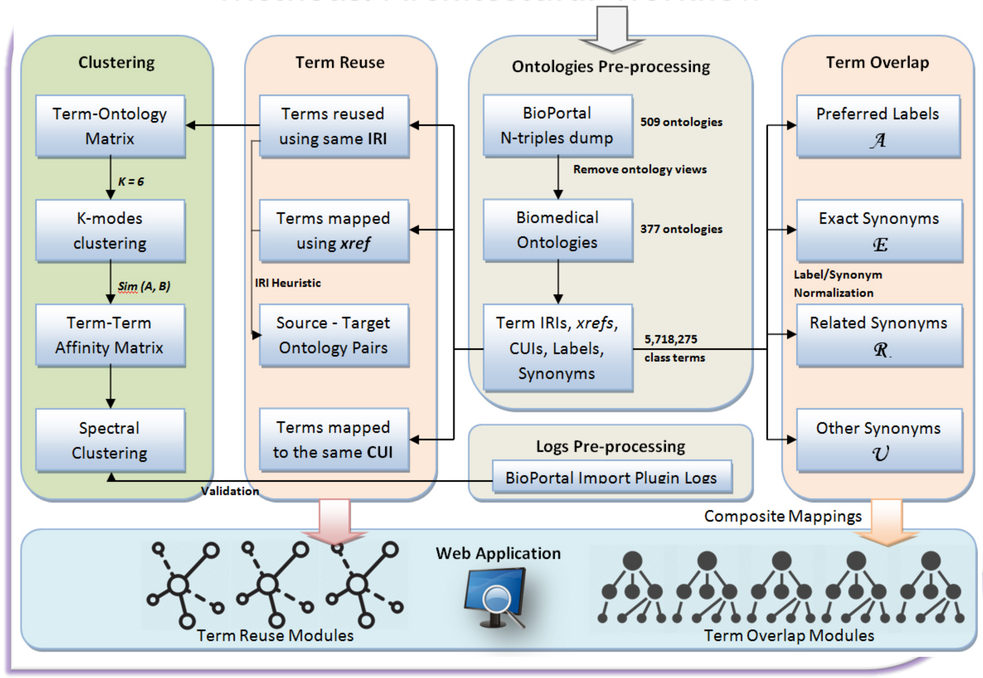


>100% Terms are reused from some ontologies

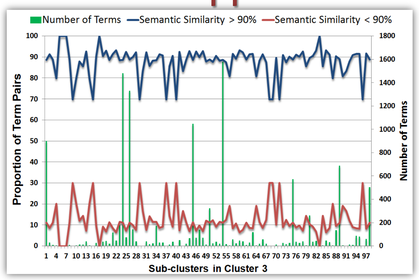


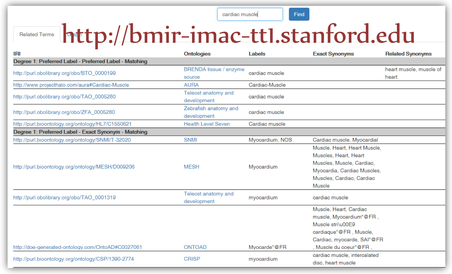
Most popular terminologies are composed of unique terms
Procedural terminologies do not share terms with each other

Methods: Architectural Workflow



Application: Term Recommender





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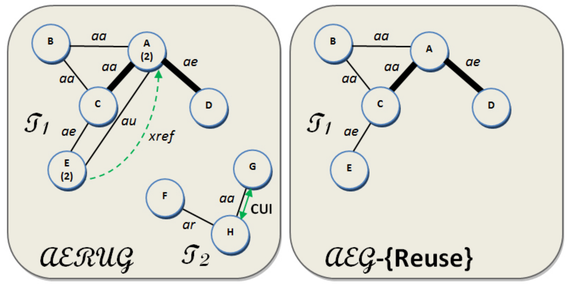
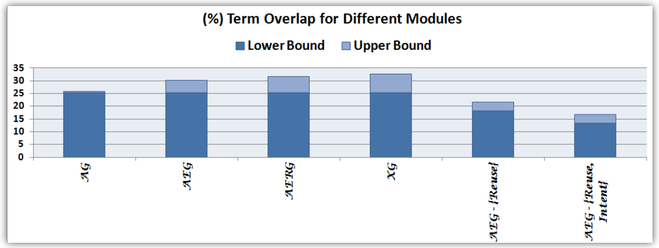
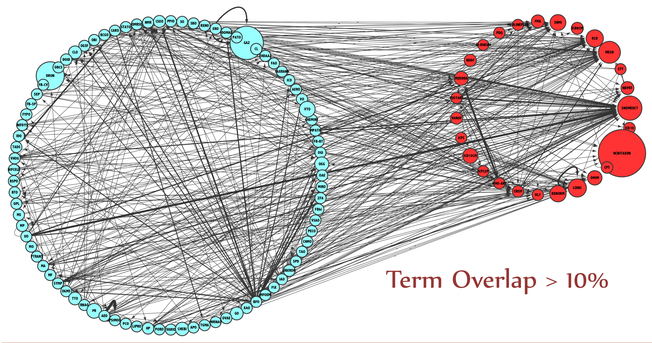
Results: Term Overlap







Term Overlap > 10%

Intent for Reuse:

- **Different Versions:** NCIT:Cerebral_Vein/NCIT:C53037
- **Different Notations:** OBO:FMA_31396, OBO:owlapi/fma#FMA_31396, OBO:owl/FMA#FMA_31396, OBO:fma#Cartilage_of_inferior_surface_of_posterolateral_part
- **Different Namespaces:** http://ihtsdo.org/snomedct/, http://purl.bioontology.org/ontology/SNOMEDCT