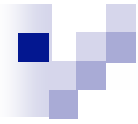


OntoFox: A web server for ontology information retrieval

July 26, 2009

Zuoshuang “Allen” Xiang, Yongqun “Oliver” He
University of Michigan Medical School



MIREOT: Minimum information to reference external ontology terms

- Melanie presented a wonderful introduction on MIREOT yesterday
- Aim: import limited terms with minimum information from large ontologies
- Question: How can I use this method?

Reference: Courtot M, Gibson F, Lister AL, Malone J, Schober D, Brinkman RR, Ruttenberg A. MIREOT: the Minimum Information to Reference an External Ontology Term. ICBO 2009.



Implementations of MIREOT Principle

- OBI MIREOT implementation
 - OBI specific
 - Requires command line, scripts, and SPARQL programming
- OntoFox:
 - Web based tool: <http://ontofox.hegroup.org>
 - Generic for any ontology development
 - No programming needed for users
 - Easy to use



More OntoFox Features

- Automatically retrieve middle level terms in between bottom and top level terms
- Map annotation terms between different annotation formats
 - e.g., “hasDefinition” (oboInOwl) to “definition” (IAO)
- Defined easy-to-use text input format for efficient implementation and maintenance
- Automatically retrieve terms that are not in superclass hierarchy but required to define your imported term (optional)



OntoFox Extends MIREOT Guideline

- MIREOT guideline suggests 3 minimum data items:
 - Source ontology URI
 - Source term URI = Low level source term URI in OntoFox
 - Target direct superclass URI = URI of target direct superclass of top level source term in OntoFox
 - Note: These 3 items are for one item “mireoting”.
- OntoFox includes 2 more data items (Optional)
 - Top level source term URI
 - Aim: to automatically extract all intermediate level terms between top and low level terms in ontology hierarchy
 - Note: Top level may be the same as low level
 - Source term annotation URIs
 - Aim: to be consistent with target ontology annotation format



OntoFox Web Usage:

Four sections:

1. Define source ontology

Note: choose from menu

2. Low level source terms

http://purl.org/obo/owl/NCBITaxon#NCBITaxon_234

3. Top level source terms w/ target direct superclass

http://purl.org/obo/owl/NCBITaxon#NCBITaxon_2

subClassOf http://purl.obofoundry.org/obo/OBI_0100026

4. Source annotation URIs

<http://www.w3.org/2000/01/rdf-schema#label>

mapTo http://purl.obofoundry.org/obo/IAO_0000111# # Additional annotation

<http://www.geneontology.org/formats/oboInOwl#hasDefinition>

wrapTo http://purl.obofoundry.org/obo/IAO_0000115# # Replace annotation

Output OWL file, directly viewable in Protégé, => see Demo

OntoFox
Home | Introduction | Tutorial | FAQs | References | Links | Contact | Acknowledge

OntoFox: A web server that facilitates ontology development by automatically fetching ontology terms and their annotations from existing ontologies and saving the results in an importable RDF/OWL format. (Note: OntoFox was previously named Ontofetch.)
OntoFox is developed based on the [HNECOT](#) principle. OntoFox is implemented using one of the following two methods, based on how data is input:

1. Data input using web forms:
Examples: [example 1](#), [example 2](#), [example 3](#), [example 4](#), [example 5](#)

(1) Select one or more source ontologies:
Chemical Entities of Biological Interest (CHEBI)
Common Anatomy Reference Ontology (CARO)
Cell Type Ontology (CTC)
Human Disease Ontology (DOID)

(2) Include low level source term URIs (One URI per line):

(3) Include top level source term URIs and target direct superclass URIs (One URI per line, optional):

(4) Include source annotation URIs (One URI per line, optional):
Common annotation IRIs: [@label](#), [oboInOwl:Synonym](#), [oboInOwl:hasSynonym](#), [oboInOwl:hasExactSynonym](#),
[oboInOwl:hasReplacesSynonym](#), [oboInOwl:hasNarrowerSynonym](#), [oboInOwl:hasBroaderSynonym](#), [oboInOwl:isClassifiedBy](#),
[oboInOwl:hasDefinition](#), [iao:refersToTerm](#), [iao:definition](#). If no URI is specified, all possible annotations will be included.

2. Data input using local text file:
Example: [Sample file](#) (Data format: [description](#))

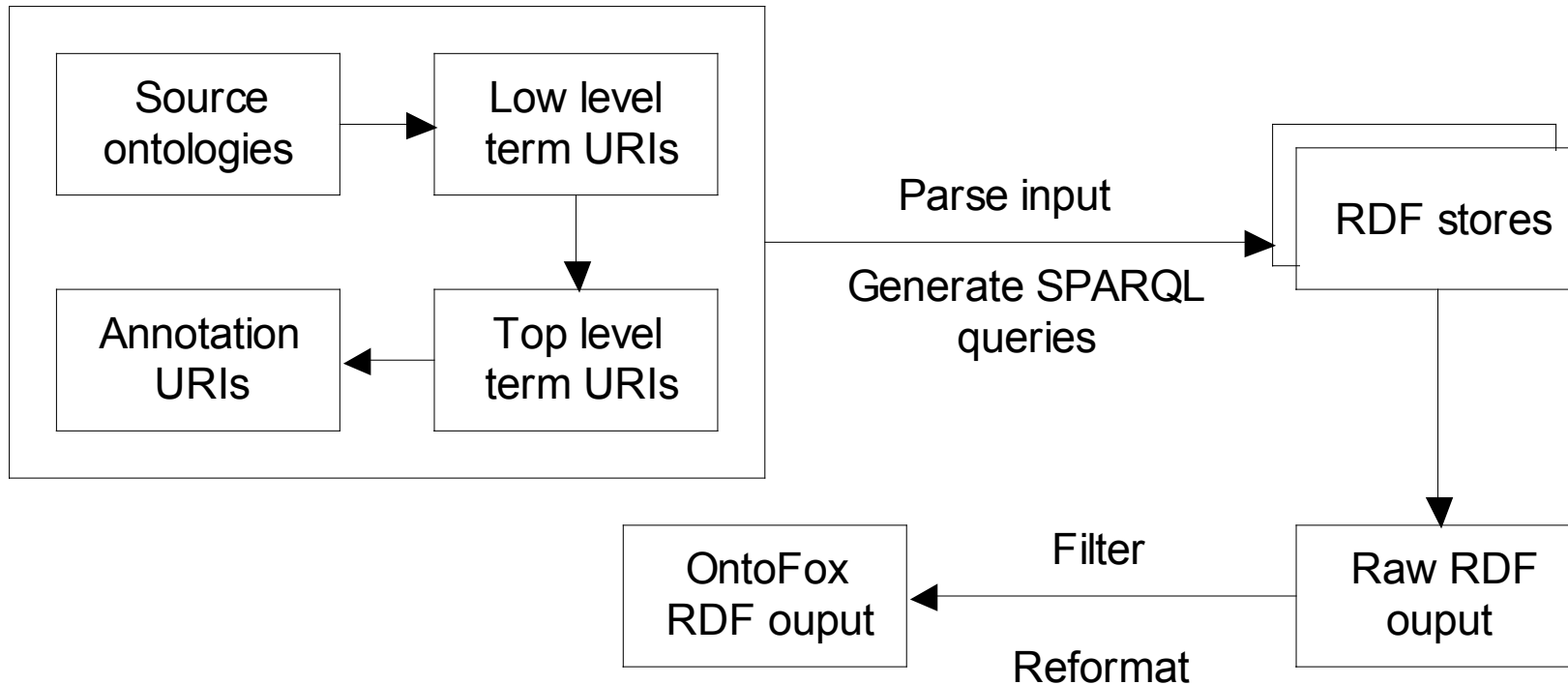
Upload input file:

He Group
University of Michigan Medical School
Ann Arbor, MI 48109

UNIVERSITY OF MICHIGAN



OntoFox Workflow



14 Source Ontologies available in OntoFox

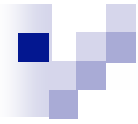
#	Ontology	Base URI	Term URI example
1	CARO	http://purl.org/obo/owl/CARO	http://purl.org/obo/owl/CARO#CARO_0000040
2	CHEBI	http://purl.org/obo/owl/CHEBI	http://purl.org/obo/owl/CHEBI#CHEBI_48999
3	CL	http://purl.org/obo/owl/CL	http://purl.org/obo/owl/CL#CL_0000799
4	DOID	http://purl.org/obo/owl/DOID	http://purl.org/obo/owl/DOID#DOID_12685
5	ENVO	http://purl.org/obo/owl/ENVO	http://purl.org/obo/owl/ENVO#ENVO_00000483
6	GO	http://purl.org/obo/owl/GO	http://purl.org/obo/owl/GO#GO_0043152
7	IDO	http://purl.org/obo/owl/IDO	http://purl.org/obo/owl/IDO#IDO_0000064
8	MP	http://purl.org/obo/owl/MP	http://purl.org/obo/owl/MP#MP_0000026
9	NCBITaxon	http://purl.org/obo/owl/NCBITaxon	http://purl.org/obo/owl/NCBITaxon#NCBITaxon_263
10	OBI	http://purl.obofoundry.org/obo/	http://purl.obofoundry.org/obo/OBI_0100026
11	PATO	http://purl.org/obo/owl/PATO	http://purl.org/obo/owl/PATO#PATO_0001793
12	PRO	http://purl.org/obo/owl/PRO	http://purl.org/obo/owl/PRO#PRO_000001795
13	SO	http://purl.org/obo/owl/SO	http://purl.org/obo/owl/SO#SO_0001288
14	VO	http://www.violinet.org/vo/	http://www.violinet.org/vo/VO_0000001

More source ontologies will be added to OntoFox for broad use



OntoFox has been tested for two ontologies

- VO: Vaccine Ontology
 - VO: A community-based ontology for the domain of vaccine
 - ~900 terms are mirrored by OntoFox to VO
 - Six ontologies used:
 - OBI, NCBITaxon, CHEBI, DOID, MP, PATO
 - OntoFox is routinely used for VO development
- OBI: Ontology for Biomedical Investigations
 - > 1000 terms imported from 10 other ontologies



Acknowledgements

Melanie Courtot, Alan Ruttenburg

OntoFox Software Demo:

<http://ontofox.hegroup.org/>