Improving Metadata Search Efficiency by Enabling Semantic Queries

Chad Berkley[1], Shawn Bowers[2], Matthew Jones[1], Mark Schildhauer[1]
[1] National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara
[2] University of California, Davis

Rationale

- Increasing numbers of digitized ecological datasets make it critically important to improve techniques for more precisely locating and delivering relavant information from scientific searches.
- Semantic search features increase the relavence of search results while decreasing false positive matches allowing users to browse a smaller, more relevant resultset.
- Structured browsing of semantically enabled datasets yields a more precise result which does not allow the user to choose browse parameters that do not yeild results.
- Ontologies allow datasets to share a common vocabulary for more uniform searching, while not constraining scientific expression.
- Free tools make these techniques available to anyone who is interested in persuing them.

Types of Searches

Basic Keyword Search - Search all metadata text fields for user entered terms.

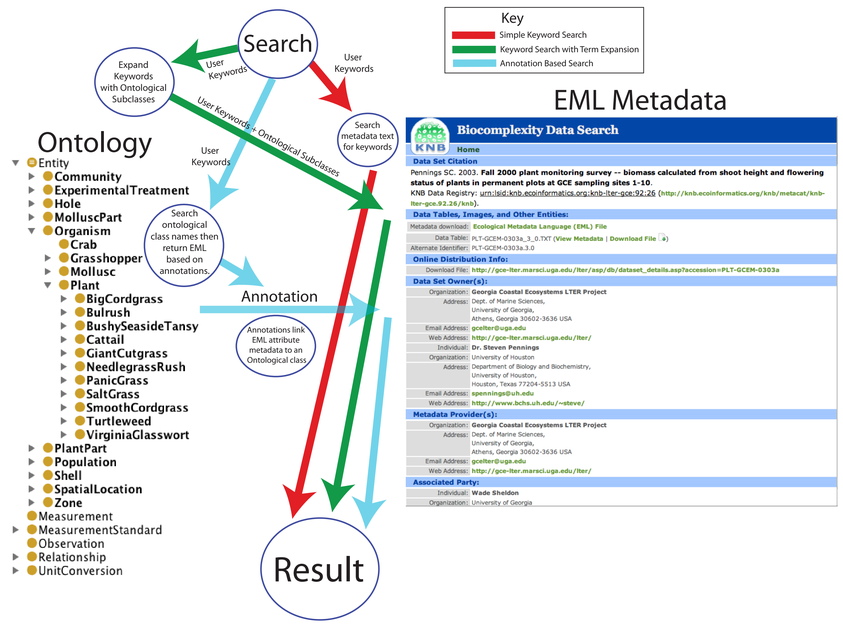
Ontological Term Expansion - User entered keywords are expanded using a controlled vocabulary in an ontology, then each expanded term is run against the metadata document base. Terms can be combined with various boolean functions.

Annotation Based Searching - Metadata fields are annotated against the structure of an ontology. The annotation is searched for user entered keywords instead of the metadata document itself. When a result is found, any metadata document linked via the annotation is returned.

Structured Annotation Search with Term Expansion - This search allows the user to narrow down search results by browsing ontological categories relevant to ecological datasets. As each category is chosen, a new resultset is displayed. Only categories that yield results are displayed to the user.

Prototype Results

Anatomy of the Searches



EML Metadata

Biocomplexity Data Search

Home

Data Set Citation

Pennings SC. 2003. **Fall 2000 plant monitoring survey -- biomass calculated from shoot height and flowering status of plants in permanent plots at GCE sampling sites 1-10.** KNB Data Registry: urn:lsid:knb.ecoinformatics.org:knb-lter-gce:92:26 {http://knb.ecoinformatics.org/knb/metacat/knb-lter-gce.92.26/knb}.

Data Tables, Images, and Other Entities:

Metadata download:	Ecological Metadata Language (EML) File
Data Table:	PLT-GCEM-0303a_3_0.TXT (View Metadata | Download File)
Alternate Identifier:	PLT-GCEM-0303a.3.0

Online Distribution Info:

Download File:	http://gce-lter.marsci.uga.edu/lter/asp/db/dataset_details.asp?accession=PLT-GCEM-0303a

Data Set Owner(s):

Organization:	Georgia Coastal Ecosystems LTER Project
Address:	Dept. of Marine Sciences, University of Georgia, Athens, Georgia 30602-3636 USA
Email Address:	gcelter@uga.edu
Web Address:	http://gce-lter.marsci.uga.edu/lter/
Individual:	Dr. Steven Pennings
Organization:	University of Houston
Address:	Department of Biology and Biochemistry, University of Houston, Houston, Texas 77204-5513 USA
Email Address:	spennings@uh.edu
Web Address:	http://www.bchs.uh.edu/~steve/

Metadata Provider(s):

Organization:	Georgia Coastal Ecosystems LTER Project
Address:	Dept. of Marine Sciences, University of Georgia, Athens, Georgia 30602-3636 USA
Email Address:	gcelter@uga.edu
Web Address:	http://gce-lter.marsci.uga.edu/lter/

Associated Party:

Individual:	Wade Sheldon
Organization:	University of Georgia

This work was supported by the National Science Foundation under awards 0533368 and 0225676 (SEEK). Support was also given by the National Center for Ecological Analysis and Synthesis (a Center funded by NSF grant #DEB-0553768, the University of California, Santa Barbara, and the State of California) and the University of California, Davis.