Use of the MeSH Thesaurus in the PORTAL-DOORS System

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Abstract

The NLM MeSH Thesaurus has been incorporated for use in the PORTAL-DOORS System (PDS) for resource metadata management on the semantic web. Use of this important biomedical terminology will greatly enhance the quality of metadata content of the PDS records thus improving cross-registry searches between different clinical specialty fields.

Introduction

The PORTAL-DOORS System (PDS) for resource metadata management has been designed to address information retrieval problems caused by cybersilos, search engine oligopolies, the spread of misinformation, and continuing barriers to data interoperability in the transition from original web to semantic web [1]. This design was modeled on the enormously successful design of the IRIS-DNS System for the original web with mobile metadata. The Internet Registry Information Service (IRIS) registers domain names while the Domain Name System (DNS) publishes domain addresses with mapping of names to addresses for the original web. Analogously, the Problem Oriented Registry of Tags And Labels (PORTAL) registers resource labels and tags while the Domain Ontology Oriented Resource System (DOORS) publishes resource locations and descriptions with mapping of labels to locations for the semantic web. This poster describes the most recent developments enabling enhanced description of resource metadata implemented for PDS as a result of the incorporation and use of the NLM controlled vocabulary and thesaurus MeSH [2].

Methods & Results

An iterative process of software development and re-design has been pursued from the beginning of the project with PDS progressing through draft versions 0.1 to the current 0.6. This iterative development has been maintained from a variety of perspectives including UML, SQL and XML modeling for PDS itself (the infrastructure system) as well as for the initial content managed by the system with the prototype biomedical registries GeneScene for genetics, ManRay for nuclear medicine, BrainWatch for brain imaging and neuropsychiatry, and BioPORT for biomedical computing [3]. The important interdisciplinary use case with cross-registry search in PDS for pharmacogenomic molecular imaging of

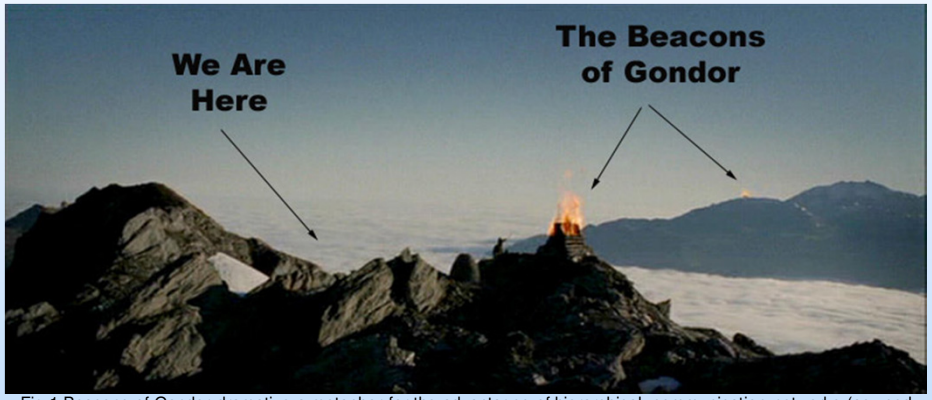

Fig 1:Beacons of Gondor dramatize a metaphor for the advantages of hierarchical communication networks (as used in the PORTAL-DOORS System) that enable search and discovery of a small item in a very large world.

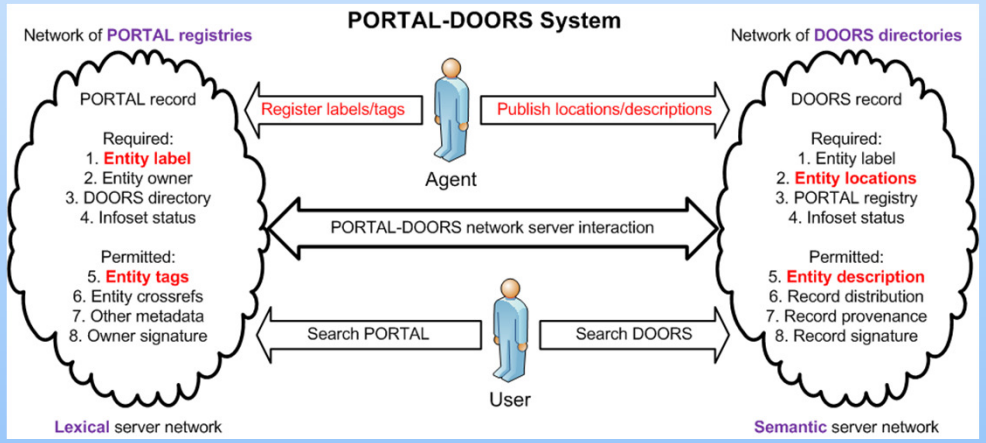

Fig 2: Resource metadata registered and published by agents for search by users in the PORTAL-DOORS server networks.

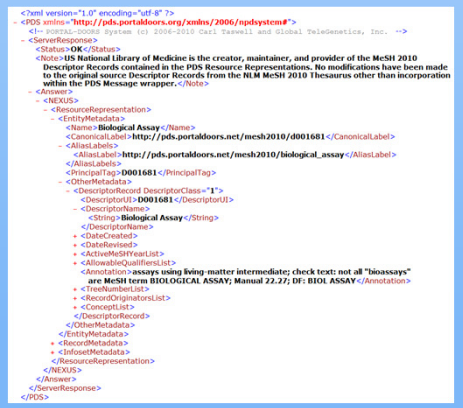

Fig 3: Example record from PDS MeSH2010 Thesaurus.

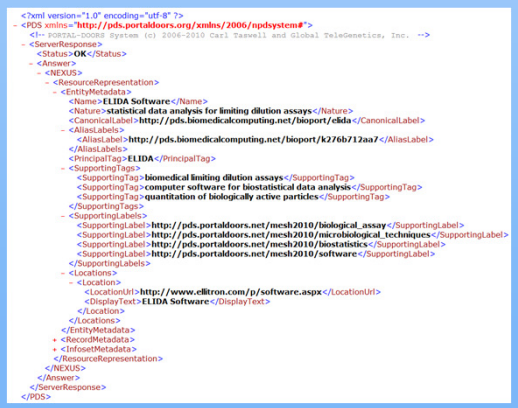

Fig 4: Example record from PDS BioPORT using MeSH2010.

Methods & Results (Cont'd)

the brain has been elaborated [4]. Facilities to enhance metadata description of resources entered in the PORTAL registries and DOORS directories of PDS are a necessary and important addition to improve the content of each resource record. Incorporation and use of the MeSH 2010 Thesaurus has been prioritized as the first major controlled vocabulary to be integrated into PDS because of its important status and use by NLM for indexing of the medical literature and its current availability in XML format [2]. Each MeSH record has been exposed as a RESTful web service based resource that is referenceable via a PDS *resource label* so that it may also be used for metadata descriptions of other resources entered in the PORTAL registries and DOORS directories. Software with Microsoft ASP.Net and SQL code together with the most up-to-date XML schemas and OWL ontologies are available for download at http://www.portaldoors.org/.

Conclusion

Incorporation and use of the MeSH controlled biomedical vocabulary and thesaurus to enhance the metadata description of resources entered within PDS should significantly improve the quality and utility of the content of PDS resource records for biomedical registries, directories and applications including clinical trials and literature meta-analyses. Continuing addition and integration of other biomedical terminologies including those encompassed by the UMLS metathesaurus [5] will further serve the PDS goal of interoperability for information retrieval and data integration.

References

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