CVDI Year 6 Mid-Year Report

07/01/17 – 12/31/17

6a.013.DU – Ontology as a Service (OAAS)

Report Date	Project Start	Project End	Project Budget	Amount Spent To Date
12/31/2017	10/01/2017	6/30/2018	$25,000	~$15, 000

PROJECT SUMMARY

Ontology as a Service (OAAS), an innovative ontology engineering approach that enables optimal application of existing rich semantic metadata networks within and across industry. The platform extends the Metadata Research Center's Helping Interdisciplinary Vocabulary Engineering (HIVE) technology, and can aid CVDI members in transforming workflows to extract knowledge from their data assets. The research is of value specifically for partners such as GSK, Clarivate, J&J, and others as a service to science, and can aid any CVDI industry partner in managing data assets with semantic metadata structures. The three chief goals of this work include: 1) Advancing ontology server registration and reducing vocabulary silos, 2) Improving multiple-ontology visualization to assist decision-driven applications, 3) Increasing intelligence about on the value and use of semantic ontologies in daily operations (e.g. resource discovery to semantic driven data analytics).

PROJECT TEAM

Team Member Name	Team Role *(PI, Co-PI, Student, Researcher)*	Academic Site
Jane Greenberg	PI	Drexel University
Yuan An	coPI	Drexel University
Joan Boone	coPI	Drexel University
Hongwei Liu	Post-graduate data sci. fellow	Drexel University
Chloe Rottman	MSLIS student	Drexel University

IAB PROJECT MENTOR(S)

IAB Project Mentor Name	IAB Organization
Elizabeth Davenport (now, Jon Emeigh)	GSK
Jason Rollins	Clarivate

PROJECT FUNDED BY

IAB Organization(s)
GSK
Clarivate

OVERALL PROGRESS/ACHIEVEMENTS TO DATE

1. Initial ontology interoperability script and service has been produced
2. Embedded D3.js with RESTAPI
3. Transformed original vocabulary table form to an interactive bubble graph.
4. Transformed original search result to an interactive hierarchical graph.
5. Transformed original index result word cloud to an interactive hierarchical graph.

The recent updates use D3.js to visualize search results.
There are three parts in HIVE, Vocabularies, Search and Index.

Figure 1: HIVE Prototype Ontology Index

Vocabularies | Search | Index

Vocabulary	Concepts	Last Updated	URI
Asthma Ontology	289	03/02/2016	http://childhealthservicemodels.eu/asthma
Diabetes Mellitus Diagnostic Ontology	6439	12/20/2015	http://purl.obolibrary.org/obo/DDO.owl
Metals	44	01/01/2016	http://en.wikipedia.org/wiki/
Radiation Oncology	1183	07/07/2015	http://www.radlex.org/RID/
Radiology Lexicon	45471	11/16/2016	http://www.radlex.org/RID/
Smart Appliances REFerence ontology	112	02/10/2015	https://w3id.org/saref/
US Geological Survey	968	01/01/2016	http://www.usgs.gov/science/USGSThesaurus/
Unified Astronomy Thesaurus	1836	12/23/2015	http://www.altbibl.io/astronomy/uat/

To help users to quickly have a sense of each ontology (Figure 1), we would like to enhance the display following the prototype as seen in Figure 2, to more granular display in Figure 3 for Search and Indexing:

Figure 2: Ontology Search Display

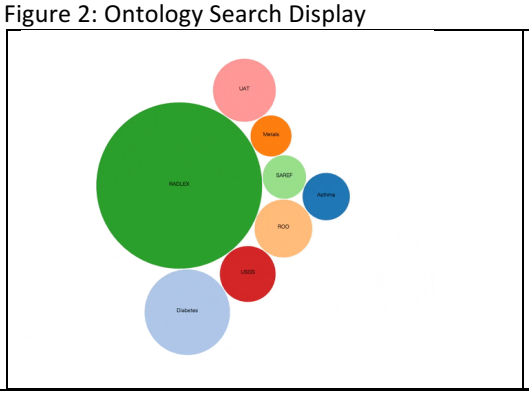
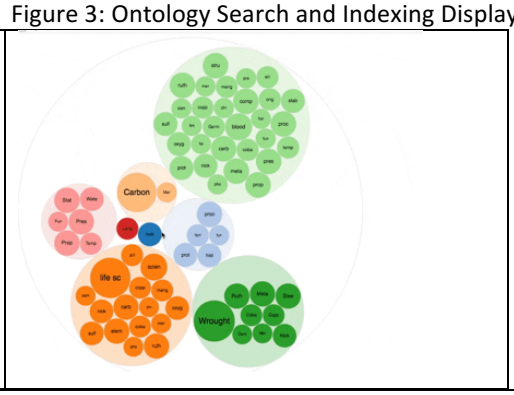


Figure 3: Ontology Search and Indexing Display



PROJECT DELIVERABLES

Deliverable	Achievements	Remaining To Do
1. **Ontology registration and interoperability framework:** Develop an automated pipeline supporting interoperability among RDF, SKOS, OWL, and JSON-LD, including the most common variants.	Initial script and service has been produced.	Code refinement and testing of different ontologies for automatic integration into HIVE.
2. **Enhance the HIVE's visualization**. Use D3.js REST API to provide visualization for examining two or more semantic ontologies and determining the best application.	An initial prototype has been built.	Enhance prototype to support multiple vocabularies and link to hierarchical display in HIVE to display of supra- and sub-class levels and selection of ontological concepts.
3. **Evaluation OAAS with IAB members – GSK + Clarivate.** Test the effectiveness and efficiency of the prototype ontology pipeline in real-world settings.	Initial communication has been with GSK, recent communication with Clarivate. OAAS Team member had a GSK visit 12/12.	Continue GSK communication selecting use case. Hold meeting with Clarivate (tentative – 1/5/2018) to identify workflow test case.
4. **Roundtable.** Seek CVDI IAB input about the potential for a roundtable for the spring meeting.	Initial discussion and preliminary plans underway for Drexel Spring meeting.	Organize ontology roundtable.