

Ontology Summit 2013
HC-06: ISO 15926 Reference Data
Validation
Sat 2013.03.30

Anatoly Levenchuk
Victor Agroskin
TechInvestLab.ru

Clinic Ideas and Goals

- Evaluation of publicly available ISO 15926 reference data, viewing it as an ontology for the engineering domain:
 - Check compliance to upper ontology
 - Diagnose problems
 - Evaluate ease of understanding and use of existing data
 - Make suggestions for ontology improvement
 - Calculate formal ontology quality metrics
 - Evaluate tools
- Not all pursued and achieved, but some!

RD (Ontology) in Focus

- ISO 15926 - a standard for engineering data integration, sharing, exchange, and hand-over
 - Generic data model – an upper ontology for an engineering domain
 - Extensive Reference Data Libraries (ontology data) for process plants – used by equipment manufacturers, engineering companies and owner/operator companies in oil and gas, nuclear power, petrochemical industries ...
 - Standard development and application jointly managed as JORD project by two industry associations: POSC Caesar Association and FIATECH
- Upper ontology of the ISO 15926 as OWL:
 - http://rds.posccaesar.org/2008/02/OWL/ISO-15926-2_2003
- JORD/PCA Reference Data Library:
 - human browser access & query <http://posccaesar.org/endpoint/>
 - the SPARQL endpoint <http://posccaesar.org/endpoint/sparql>
 - snapshot for download <http://rds.posccaesar.org/downloads/PCA-RDL.owl.zip>
- Various resources for study:
 - <http://www.infowebml.ws/>, <http://www.15926.info/>
 - <http://www.15926.org/>
 - <http://levenchuk.com/2012/10/01/iso-15926-self-education-sequence/>

RD as Ontology – Non-Standard Representation

- Classification and specialization relations are reified in JORD/PCA RDL

- Standard RDF representation:

```
<pcardl:RDS6298485 rdf:about="&pcardl;RDS327239">  
<rdfs:label>PUMP</rdfs:label>  
</pcardl:RDS6298485>
```

- JORD/PCA representation:

```
<dm:Classification rdf:about="&pcardl;RDS16145754">  
<dm:hasClassified rdf:resource="&pcardl;RDS327239" />  
<dm:hasClassifier rdf:resource="&pcardl;RDS6298485" />  
</dm:Classification>
```

- Specialized query and reasoning tools required

Event

- Virtual and real sessions Sat 2013.03.30
 - 12:00pm - 6:00pm (virtual and real)
 - 8:00pm - 10:00pm (virtual) Moscow time UTC+4.
- Real session - 5 participants in Moscow
- More people online from Moscow, St. Petersburg, Surgut, Kiev, Zurich.
- "Open webcast" hour with experts from UK, Spain, USA.

Organization

1. Selection of a Test or a Metric
2. Short discussion of a Test or a Metrics
3. Discussion of its application to ISO 15926 reference data, algorithm selection
4. Implementation
5. Test on real data, discussion of results
6. Preliminary documenting of results (errors, inconsistencies, metric values, etc.)

Tooling

- .15926 Editor
<http://techinvestlab.ru/dot15926Editor>
- All tests and calculations executed as Python scripts in .15926 Editor Python console
- Other tools tried and improved during the event but had not returned reportable results

Subontology for Analysis

- Subset of reference data selected for work, removing data types which are specific for ISO 15926 ontology and rarely used in mainstream OWL ontologies.
 - only classes of individual (no classes of classes)
 - except classes of EXPRESS information representation (literal data types in mainstream OWL ontologies)

Verification of RD

- Free class identification:
 - all classes which are not subclasses of any class, therefore are not connected to the taxonomy starting from "ISO 15926-4 THING"
 - identified 823 classes (some have their own subtaxonomies)
- Cycle identification
 - specialization cycles
 - just 3 classes in 2 cycles identified in major taxonomy

OQuaRE Quality Metrics for RD

- http://miuras.inf.um.es/oquarewiki/index.php5/Quality_metrics calculated:
 - LCOMOnto = 8
 - WMCOnto = 5
 - DITOnto = 16
 - NACOnto = 1.23
 - NOCOnto = 1.2
- For normalizing Metric/Score results go to http://miuras.inf.um.es/oquarewiki/index.php5/Quality_metrics

Results

- Verification report delivered to ISO 15926 community
<http://15926.org/viewtopic.php?f=5&t=154>
- Comparison of JORD/PCA reference data library with other ontologies can be carried out once comparable data is collected in OQuaRE projects
- Brought together .15926 developers and users, opportunity to demonstrate software usage patterns. Strong and weak sides of .15926 Editor ontology exploration environment identified to guide further development
- Quality time and fun!

Thank you!

Full HC-06 report with links and code available in archive
<http://ontolog.cim3.net/forum/ontology-summit/2013-04/msg00038.html>

.15926 Editor <http://techinvestlab.ru/dot15926Editor>

Anatoly Levenchuk

<http://ailev.ru> (Rus)

<http://levenchuk.com> (Eng)

ailev@asmp.msk.su

Victor Agroskin

vic5784@gmail.com