

Ontology Summit 2013

Hackathon & Clinics Program Launch

13 April 2013

Testing OOPS and OQuaRE as
examples of tools for Ontology
Evaluation using FIBO

Overview

- Description
- Collaborators
- Resources
- Ontologies involved
- Objectives / Goals
- Deliverables
- Remarks

Description

- FIBO
 - Identify the relevant quality measures for two styles of ontology:
 - Business Conceptual Ontology (standard business terms)
 - Operational ontologies (for semantic applications)
 - Develop quality methodology for development and maintenance of FIBO suite of ontology standards for the financial industry
- OOPS!
 - Catalog the ontology pitfalls in the FIBO BCO

Collaborators

FIBO

Mike Bennett,
Enterprise Data Management Council

OOPS!

Mari Carmen Suarez-Figueroa, Maria Poveda-Villalon,
Ontology Engineering Group. Departamento de Inteligencia Artificial. Facultad de
Informática, Universidad Politécnica de Madrid, Spain.

OQuaRE

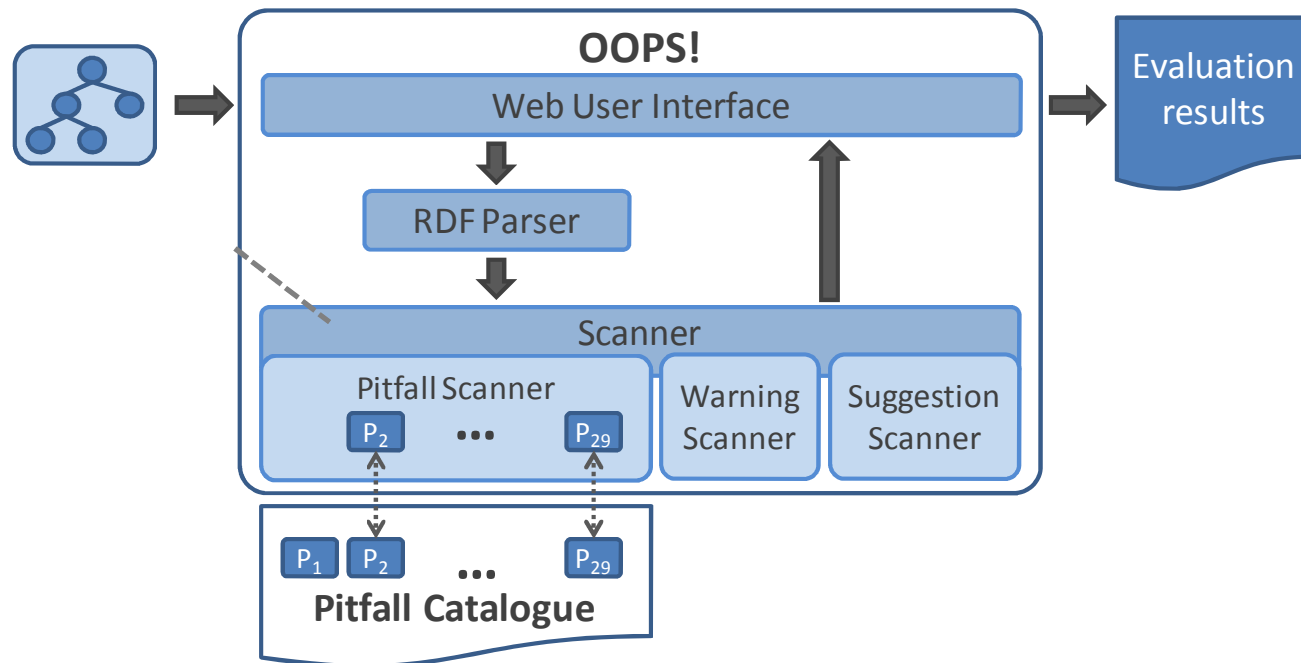
Jesualdo Tomás Fernandez-Breis, Astrid Duque-Ramos
Departamento de Informática y Sistemas, Universidad de Murcia, Spain.

Others

We are open to working with any and all others who may have tools, techniques or
methodological material which may be applied either to business conceptual
ontologies, to operational OWL ontologies or both.

Collaborators: OOPS!

- **Web-based tool**
- Available at <http://www.oeg-upm.net/oops>



Collaborators: OOPS!

The screenshot shows the OOPS! Ontology Pitfall Scanner interface. At the top, the logo and title 'Ontology Pitfall Scanner!' are displayed. Below this, a brief description explains the tool's purpose: to detect common pitfalls in ontology development. The interface includes two input areas: 'Scanner by URI' with a text field and a 'Scanner by URI' button, and 'Scanner by direct input' with a larger text area and a 'Scanner by RDF' button. An example URI is provided: 'http://data.semanticweb.org/ns/swc/swc_2009-05-09.rdf'. The main content area is divided into several sections: 'News!' with a paragraph about integrating the scanner; 'Detecting common pitfalls in ontologies' with a detailed paragraph and a bulleted list of pitfalls; 'Want to help?' with a list of actions like 'Suggest new pitfalls' and 'Provide feedback'; 'Documentation:' with links to 'Pitfall catalogue', 'User guide', and 'Technical report'; 'Related papers:' with a list of papers like 'EKAW 2012' and 'ESWC 2012 Demo'; 'Web services:' with a link to 'RESTful Web Service'; and 'Developed by:' with the 'Ontology Engineering Group' logo and a Twitter follow button. On the right side, there are four callout boxes with arrows pointing to specific sections: 'Suggestions & feedback' points to the 'Want to help?' section, 'Documentation' points to the 'Documentation:' section, 'Related papers' points to the 'Related papers:' section, and 'Web Services' points to the 'Web services:' section. On the left side, there are two callout boxes: 'Ontology input area' points to the input fields, and 'Brief description' points to the 'Detecting common pitfalls in ontologies' section.

Ontology input area

Brief description

Suggestions & feedback

Documentation

Related papers

Web Services

Collaborators: OOPS!

Evaluation results

[Expand All] | [Collapse All]

Results for P04: Creating unconnected ontology elements.	11 cases
Results for P05: Defining wrong inverse relationships.	2 cases
Results for P08: Missing annotations.	156 cases
Results for P11: Missing domain or range in properties.	83 cases
Results for P12: Missing equivalent properties.	8 cases
Results for P13: Missing inverse relationships.	40 cases

This pitfall appears when a relationship (except for the symmetric ones) has not an inverse relationship defined within the ontology. For example, the case in which the ontology developer omits the inverse definition between the relations `!hasLanguageCode!` and `!isCodeOf!`, or between `!hasReferee!` and `!isRefereeOf!`.

- OOPS! has the following suggestions for the relationships without inverse:
 - > `http://data.semanticweb.org/ns/swc/ontology#hasPart` could be inverse of `http://data.semanticweb.org/ns/swc/ontology#isPartOf`
 - > `http://data.semanticweb.org/ns/swc/ontology#isLocationFor` could be inverse of `http://data.semanticweb.org/ns/swc/ontology#hasLocation`
 - > `http://swrc.ontoware.org/ontology#participant` could be inverse of `http://swrc.ontoware.org/ontology#organizerOrChairOf`
- Sorry, OOPS! has no suggestions for the following relationships without inverse:
 - > `http://www.w3.org/2002/12/cal/ical#component`
 - > `http://www.w3.org/2002/12/cal/ical#dtstamp`
 - > `http://www.w3.org/2002/12/cal/ical#dtstart`
 - > `http://data.semanticweb.org/ns/swc/ontology#hasRelatedArtefact`
 - > `http://data.semanticweb.org/ns/swc/ontology#plansToAttend`
 - > `http://purl.org/dc/terms/isPartOf`
 - > `http://swrc.ontoware.org/ontology#url`
 - > `http://www.w3.org/2002/12/cal/ical#dtend`
 - > `http://xmlns.com/foaf/0.1/based_near`
 - > `http://data.semanticweb.org/ns/swc/ontology#hasProgramme`
 - > `http://xmlns.com/foaf/0.1/maker`
 - > `http://xmlns.com/foaf/0.1/homepage`
 - > `http://swrc.ontoware.org/ontology#givenBy`
 - > `http://swrc.ontoware.org/ontology#vendor`
 - > `http://swrc.ontoware.org/ontology#Root`
 - > `http://swrc.ontoware.org/ontology#dealtWithIn`
 - > `http://swrc.ontoware.org/ontology#publication`
 - > `http://swrc.ontoware.org/ontology#outcomeProduct`
 - > `http://swrc.ontoware.org/ontology#school`
 - > `http://swrc.ontoware.org/ontology#headOf`

Pitfall name

Pitfall description

Pitfall frequency

Ontology elements affected

Want to help?

- Suggest new pitfalls
- Provide feedback

Documentation:

- Pitfall catalogue
- User guide
- Technical report

Related papers:

- EKAW 2012
- ESWC 2012 Demo
- Ontoqual 2010
- CAEPIA 2009

Web services:

- RESTful Web Service

Developed by:



Follow @OOPSog

Collaborators: OQuaRE

- OQuaRE is a framework for Ontology Quality Requirements and Evaluation based on ISO/IEC 25000:2005, the standard for Software Quality Requirements and Evaluation. OQuaRE defines intrinsic and extrinsic quality criteria in terms of quality sub-characteristics.
- OQuaRE aims to define all the elements required for ontology evaluation: evaluation support, evaluation process and metrics. The current version of OQuaRE includes, so far, the quality model and the quality metrics:
 1. The quality model is composed of a set of quality characteristics such as structural, functional adequacy, maintainability etc. and its associated sub-characteristics such as reliability, reusability, availability, redundancy, consistency, etc.
 2. The quality metrics have been taken from the state of the art in ontology, such as Depth of subsumption hierarchy, Class Richness, Tangledness etc.
- Complete definition of OQuaRE is available at:

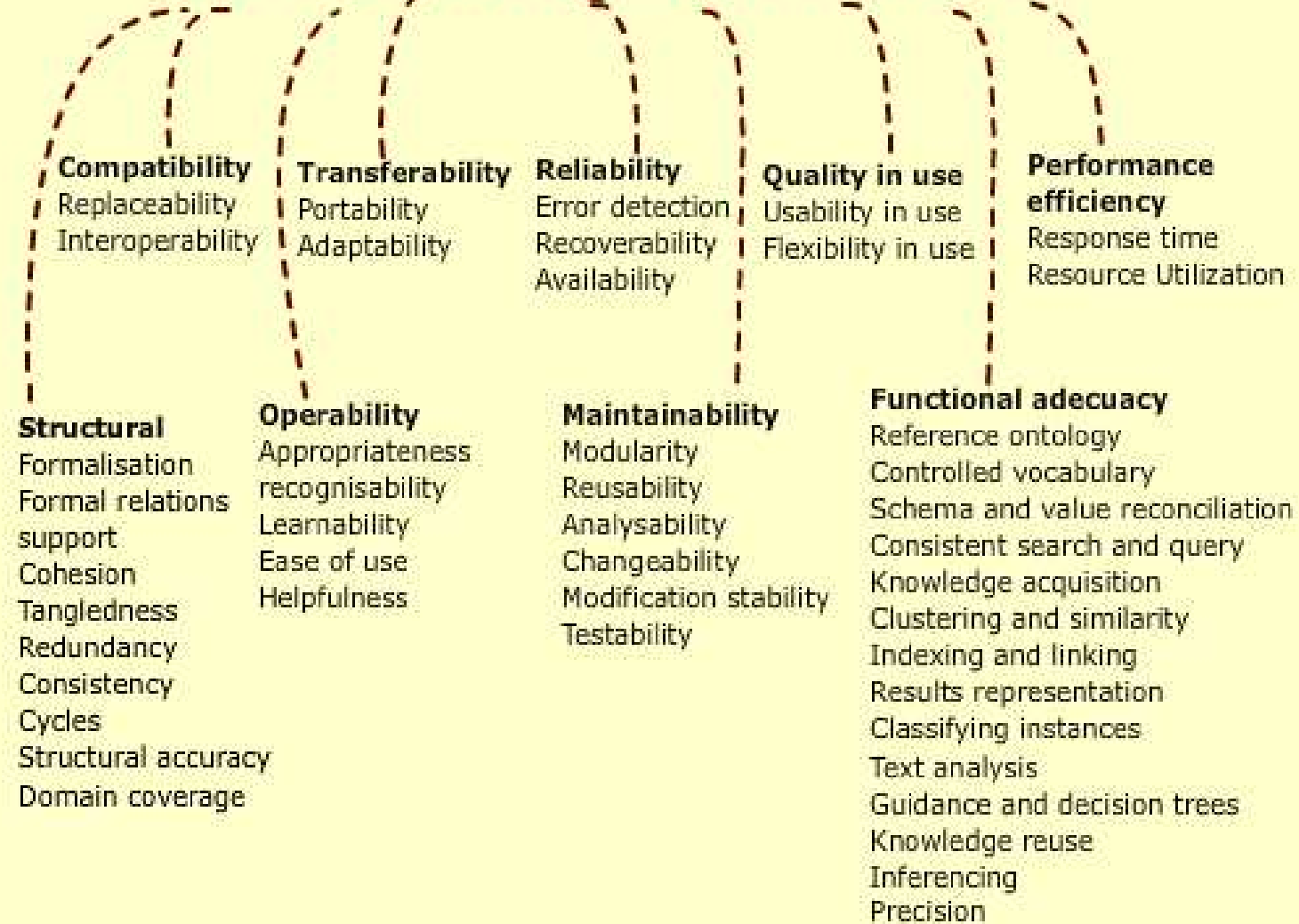
<http://miuras.inf.um.es/evaluation/oquare/>

and

<http://miuras.inf.um.es/oquarewiki/>

Collaborators: OQuaRE

ONTOLOGY QUALITY MODEL



Ontologies Involved in this Hackathon

- Financial Industry Business Ontology
 - Background: What and why
 - Conceptual v Operational Ontology

- FIBO Conceptual Ontologies
 - Business Entities
 - Foundations (supporting terms semantics)

FIBO Conceptual Ontology Quality Considerations

- Requirements for a “Business” or “Conceptual Model”
 - should not reflect application constraints
 - Should be validated by business domain experts
 - Should be logically consistent and well formed semantically
 - Business meaning also requires:
 - Abstraction / reuse
 - Partitions usage / structure
 - Formal semantic grounding of concepts
- Compromises for Business SME View
 - Use of property restrictions
 - Object property sub-types (functional etc.)
 - Distinguishing the necessary / necessary and sufficient properties of a class
 - Tool Effects
 - Used ODM (UML Profile for OWL) to create business views;
 - UML tooling has some limitations
- FIBO Operational Ontologies
 - Are different from Conceptual Ontologies
 - Should conform with all application-specific operational quality requirements
 - Should reflect the business semantics in the BCO
 - Should NOT reflect the compromises listed above

Objectives

A: Use of an example ontology quality tool for the evaluation of FIBO Business Conceptual Ontologies

- Identification of relevant quality metrics and aspects for FIBO Business Conceptual Ontologies
- Applying these measures to the “FIBO-Business Entities” set of ontologies and its imports from the “FIBO-Foundations” ontologies using the available tools
- Consider how this can inform the formal methodology for FIBO development

Deliverables

- Elements of a formal methodology for development of FIBO Business Conceptual Ontologies
- Elements of a formal methodology for local extension of FIBO BCOs by end users, to create their own ontologies at the same conceptual level
 - (for onward use either in conventional technology model driven development, data integration or the development of operational ontologies for semantic processing)
- Notes and “how to” material for developers of semantic technology applications that use FIBO
- Formal Findings on the ontology quality tools

The Process

On the morning of the Hackathon the **OOPS** and the **OQuaRE** people will be pointed to a representative set of FIBO content.

- The Universities will process FIBO through their respective software and provide results to EDMC.
- Evaluation of the applicability of these tools as an aid to FIBO quality control will be performed by EDMC staff.
- EDMC will report results and a proposed way forward to the Universities.

Remarks

- Clinic as a vital first step in development of
 - Formal methodology for FIBO standards development
 - For end users of FIBO in semantic technology-based applications:
 - Conformance points
 - Developer guidance
- The tools and techniques which are applied in this clinic will likely form a part of those formal processes going forward.
- Development lifecycle framed in terms of Tools and Techniques
 - Quality measures
 - Tools for analysis of the ontologies
- What measures can be formalized to the extent needed for formal standards conformance language?
- Do we have the flexibility needed to recognize different styles of ontology / different ontology requirements?

Questions?