Ontology Design Patterns and Semantic Abstractions in Ontology Integration

HACKATHON PROPOSAL

ONTOLOGY SUMMIT 2014

The Challenge

Hackathons:

- ❑Focus on technology
- ❑Get “down and dirty” with some solution

The Interesting Question:

- ❑Re-use of semantic content
- ❑Ontology Design Patterns and Semantic Abstraction
- ❑Ontology is about modelling reality itself
- ❑But the work is comparable to software development

An Idea:

Propose a hackathon which takes a possible set of design patterns, looks for re-usable content, looks for patterns in that content and links this all together to make (or at least describe) an application

Hackathon Proposal

Use Risk as a unifying use case for bring together several ontology patterns, look for patterns in linked data, reconcile different conceptual representations of the fundamental concepts in different ontologies

Then use this to propose / scope out a simple application

Ontologizing Risk

Risk: High level abstract pattern is well known:

- Risk = Probability x Impact

Probability = percentage chance of event occurring

Impact = effect on goal or situation

Semantic Abstractions:

- Mathematical Probability
- Event pattern
- Situations
- Statistical Information (incidents, historical frequencies etc.)
- Business Goals

Hackathon Outline

- This hackathon will bring together a number of ontologies, ontology design patterns and high level semantic abstractions to create an ontology around the area of risk.

- Perceived end goal / use case:
  - Extend this into a basic risk application.
    - This would use some semantic abstraction of risk itself
    - Combine events, situations, probabilities and impacts,
    - Integrate data such as accident statistics to support a simple query and calculation application.

- A possible outcome would be the specification of such an application for future development.

Hackathon Description

- ❑Create a complete ontology for the different subject areas
  - ❑Linked within a common set of partitions?
  - ❑Consistent world-view locally to the application
- ❑Explore extension of ODPs
  - ❑Risk related Event as extension of Event; Risk related Situation v Situation
  - ❑OR is it a matter of using the same ontology but in a risk context?
    - ❑ Will explore and compare both approaches;
    - ❑ consider use of partitions in articulating contexts
    - ❑ With examples
- ❑Explore usefulness of semantically primitive abstractions, partitions
- ❑Have something which can be stood up in e.g. Protégé / WebProtégé

Focus

- Ontology design patterns versus high level abstractions
- Extension versus re-use
- Use of ontology partitions in integration
- Linked data
- Applying ontologies to linked data resources
- Conceptual modelling: possible use of SKOS
- Understanding what makes an ontology re-usable

Hackathon Work Plan

Ontology Patterns / Abstractions

- Look for ontologies in the subject areas identified
- Identify usable ontology design patterns
- Brainstorm semantic abstractions
- Experiment with approaches to re-use, extension, cross-referencing
- End point is a single integrating ontology

Application – additional steps if time

- Gather a diverse corpus of data about events, incidents / accidents, news etc.
- Align these semantically within one unifying ontology
- Model probability semantically and find test data for probabilities / history

Future application / perceived end result

- Carry out SPARQL query against combined probability / event / impact
- Returns numbers: Feed those into a simple calculation application or spreadsheet

Tools / Environments

- Environment for modelling ontology
  - Protégé / WebProtégé / Others?
- Environment for Business review / presentation?
- Environment for instance data
- SPARQL Querying
- Calculation / spreadsheet for results

Outcomes

- An understanding of the factors influencing reusability
  - Ontology Design Patterns versus Semantic Abstraction
  - Be able to frame concepts from different ontologies within one framework
  - Identify what it took to make different ontologies re-usable for this application
  - Conceptual: Use / usefulness of SKOS, other tools to formalize “Concept”
- Use-case Driven Ontology Integration, or how:
  - Use case drives queries
  - Queries drive ontology requirements
  - Ontology requirements drive re-use
- How available data determines ontology use / re-use
- Understand the integration considerations:
  - Partitioning of the model concepts
  - Reconciling diverse views of a concept (e.g. event)
  - Linking available data to integrated ontologies

More Ambitious:

Prototype application: Risk Assessment

- ❑ Define a use case in the risk area
- ❑ Determine the queries needed to satisfy this

Scope out prototype risk application – this is the use case which drives the requirements for the ontology

The App:

What should I worry about today?