eCulture on the Semantic Web

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Acknowledgement

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Talk overview

- What is eCulture?
- What is the Semantic Web?
- How can eCulture benefit from the Semantic Web?

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What is eCulture?

- Online descriptions of physical artefacts
  - library catalogues
  - museum archives
- Web accessible descriptions of exhibitions in musea
- Online representations of physical artefacts
- Online representations *are* the artefacts

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THE SEMANTIC WEB

A new form of Web content
that is meaningful to computers
will unleash a revolution of new abilities

by
TIM BERNERS-LEE,
JAMES HENDLER and
ORA LASSILA

What is the Web?

A standard means of

- locating information (URI)
- describing documents (HTML, XML)
- transferring documents (HTTP)

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Semantic Web

A standard means of

- labelling connections (RDF) among objects (URI)
- categorising objects and their connections (RDF Schema)
- specifying constraints on the connections and the objects (OWL)

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Use cases for the Semantic Web

- Knowledge management
  - Search
- Personalisation and contextualization of information
- Web services
  - eCommerce
  - automated diary scheduling

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Semantic Web Ingredients

- ✓ Languages
- Vocabularies
- Annotations

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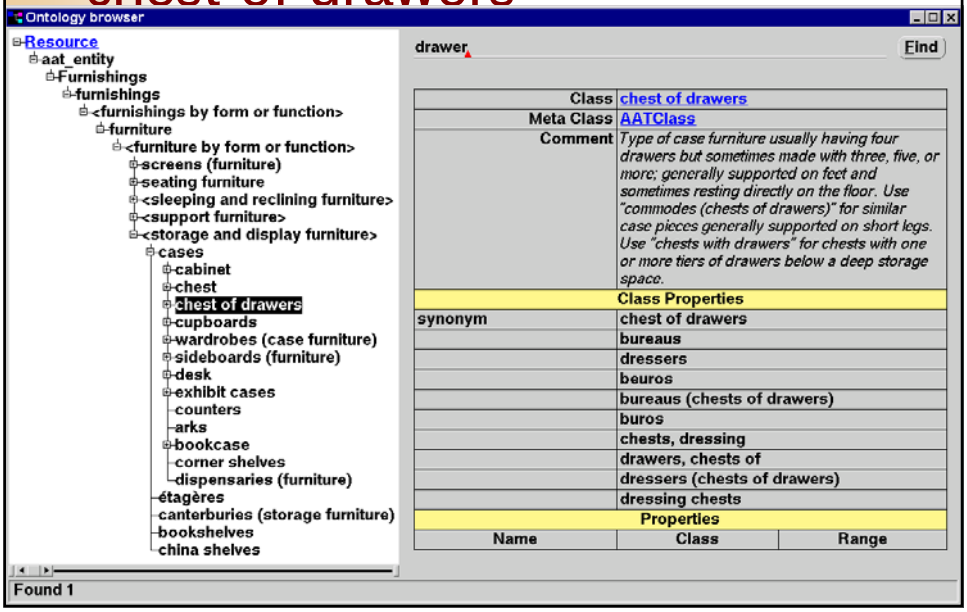
AAT description of chest of drawers



Resources for semantic annotation of art images

- WordNet general lexical database of nouns, verbs, adjectives and adverbs.
- Iconclass iconographic classification system for the content of visual resources.
- AAT hierarchically ordered thesaurus of terms relevant for the art domain.
- ULAN information about artists, including names and limited bibliographical information.

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Number of RDF statements ("triples")

WordNet 1.5 (limited to hyponym relations)	280K
Iconclass (partial)	15K
Art and Architecture Thesaurus	179K
ULAN	100K
Total	574K

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Semantic Web Ingredients

- ✓ Languages
- ✓ Vocabularies
- Annotations

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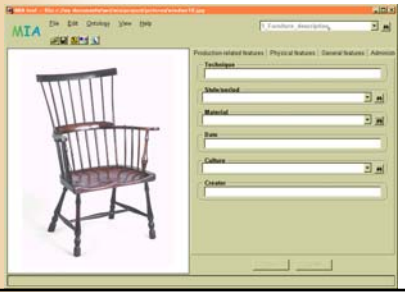
Experiment: manual annotation of Windsor chair images

- Subjects: 2 art historians, 2 lay persons
- 3+5 images per subject
- Time needed, remarks during session, resulting annotations



- Ontology structure relatively easy to understand for all subjects
- Art historians used considerably more time and added more detail
- Art historians used the ontology to learn specifics of Windsor chairs
- Art historians were used to manual indexing

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Automated techniques

- Natural language processing
  - Preprocessing of existing informal index texts to (partial) annotation
- Image analysis
  - Segmentation
  - Color determination
- Audio and video analysis
- “Semantic gap” remains

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Observation

- Semantic web applications typically use multiple semantic sources: thesauri, vocabularies, ontologies
- Semantic web languages solve the syntactic interoperability problem
- What remains is linking the semantics!

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Application scenario: Paintings

Knowledge corpora
AAT ULAN
ICONCLASS
WordNet

Annotation Template
VRA 3.0
Scene descriptors

RDF Schema

Annotation & search tool

RDF image annotations

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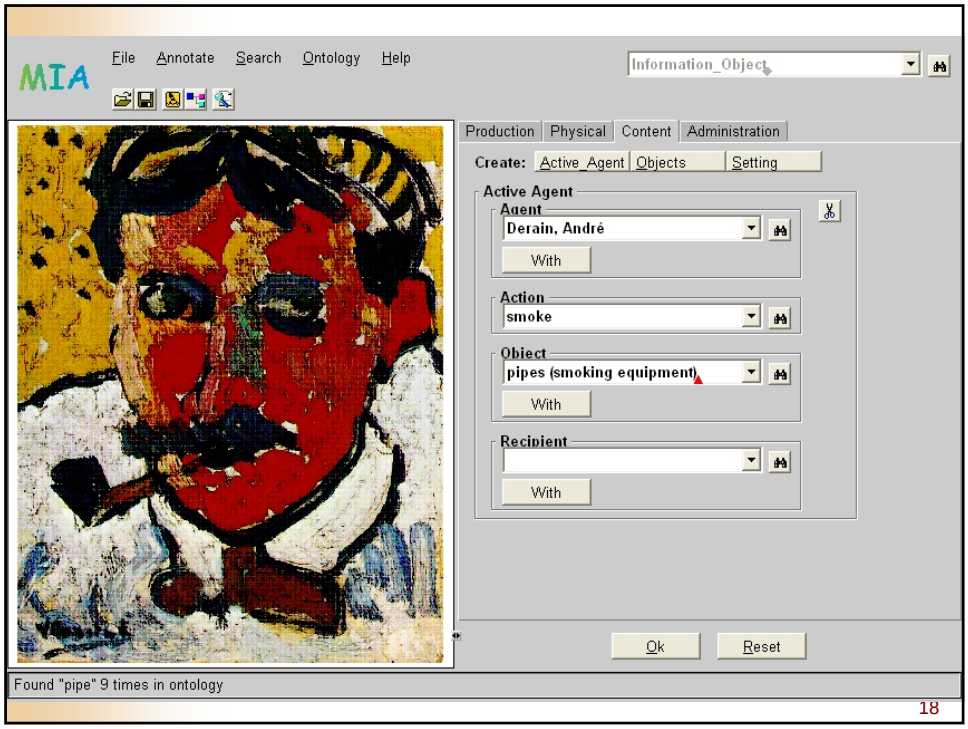

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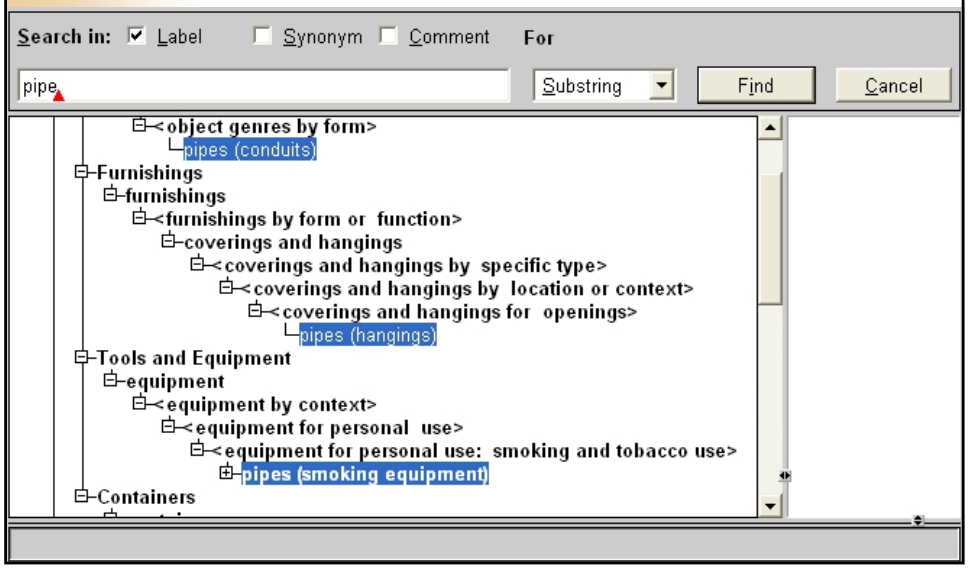
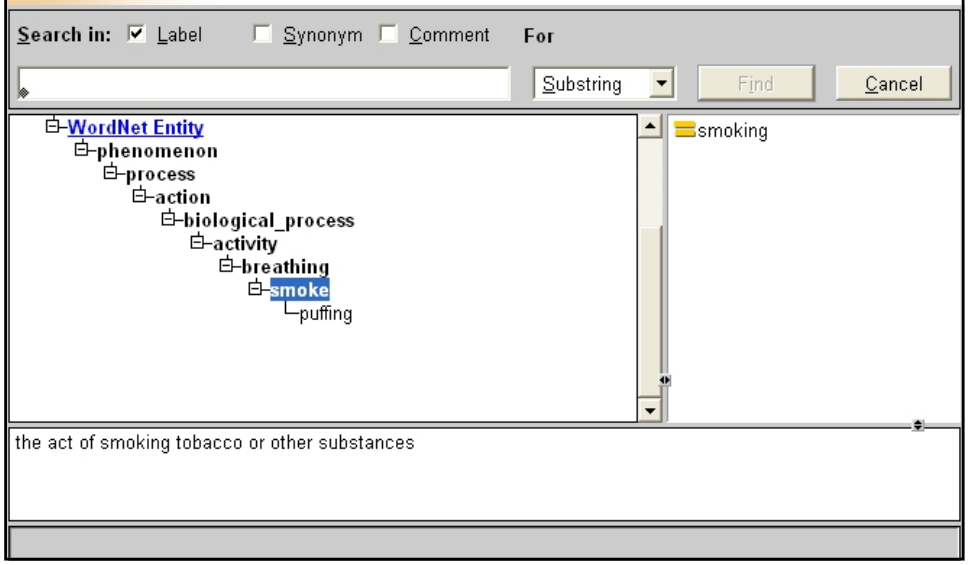
Term disambiguation



Implicit meaning of term



Using annotations for search

Personalised Presentation

- HTML presentation...

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- Online descriptions of physical artefacts
  - library catalogues
  - museum archives — Semantic Web
- Web accessible descriptions of exhibitions in musea — (Semantic) Web
- Online representations of physical artefacts — Web + Sem. Web
- Online representations *are* the artefacts — future work...

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Will the Semantic Web succeed?

- There is a growing need for semantic search of information
- A little semantics goes a long way
- Availability of large amounts of semantically annotated content is essential
  - but: there is a lot of content already out there
- First applications are likely to be in area of large virtual collections
  - e.g., cultural heritage, medicine

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Resources

- Semantic Web at W3C
  http://www.w3.org/2001/sw/
- Semantic Web best practices
  http://www.w3.org/2001/sw/BestPractices/
- http://www.semanticweb.org
- Semantic Web applications
  http://challenge.semanticweb.org
- Museum Finland
  http://www.cs.helsinki.fi/group/seco/museums/

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