A System of ontologies and services for Hypermedia authoring on the web

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An Hyperatlas allows to browse representations of concepts organized in classification tree.

In a museum hypeatlas the structure of the hyperlinks suggests to the user a logical organization of museum parts (s)he can browse.

Each scene describes and/or represents a single museum item and its position in the proposed museum logical organization.
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Media & XML metadata

Authoring services

Media assets index, KB, & process descriptors
THE MEDIA & METADATA REPOSITORY

A media and XML metadata repository, managed by the MILOS Multimedia CMS and accessed via the MILOSBridge WS.

To maintain MILOS indexing efficiency on XML data, metadata on media assets are encoded in the MPEG-7 format according to the DAVP profile and retrieved via XQUERYs.

**Denotation** (description) of media segments via MPEG-7 descriptors, **connotation** (semantic annotation) via **glossaries of controlled terms** inserted in MPEG-7 semantic descriptors and referencing RDF resources.
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A repository of RDF/OWL graphs containing platform-specific **ontological descriptions** of media assets, of **semantic contents**, of genre-dependent contents representation roles and relations, of the authoring process and, finally a thesaurus of mappings among classes and properties of known ontologies named *ontopedia*.

RDF files are directly accessed on the web by services via Jena SPARQL processors.
## Hyperatlas modelling

<table>
<thead>
<tr>
<th></th>
<th><strong>Meta</strong> (concepts) role/relation</th>
<th><strong>Macro</strong> (multimedia) role/relation</th>
<th><strong>Micro</strong> (media asset) role/relation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SemanticNet &amp; Thesaurus</strong></td>
<td>Domain/Topic/Subject/Object broader/narrower</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Composition Graph</strong></td>
<td>Summary/Information summarize</td>
<td></td>
<td>Label, Description Represent/Icon/Index sibling, anchor</td>
</tr>
<tr>
<td><strong>Presentation Graph</strong></td>
<td>not modeled plays-with, exclusive, activates</td>
<td></td>
<td>MPEG4/XMT syntax</td>
</tr>
</tbody>
</table>
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HyperAtlas:
Automatic synthesis of an hypermedia representing a taxonomy of concepts.

Semantic Image Gallery:
Tool for semantic image annotation in MPEG-7, and retrieval by visual similarity or by terms.
Virtual image organizer by contents: Images labeled with terms contained in a thesaurus are shown as organized in folders hierarchically organized as the thesaurus itself.
Thank you for your kind attention!
FAQs

**MPEG-7/XSD vs COMM/RDF**
- Profiled MPEG-7 media descriptions are indexable and compatible with existing efficient XML MDB tools and MPEG-7 metadata repositories
- We use an OWL index of descriptions of media assets structure & represented contents
- moving to COMM & logical patterns for modeling n-ary relations (events/situations)

**Scalability with respect to representation genres**
- Scalability is provided at system level by the multilayer architecture and ontological based descriptions
- Services are pluggable with procedural and inference rule modules
- Structure modelling and generation tested at present just for taxonomic based presentations
The Discourse Planner & Terms Composer WS

The SemNet WS and the Snith WS implement the construct message canonical process. In the abstract or conceptual step, the SemNet WS interactively aids the user in the selection of the concepts (categories) to be included in the desired hyper-atlas, and to structure them in a semantic net.

In the terminological step, the Snith service builds a thesaurus of controlled terms (and synonyms) related to the concepts inserted in the user-defined semantic net. It queries known KBs and infers implicit relations from results of SPARQL queries.
The Media Selector WS

The Selit service implements the query canonical process. It produces an index of relevant media assets annotated with terms included in the input thesaurus.
The lthen service implements the organize canonical process. According to genre-dependent rules it selects the media assets best suited to play a role in the discourse structure and builds a role Representation Graph.
The HyperJessSyn service finally implements the publish canonical process. It synthesize the final hypermedia presentation by translating, via XSL transformations, representation roles into synchronization primitives of the publishing format. XSLT templates are used also to adapt the presentation layout.