

Knowledge lenses

OLAP, or online analytical processing, uses techniques like aggregating dimensions to analyse large quantities of multidimensional data.

For example in one of the X-Media use cases data collected for individual engines is aggregated according to the engine class and specific faults. Ontology-based metadata lends itself naturally to this kind of treatment and OLAP methods have been developed for XML data which could be used to produce summary views.

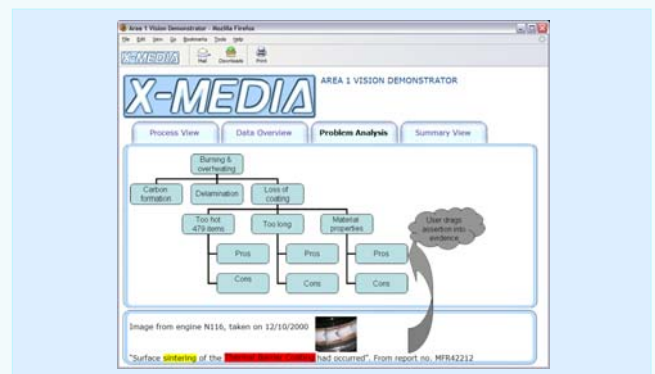
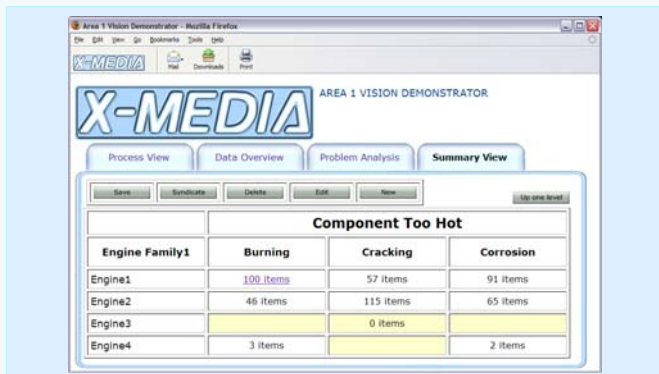
References

Wang, H., Li, J., He, Z. & Gao, H. (2005) "OLAP for XML Data", CIT05, 2336237, 2005.

Niemi, Y., Niinimäki, M., Nummenmaa, J. & Thanisch, P. (2003) "Applying Grid Technologies to XML Based OLAP Cube Construction", DMDW, 2003

Corporate knowledge is often dispersed in heterogeneous filestores, captured in different media and augmented with external knowledge sourced over the internet. In the X-Media project we propose **knowledge lenses** as a way to enable users to understand large collections of knowledge with many parameters by providing different presentations and classifications.

We use semantic web technologies, e.g. RDF and web services to support knowledge management across media because they are appropriate for dispersed, heterogeneous scenarios, and ontology-based metadata offers richer options for searching and presenting knowledge than traditional metadata.



The **Big Organizer for X-Media (The BOX)** is a collection of semantic metadata and links to information sources created or harvested by user or teams.

The BOX is persistent and its content can be viewed using different knowledge lenses: a Knowledge Lens enables the exploration and understanding of the collection from a specific point of view.

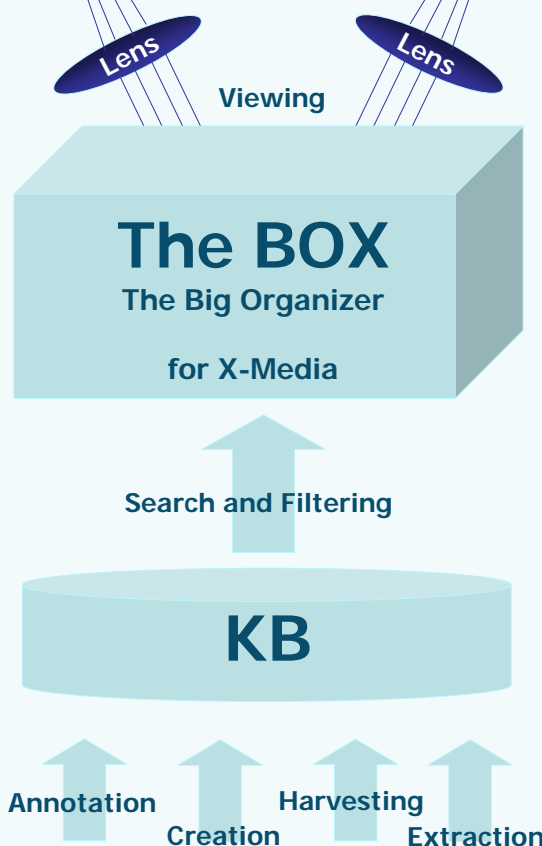
Viewing parameters are adjusted for different users, tasks or purposes. For example, a summary to communicate outside the team is created with a lens; a detailed view for discussion within the team is provided by another.

An organization's intranet contains a range of resources on different media. The **Knowledge Base** collects ontology-based metadata, in semantic web compatible formats, which describes those distributed resources.

Automating the annotation process is essential to generate metadata for legacy materials. Semi-automatic techniques can facilitate the annotation of new resources at creation time.

X-Media takes advantage of partners' expertise in extracting metadata from text, image and data sources and will develop new methods to exploit cross media evidence, i.e. to extract metadata across different media formats.

Metadata about the same real world object will be fused using evidence about provenance and certainty of the extracted data to further improve the quality of the knowledge base.



Concept mapping is a brainstorming and sensemaking technique. It allows users to construct a shared vision of a problem around a map of its main concepts and their interrelationships.

Parts of a concept map can be supplied by an ontology; in this example the upper levels are a taxonomy of possible causes of component failure. Some tools, like Compendium, can model evidence for and against a point; in this case the lower levels are nodes which link to evidence for or against each potential cause. This approach can be used to provide a view over items held in the BOX.

References

Novak, J.D. & Gowin, D.B. (1996) Learning How To Learn, CUP

Kirschner, P.A., Buckingham Shum, S.J. & Carr, C.S. (2003) Visualizing Argumentation, Springer

Aurisicchio, M., Bracewell, R.H., Wallace, K.M. (2006) Evaluation of DRed a way of capturing and structuring engineering design processes NordDesign 2006.

<http://kmi.open.ac.uk/projects/compendium/>

Semantic search techniques can be adopted to search the ontology-based metadata.

This allows:

- * exploring the available resources and their relations
 - * filtering the content accordingly to the users needs.
- Query results are more precise (as they are driven by metadata), avoiding information overload.

The X-Media semantic search will provide means to query the Knowledge Base across media and to browse the returned results using different knowledge lenses.



Authors: Victoria Uren¹, Aba-Sah Dadzie², Thomas Franz³, Vita Lanfranchi², Daniela Petrelli²

¹The Open University, Milton Keynes, MK7 6AA, UK

²University of Sheffield, Regent Court, 211

Portobello Street, S1 4DP, Sheffield, UK

³University of Koblenz-Landau, 56070 Koblenz,

Germany