Viewpoint Management for Multi-Perspective issues of Ontologies

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Background and our research goal

Background

■***Ontology:*** It is important that the ontology captures **the essential conceptual structure** of the target world as generally as possible.

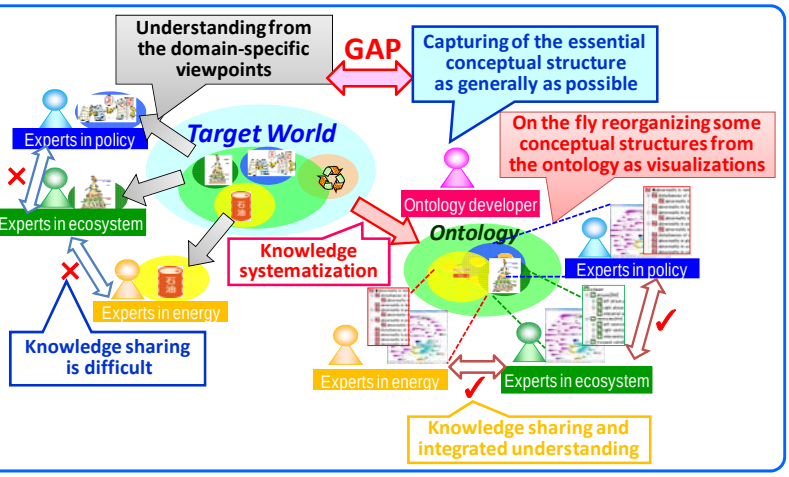
■***Domain experts*** often want to understand the target world from the **domain-specific viewpoints** in which they are interested. In many cases their interests are different, even if they are experts in the same domain.

⇨ ***Multi-Perspective issues of Ontologies***

Research goal

■***Development of semantic technologies to deal with multi-perspective issues of ontologies based on ontological viewpoint management.***

The main strategy: (1) the conceptual structure of an ontology is fixed based on ontological theories and (2) **on the fly reorganizing some conceptual structures from the ontology as visualizations** to cope with various viewpoints.

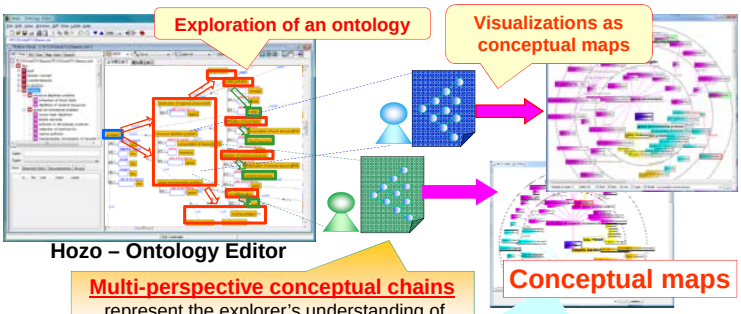


Divergent exploration of an ontology

1) Exploration of ontology depending on viewpoints

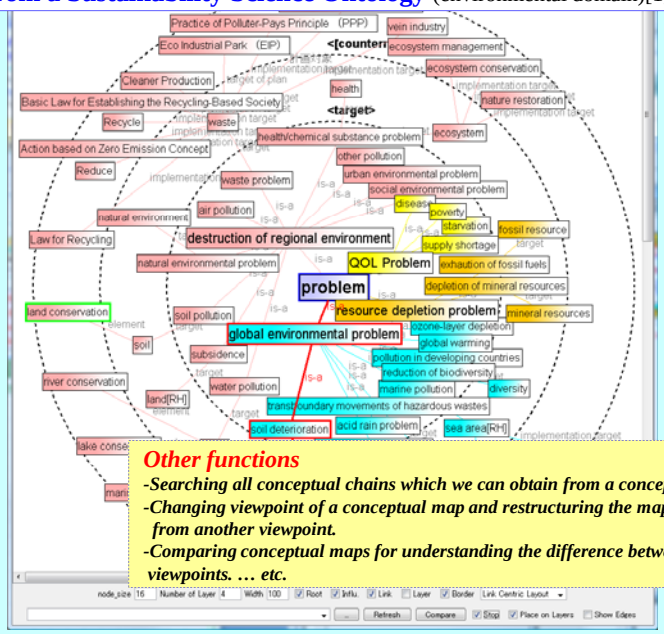
The users choose arbitrary concepts according to the their intention to obtain what we call **"multi-perspective conceptual chains".**

2) Visualizations of conceptual chains as a conceptual map



Multi-perspective conceptual chains
represent the explorer's understanding of ontology from the specific viewpoint.

An Example of Conceptual Map Generation from a Sustainability Science Ontology (environmental domain)[1]



Other functions

-Searching all conceptual chains which we can obtain from a concept.

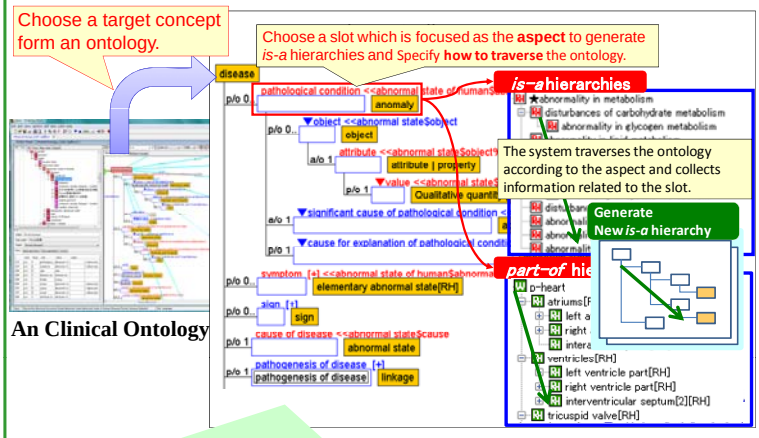
-Changing viewpoint of a conceptual map and restructuring the map from another viewpoint.

-Comparing conceptual maps for understanding the difference between viewpoints. … etc.

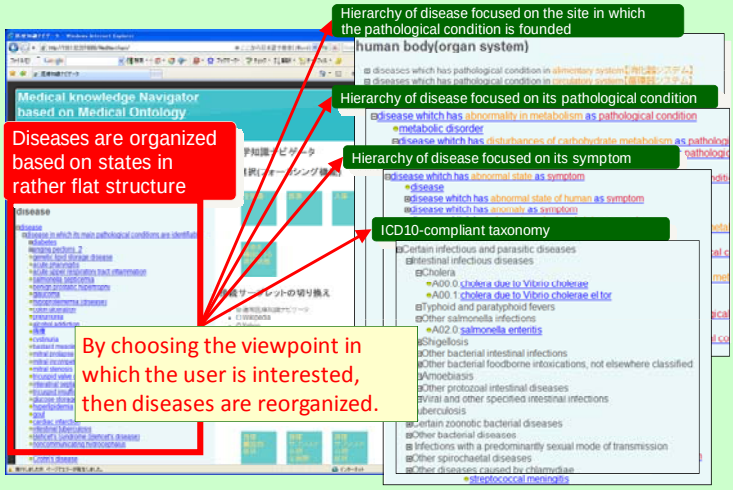
[1] Kumazawa, T. et al.:Toward Knowledge Structuring of Sustainability Science Based on Ontology Engineering, Sustainability Science, 4(1):99-116 (2009).

On-Demand *is-a* Hierarchy Generation

1) The user **chooses a slot which is focused as the aspects** to generate *is-a* hierarchies and specifies how to traverse the ontology.
2) The system traverses the ontology according to the aspect and collects information related to the slot.
3) A new *is-a* hierarchy is then generated using this information.



An Example of On-Demand is-a Hierarchy Generation from an Clinical Medical Ontology[2]



[2] Mizoguchi, R. et al.: An Advanced Clinical Ontology, Proc. of International Conference on Biomedical Ontology,:119-122, Buffalo, NY, July 24-26 (2009).

Acknowledgment

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Conclusion

■We developed two semantic technologies to deal with multi- perspective issues of ontologies based on ontological viewpoint management. Both of them take a same strategy that on the fly reorganizing some conceptual structures from a fixed ontology as visualizations.

■Their prototypes are received favorable comments from domain experts in environmental and medical domains.

■The demonstration movies are available at **http://www.hozo.jp/demo/** .