

Building Virtual Documents by Integrating Hyperbooks

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Outline

Building / augmenting ontology-based Digital Libraries

Context of Digital Libraries: Documents and KOS

Building Hyperbooks and Virtual Documents

Building Digital Libraries

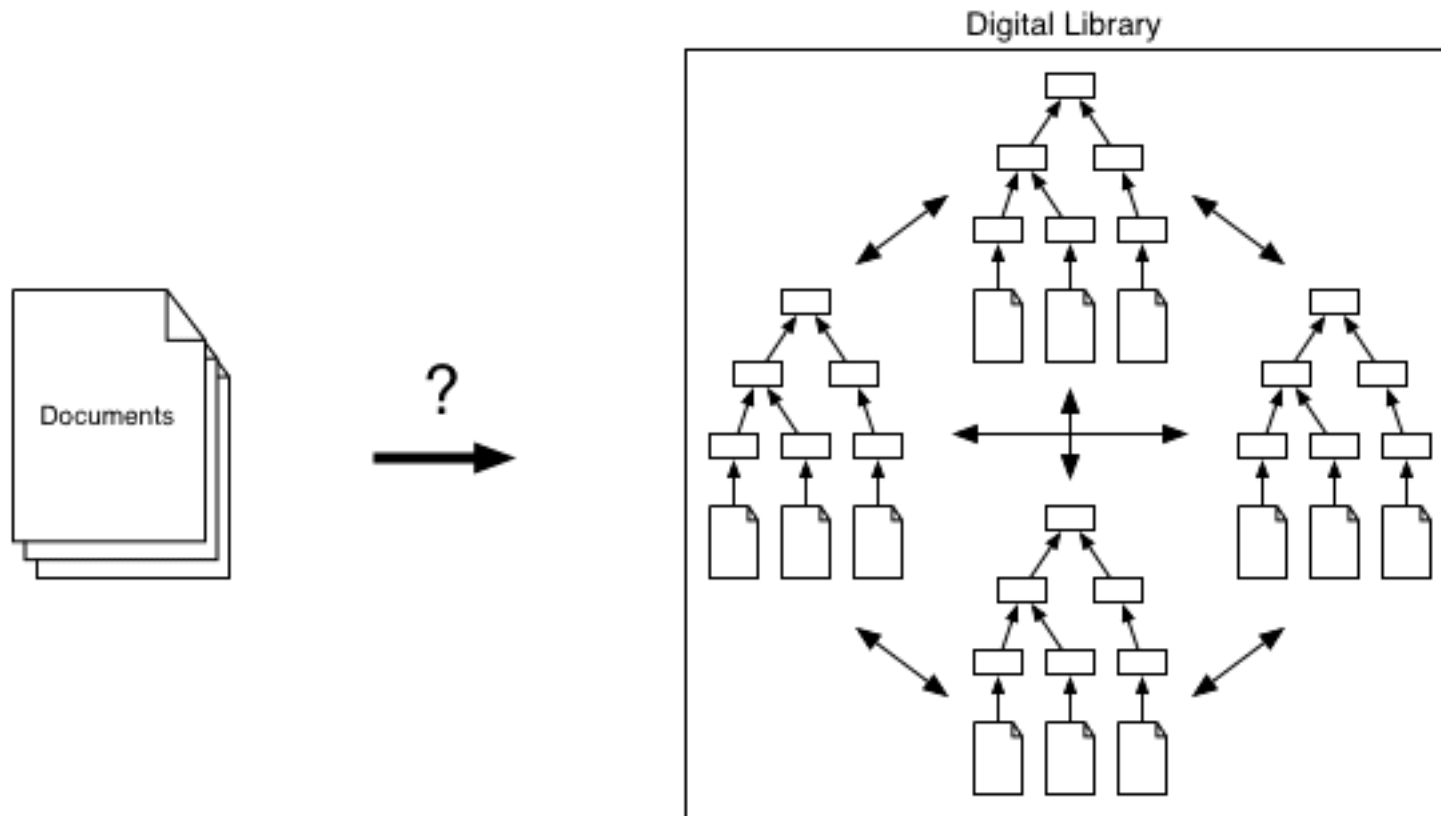
Building Digital Libraries through Ontology Alignment

Virtual Document of a Hyperbook Including Similar Concepts of a Second Hyperbook

Conclusion

Building / augmenting ontology-based Digital Libraries

How to integrate documents into an Digital Library?



=> By considering their glossaries, indexes, ontologies, ...

Context of Digital Libraries: Documents and KOS

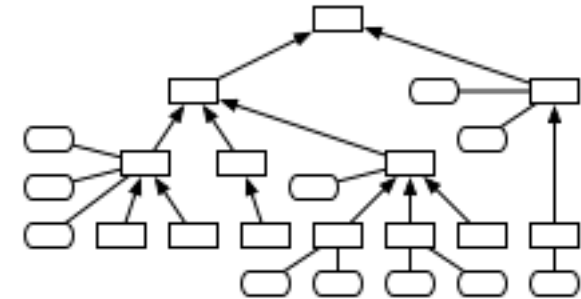


**Electronic versions
of documents**
Book chapters
Journal articles
Web pages

- + availability
- no or weak semantic structure



**Weakly structured
KOS**
Glossaries
Directories
Indexes, Folksonomy
Metadata annotated
models (Learning Objects)

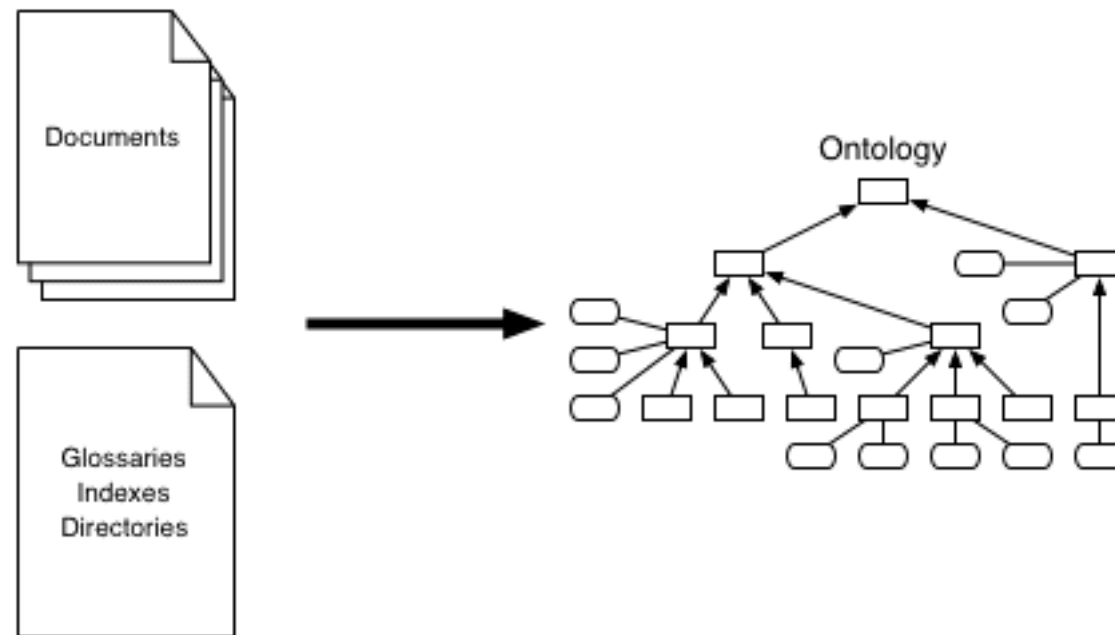


**Highly structured
KOS**
Ontologies
Thesauri
Concept maps
Taxonomies

- + strong semantic
structure
- not available
- **difficult to construct**

Context of Digital Libraries: Documents and KOS

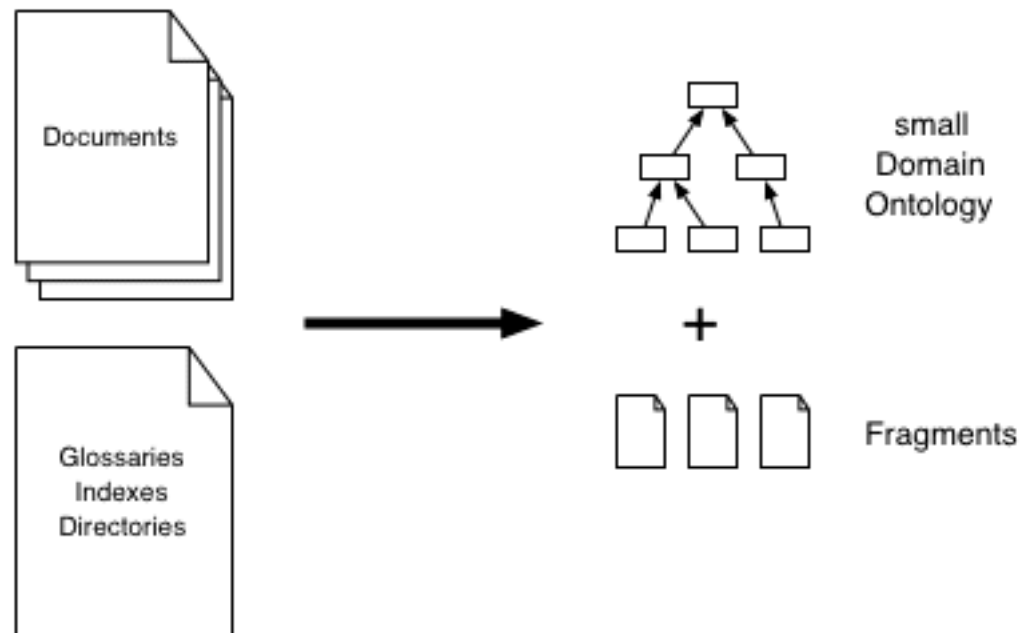
=> Transferring documents and weakly structured KOS into highly structured KOS



=> By considering only ontologies, it is necessary to create full-fledged ontologies

Context of Digital Libraries: Documents and KOS

=> Considering highly structured KOS and fragments

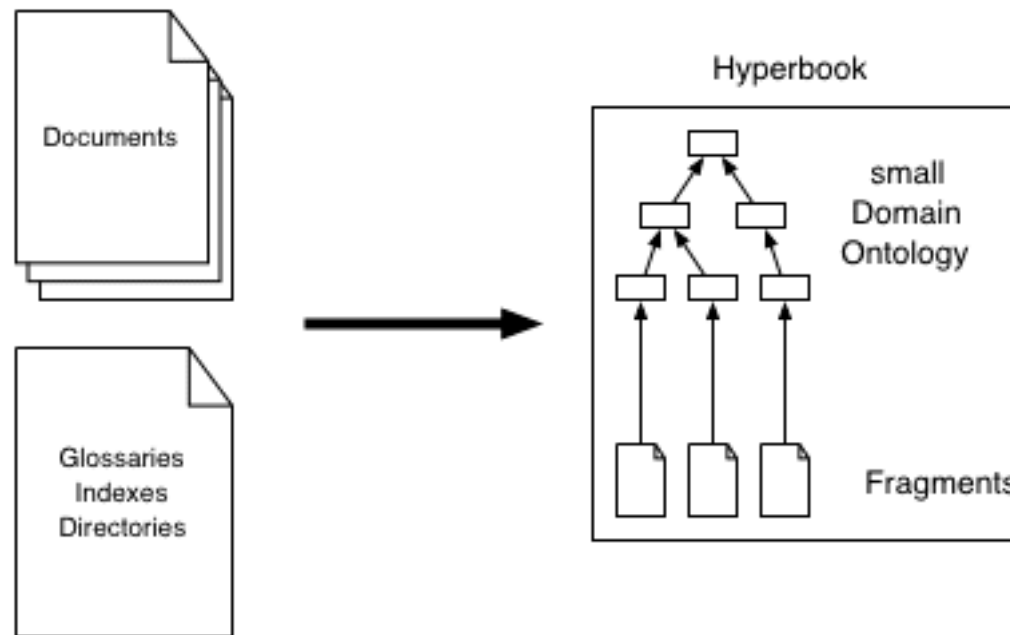


=> By considering ontologies and fragments, it is **no longer** necessary to create full-fledged ontologies

=> There is no distance between the content represented in the ontology and the content of the documents

Context of Digital Libraries: Documents and KOS

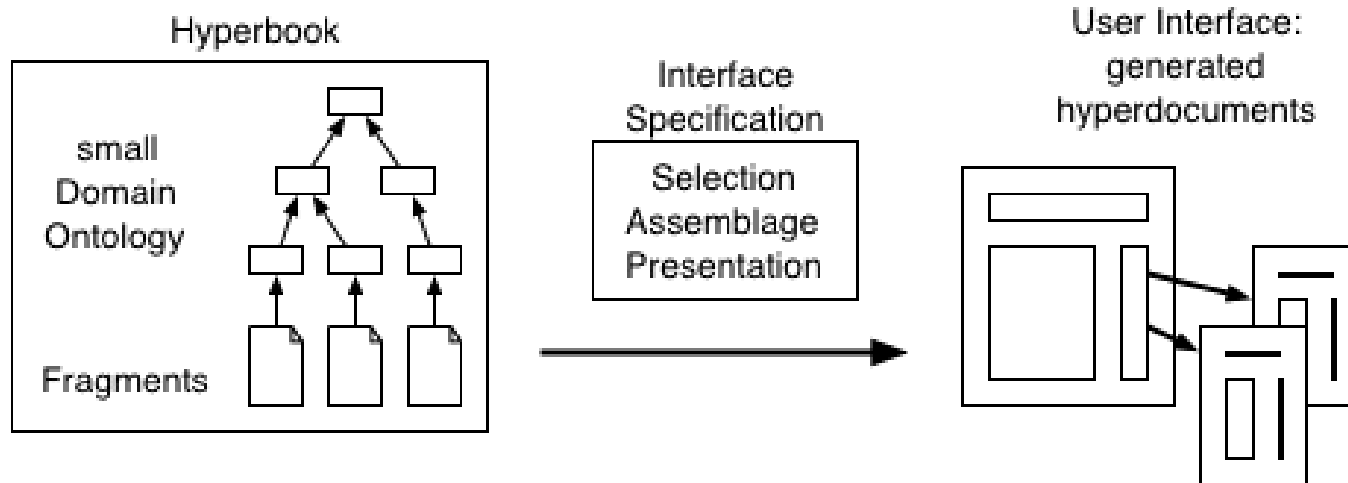
=> Considering highly structured KOS and fragments



=> Hyperbook

Building Hyperbooks and Virtual Documents

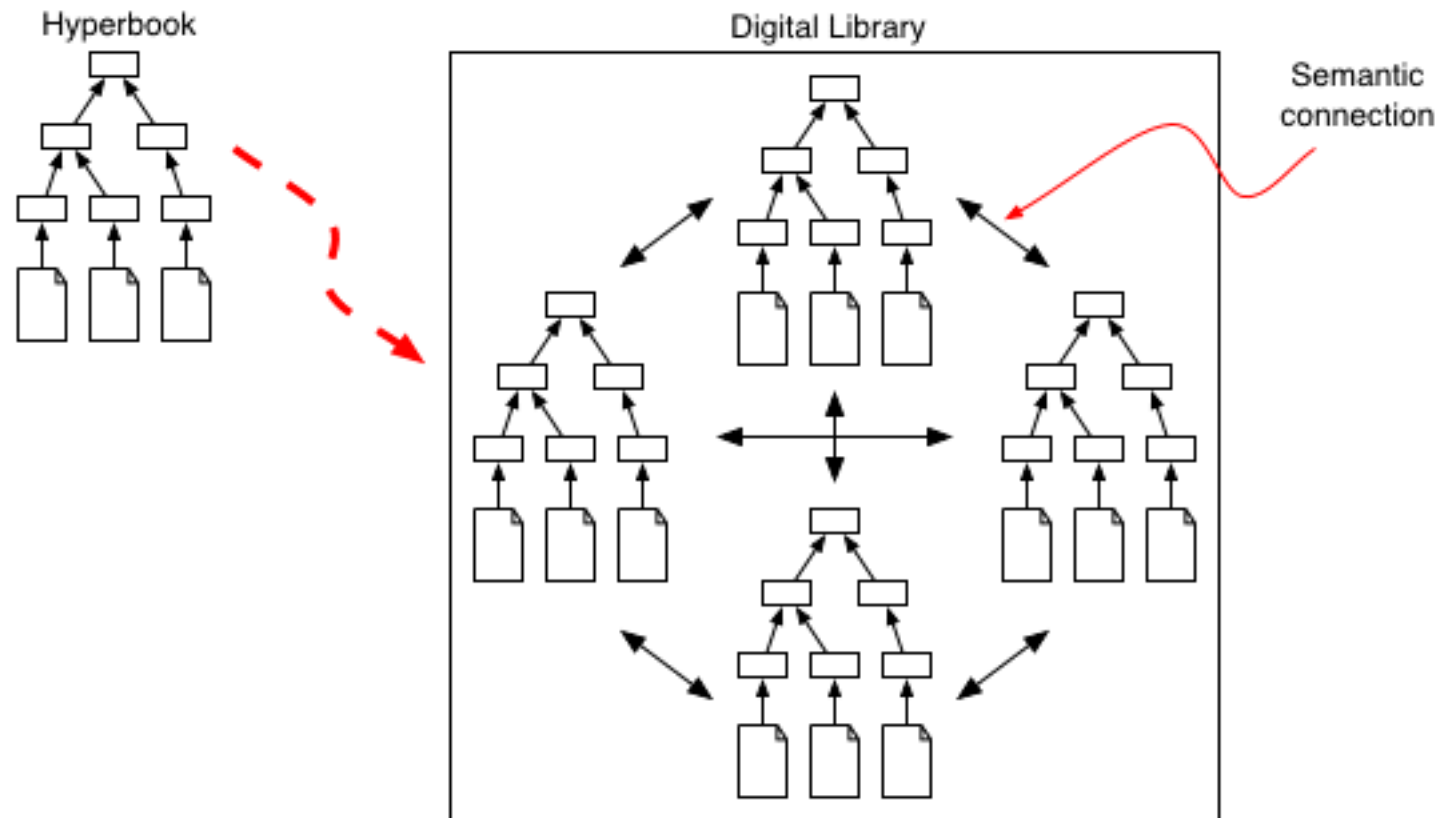
- Fragments are linked to concepts (optionally typed)
- Generating virtual documents out of the hyperbook structure through an interface specification



[Crampes], [Garlatti], [DeBra], [Brusilowsky], [Falquet]

Building Digital Libraries

= Building a Digital Library of Hyperbooks



Building Digital Libraries

= Building a Digital Library of Hyperbooks

Hyperbooks

- Break the monolithic aspect of the documents
- New access methods / reading possibilities
- Synthesize books

Digital Library of Hyperbooks

- Compare books
- Extend a book with the contents of others

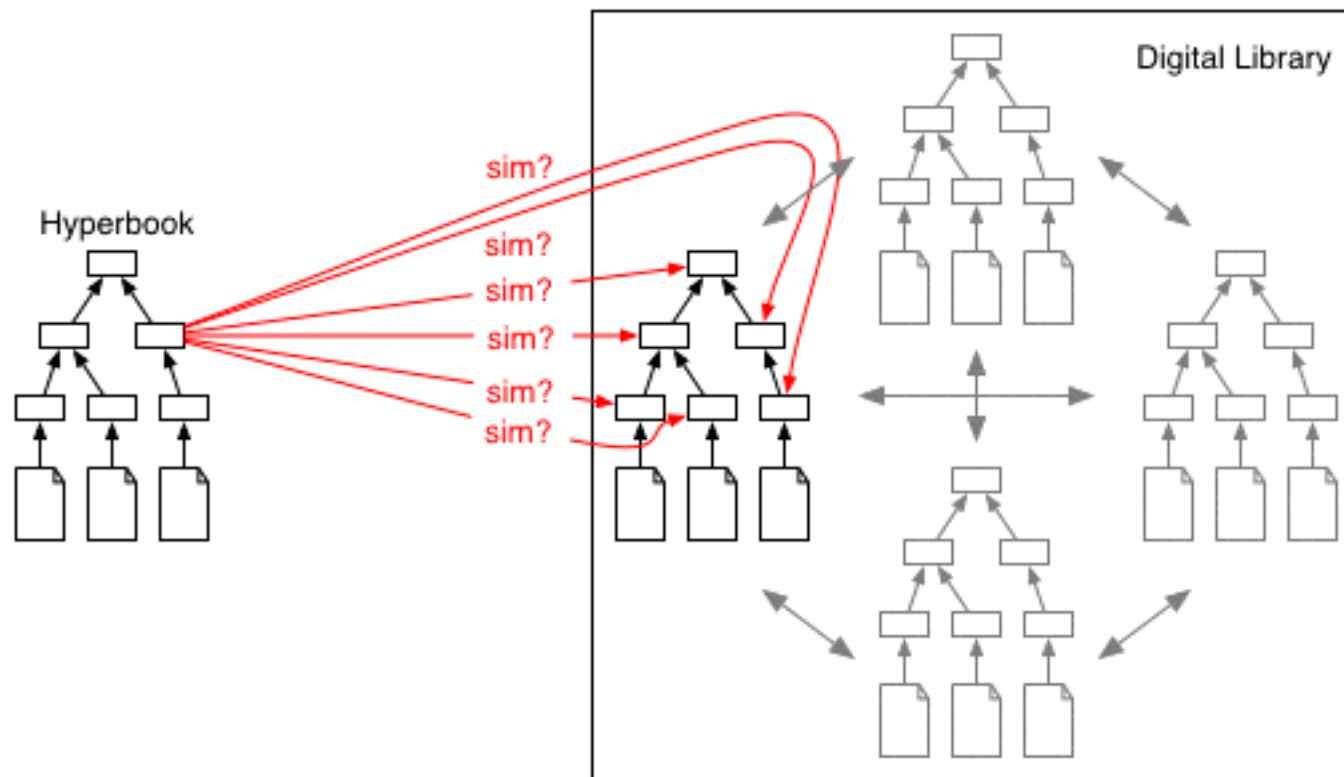
Virtual document

- Global reading interfaces
- Re-use the interface specification of one hyperbook for

Building Digital Libraries through Ontology Alignment

=> Integrating the ontologies of the hyperbooks

Compute **similarity** between concepts of the hyperbook ontology to integrate and concepts of the hyperbook ontologies already in the Digital Library



Building Digital Libraries through Ontology Alignment

Alignment method

- > Problem: Most ontology alignment methods need **well-structured ontologies**. But hyperbook writers are not knowledge engineers.

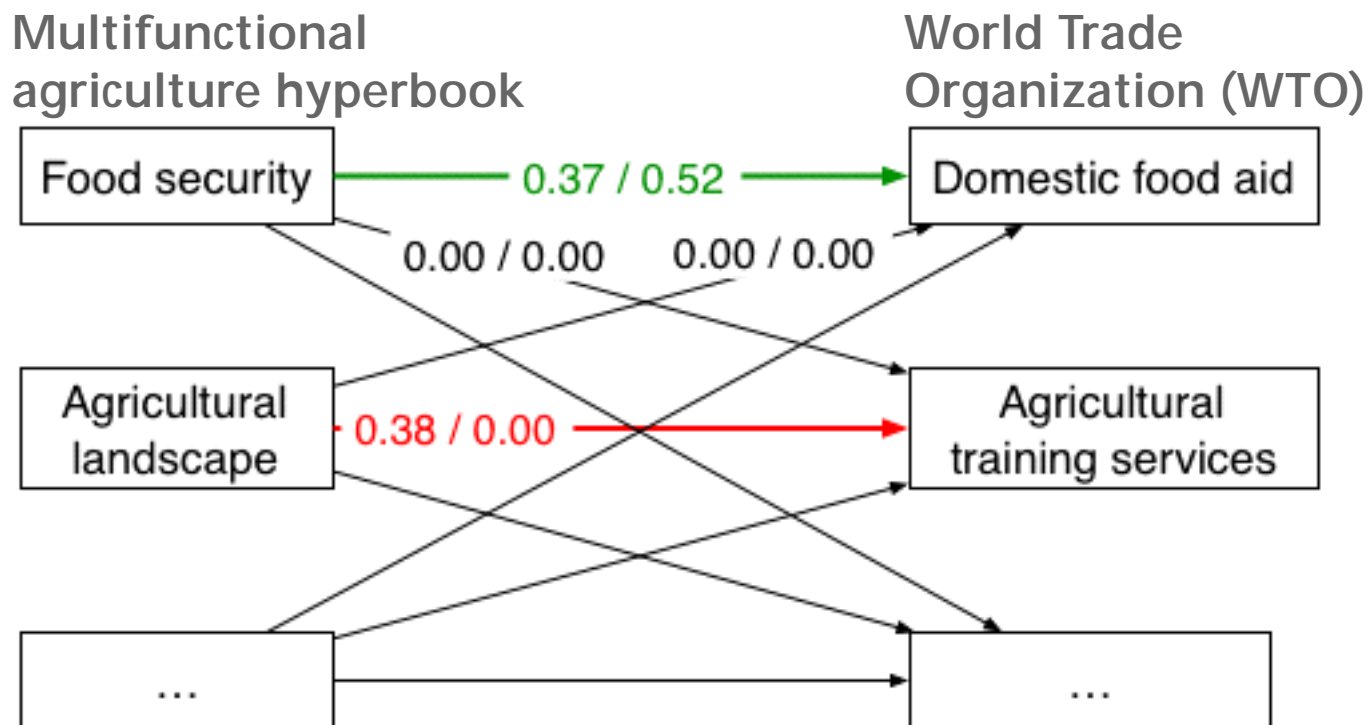
[C. Marshall, F. Shipman. *Which semantic web?*]
«The difficulty of knowledge acquisition, representation and reasoning has a long history of being underestimated ...»

- => Alignment method that works with less formalized (incomplete) ontologies, adapted from [Rodríguez&Egenhofer03] by **involving fragments**

Building Digital Libraries through Ontology Alignment

Alignment method

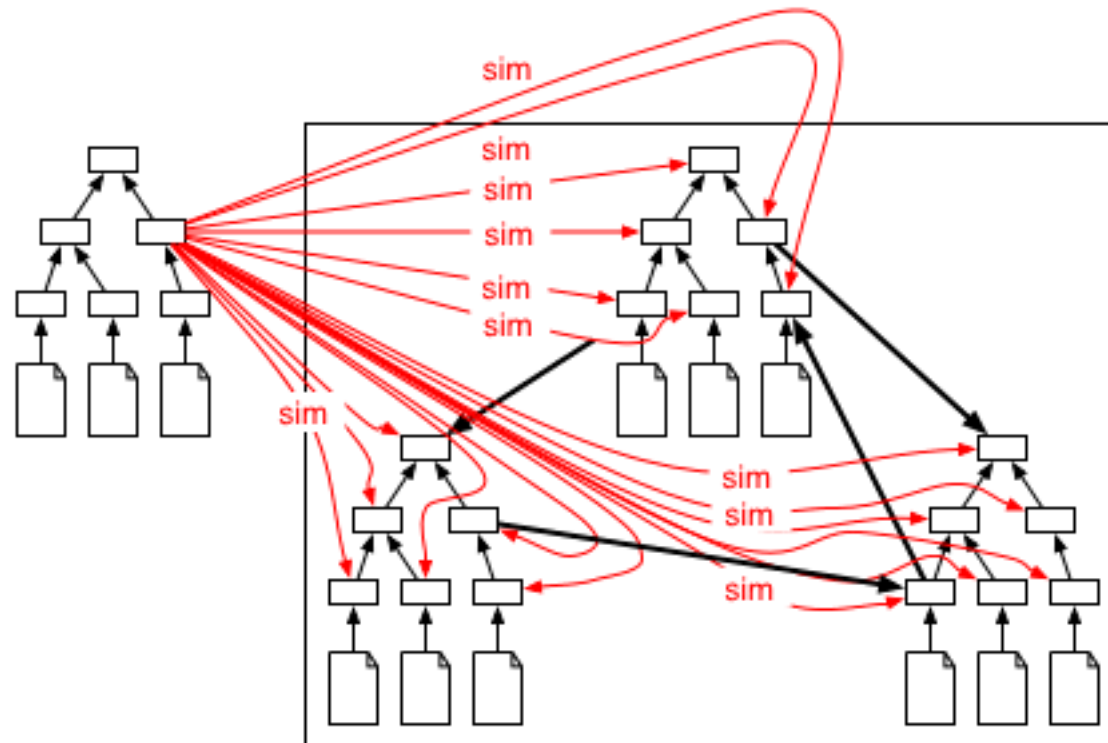
- Word Matching (terms of the concepts, often 0.00)
- Fragment Matching (terms of the fragments, often > 0)
- ~~Feature Matching (terms of the concept's features)~~



Building Digital Libraries through Ontology Alignment

Digital Library as network of hyperbooks

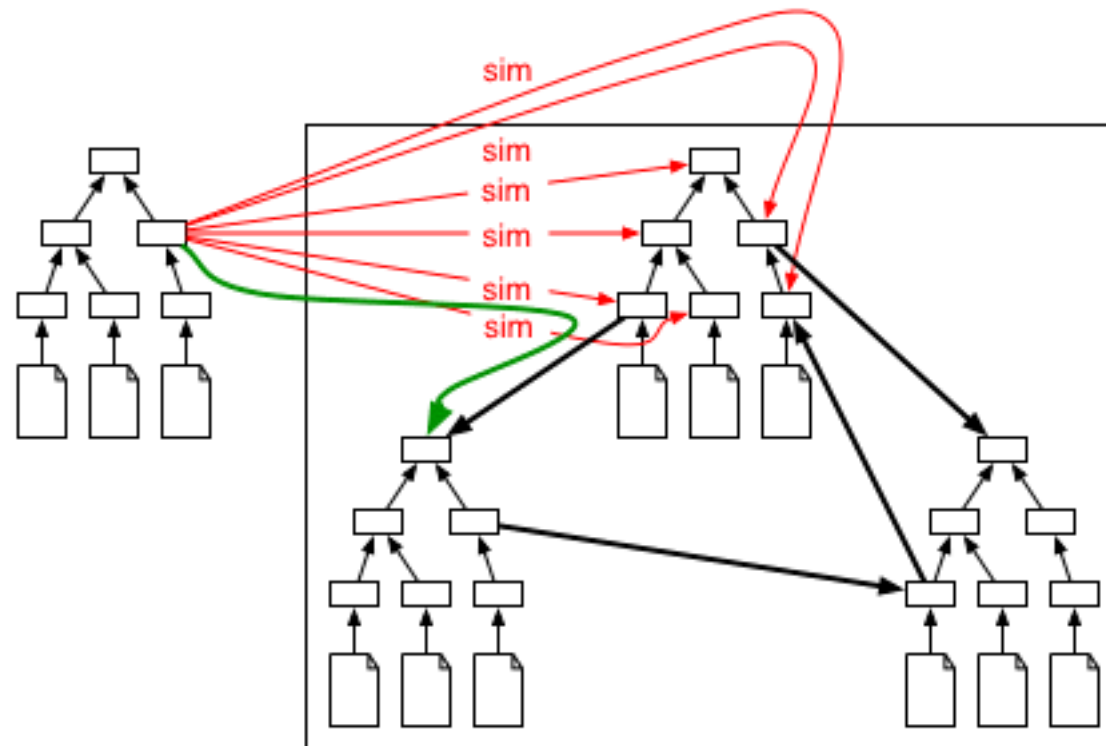
All hyperbooks of the Digital Library serve as target hyperbooks of the integration process that means to compute many similarity values



Building Digital Libraries through Ontology Alignment

Digital Library with a reference hyperbook and link inference

A reference hyperbook of the Digital Library could serve as the single target hyperbook of the integration process



Building Digital Libraries through Ontology Alignment

Digital Library with a reference hyperbook and link inference

Ontology alignment through a reference hyperbook if **subjects of hyperbooks are close** to each other

-> To avoid creating too many similarity links

=> Infer links to other hyperbooks

Virtual Document of a Hyperbook Including Similar Concepts of a Second Hyperbook

Node: hb5.linkedfragments[1871,1884]

http://cuisun1.unige.ch:8080/lazy/ns?eip=ZY

Multifunctional Agriculture [concepts] [fragments]

Ensuring Food Security

All countries have to ensure food security for their people, through domestic production, stockholding and imports. Several background elements contribute to such a conclusion. First, market mechanisms alone may not be sufficient to ensure food security. Food security therefore has the characteristics of a public good the provision of which may require government intervention. Second, the WTO agricultural reform process must be consistent with other relevant multilateral commitments such as those relating to the right to food. Article 11 of the International Covenant on Economic, Social and Cultural Rights recognises the fundamental right of everyone to be free from hunger, emphasises the responsibility of the state in this respect and underlines the necessity of taking into account the problems of both food-importing and food-exporting countries, to ensure an equitable distribution of world food supplies in relation to need. Third, we need to recognise that agriculture is a complex and longterm activity, which only slowly responds to changes in demand. This has important implications for our national food security strategies. One, since agriculture is a biological production characterised by seasonality and constrained by climatic conditions and the limits that exist for

Terminé

Related concepts: food security

Similar concepts in other hyperbooks

- Public stockholding programmes for food security purposes (in WTO)
- [Public stockholding definition](#)
- [Stockholding programmes in Europe](#)
- [An assessment of public stockholding policies](#)
- Domestic food aid (in WTO) [view fragments]

Virtual Document of a Hyperbook Including Similar Concepts of a Second Hyperbook

Node: hb5.linkedfragments[1871,1884]
http://civitan1.unige.ch:8080/lazy/rs?ip=29

Multifunctional Agriculture [concepts] [fragments]

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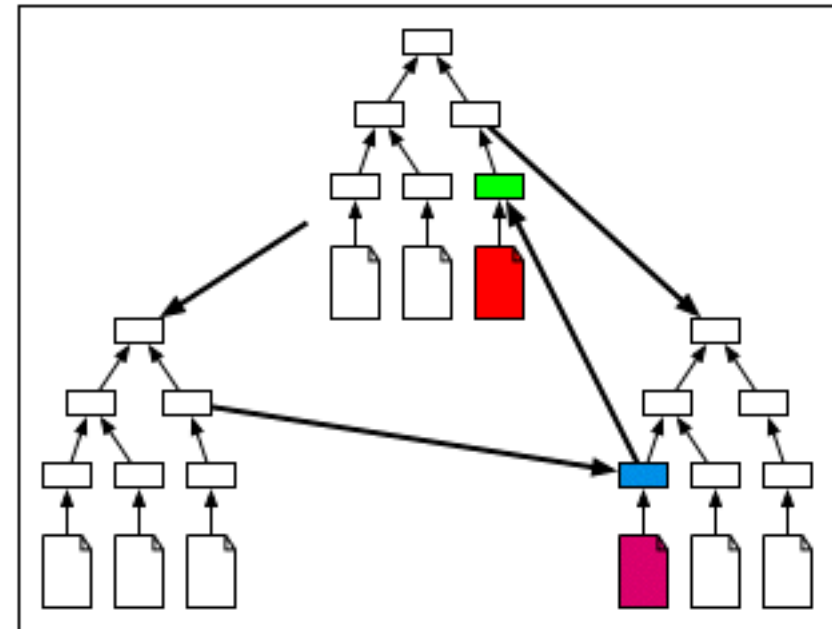
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Similar concepts in other hyperbooks

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An assessment of public stockholding policies

Domestic food aid (in WTO) (view fragments)



Conclusion

KOS to build Digital Libraries

- strong semantic structure
- but not necessarily complete (well formed)

=> Hyperbook: small domain ontology and fragments

=> Building Digital Libraries by aligning hyperbook ontologies

=> Virtual Document to generate global reading interfaces

Further experiments (blended learning, October 2005):

integrate / augment hyperbooks written by students

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Thank you!

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