SIREN –
a Concept for Semantic Information Retrieval Environment for Digital Libraries

Hendrik Thomas
Bernd Markscheffel
Torsten Brix

Technische Universität Ilmenau
PO Box 10 05 65
98684 Ilmenau GERMANY
+49 3677 69-4040

Digital Mechanism and Gear Library (DMG-Lib)

Object: collection, preservation, integration and presentation of knowledge on mechanisms and gears in theory and practice

Project:
- interdisciplinary project of engineers, computer scientists, media experts and librarians
- **different user groups**
  (engineers, teachers, students, librarians, historians, etc.)
- **high amount of heterogeneous digital resources**
  (books, videos, animations, pictures, gear models, etc.)

Requires: efficient information retrieval

Portal: www.dmg-lib.org

Support of the
Information Retrieval Process

Assumption: **rich semantic information** can enhance the information retrieval process

Questions:
1.) How to represent the semantic information? ➡ **Topic Maps!**
2.) How to model the semantic information (Who, Tools)?
3.) How to use the semantic information?

1st step: Subject Analysis

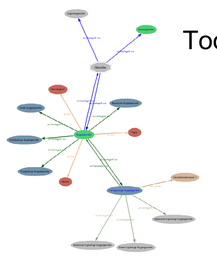
➡ **Problem:** analysis and structuring of the heterogeneous resources = indexing

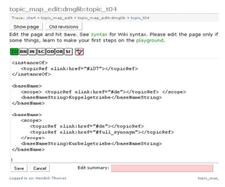
Solution: **a.) extract and model the domain knowledge of mechanisms and gears**

How: semantic meta-layer = Topic Map

Who: gear and modelling experts

Tools: web based, collaborative modelling environment
➡ **Prototype:**
TMwiki **– Topic Map Wiki Editor**





b.) assigning of relevant information resources to topics = occurrences

How: complex and time-consuming process ➡

Indexing on 3 levels

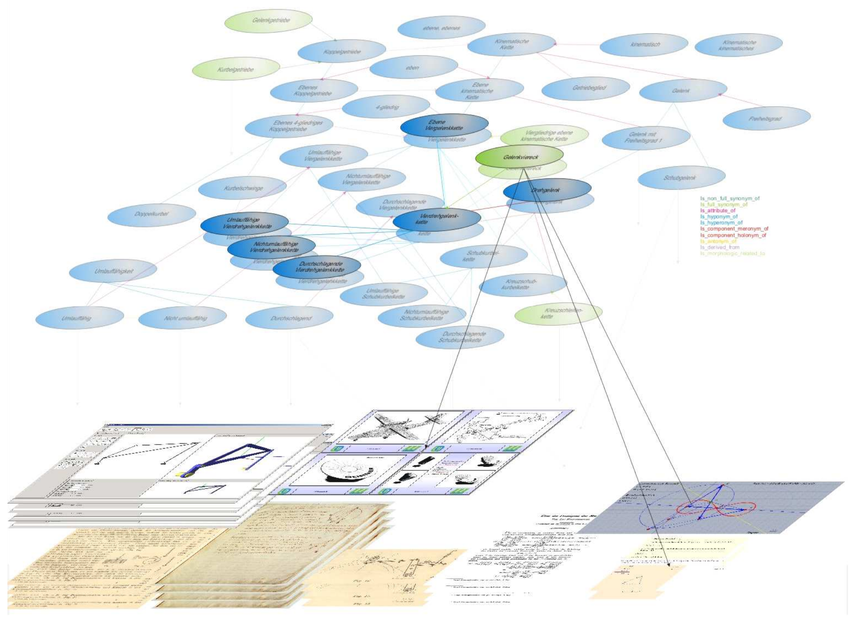
1. **level: statistical analysis of text resources**
   (fast, comprehensive, but quality?)
2. **level: expert analysis**
   (high quality, but not detailed enough: book A relevant for Topic X)
3. **level: collaborative tagging = social bookmarking**
   (flexibel, detailed, expandable: picture A, animation B relevant for Topic X,Y)

2nd Step: Specification of Information Needs

Problem: difficult if the information need is diffuse = **question of discovery**
➡ user needs an overview of knowledge domain and the resources

Solution: **1.) browsing the knowledge domain**
How: user-friendly, graphical, interactive navigation in the Topic Map
Tools: **Prototype: *TMV* – generic Topic Map Browser**

2.) definition of the information need
How: - simple input box
- complex search queries
- selection of topics (1 - N)



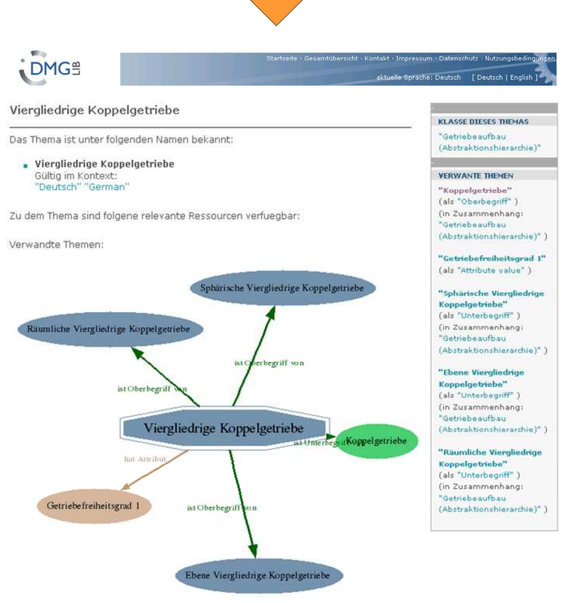
3rd Step: Search Process

Problem: identification of relevant information resources to satisfy the information need

Solution: **1.) search in the library data base**
How: search in the semantic meta-layer ➡ occurrences
➡ **set of rules:** how to use the semantic information of the meta-layer
(names, classes, scopes, associations)

2.) enrichment of the digital content
How: search in external sources (Internet, data bases)
➡ use semantic information to identify actual or unknown information

Tool: **Prototype: *MERLINO* – semi-automated generation of occurrences**



4th Step: Visualisation of the Search Results

Problem: identified relevant ressources must be displayed in the semantic context
➡ result must be a starting point to browse in associated topics **= exploration**

Solution: **show relevant resources with corresponding topics in the meta-layer**
How: provide different views in complexity and points of interests
Tool: **Prototype: *TMV* – generic Topic Map Browser**

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hendrik.thomas@tu-ilmenau.de; bernd.markscheffel@tu-ilmenau.de; torsten.brix@tu-ilmenau.de
www.dmg-lib.org