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.)

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?

Support of the Information Retrieval Process

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 (flexible, 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 = occurrences
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: MERINO = semi-automated generation of occurrences

4th Step: Visualisation of the Search Results
Problem: identified relevant resources 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