

# **Knowledge Representation Methods and their Application**

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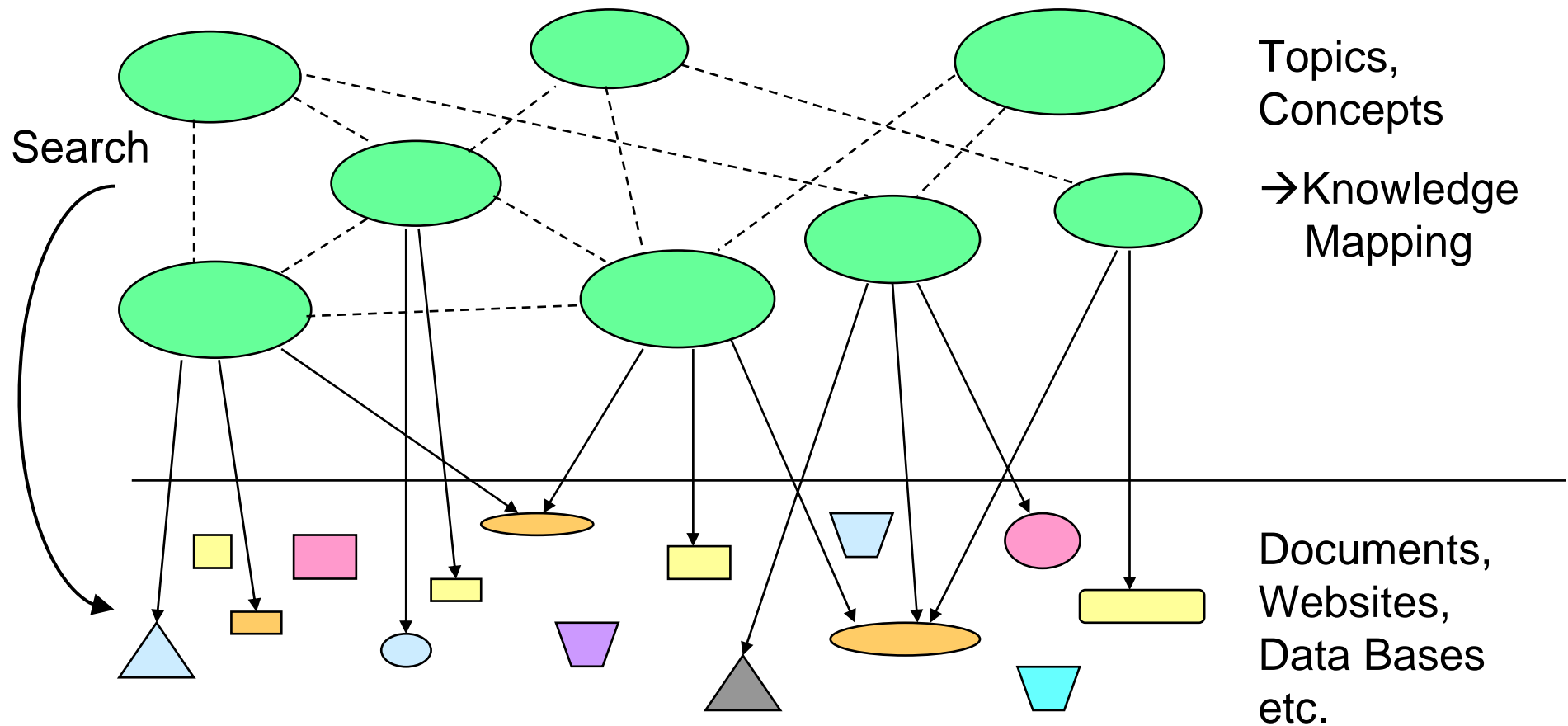
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## Some Methods to Represent Knowledge (ranked by increasing formalization)

- Documents (synopses, dossiers, ...)
  - “Classical” Web Sites
  - Wikis
  - Blogs
  - Semantic Nets (descriptions to be found in Wikipedia):
    - Mind Maps
    - Concept Maps
    - Topic Maps
    - Ontologies
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## Principles of Semantic nets

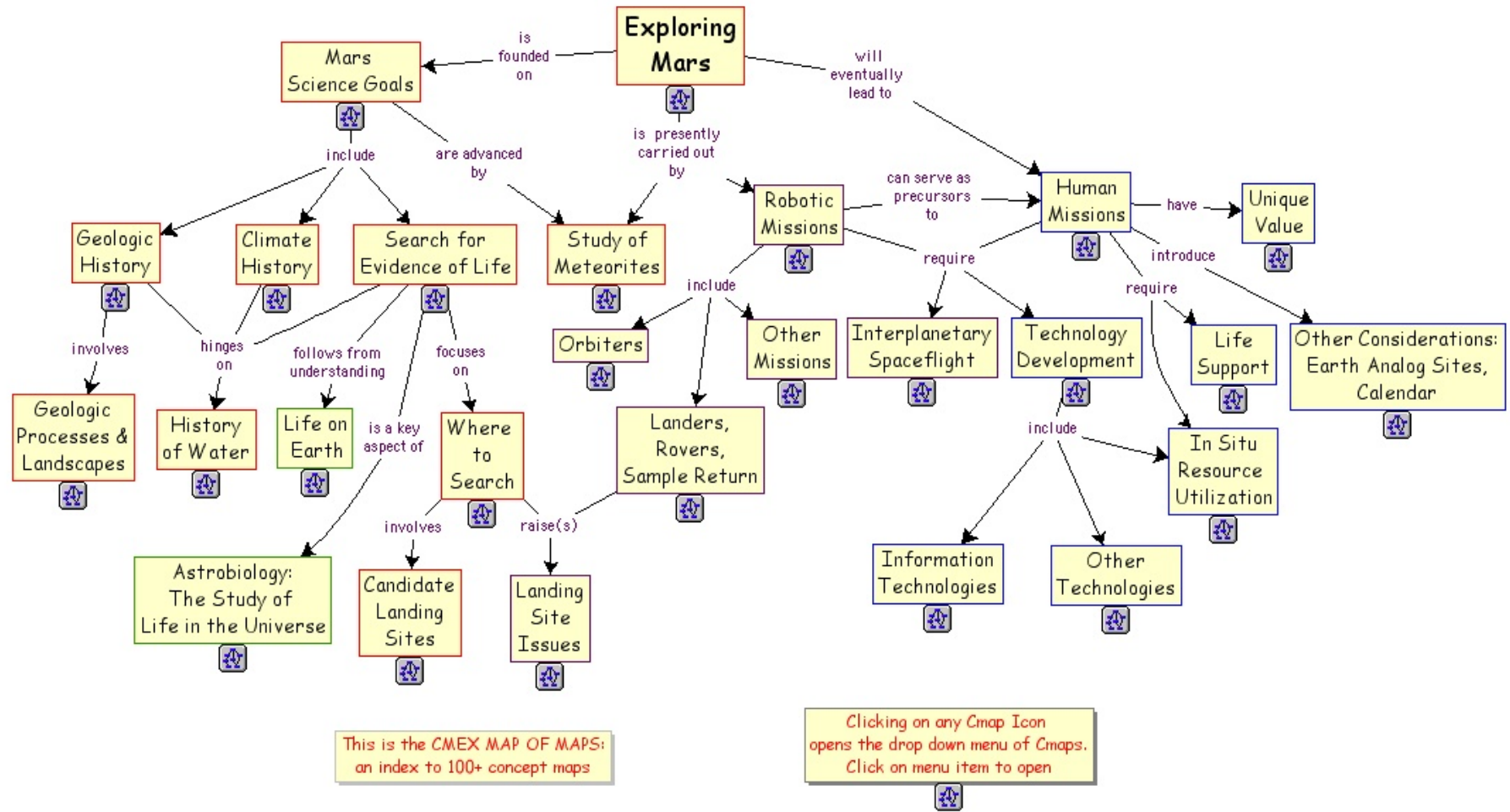


- Formal methods have some advantages:
    - Systematic Approach
    - May be understood by machines
      - Inferences may be drawn (queries, SPARQL)
      - Consistency checks
    - Controlled Vocabulary defined by experts
    - Visualization for ease of navigation
  
  - The Web 3.0 might well be a „Semantic Web“
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## A Tool Selection

- Mind Maps
    - Various free and commercial tools
    - “Personal Brain” – Personal Knowledge Management
  - Concept Map
    - [CMapTools](#) developed by Institute for Human and Machine Cognition (IHMC): free for personal use
    - Example: [NASA Mars Exploration](#)
  - Ontology Development
    - [Protégé](#) (free)
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# NASA's Concept Map of Mars Exploration



This is the CMEX MAP OF MAPS:  
an index to 100+ concept maps

Clicking on any Cmap Icon  
opens the drop down menu of Cmaps.  
Click on menu item to open

- Semantic Miner (commercial)
  - Developed by Ontoprise
  - Pilot project on development of a “Containment”-Ontology
    - 2-days Workshop with 4 field and 3 KM experts: first draft
    - Refined by other experts

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**Suchergebnisse**
WWW
Visualizer
Einstellungen

Wissensbrowser

"http://www.grs.de/contain" > DEFAULT\_ROOT\_CONCEPT > **Modelle von Phänomenen** +/-

*Beschreibung:* Charakteristisch für Normalbetrieb, Störungen, Störfälle und auslegungsüberschreitende Ereignisse (z.B. Unfälle)

Modelle von Phänomenen	Rechenprogramm	<a href="#">Rechenprogramme</a> +/-
	Beschreibung	string
	Ressourcen	string

- [Graphitbrand](#) +/-
- [Kabelbrand](#) +/-
- [Schmelzeverhalten](#) +/-
- [Spaltprodukte](#) +/-
- [Sump Clogging](#) +/-
- [Thermohydraulik](#) +/-

## Materials

- Wikipedia (<http://en.wikipedia.org>): Look for  
e.g. Knowledge Representation, Concept Map, Topic Map,  
Ontology, Semantic Web, RDF, OWL, SPARQL ...
- Concept Maps:
  - IHMC - Site (<http://cmap.ihmc.us/>)
    - Free download, Documentation

- Ontology Development with Protégé (<http://protege.stanford.edu/>):
    - Documentation: in particular [http://protege.stanford.edu/publications/ontology\\_development/ontology101-noy-mcguinness.html](http://protege.stanford.edu/publications/ontology_development/ontology101-noy-mcguinness.html)
    - Free download
  - SPARQL (<http://www.w3.org/TR/rdf-sparql-query/>)
    - A query language for RDF
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