Generalized Semantic-to-Document Derivation

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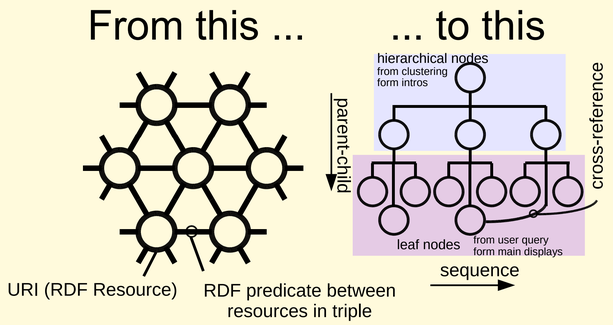
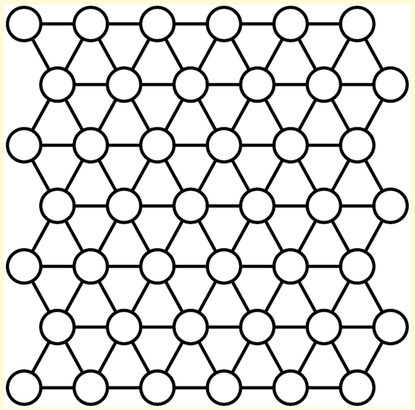


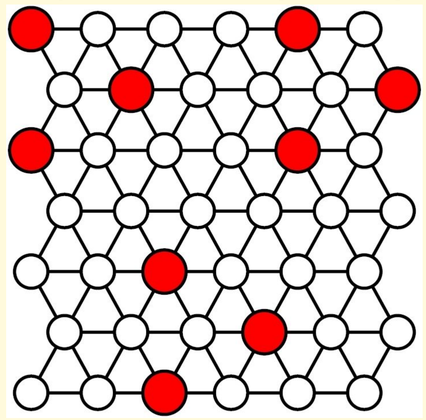
Phases

Semantics as Links



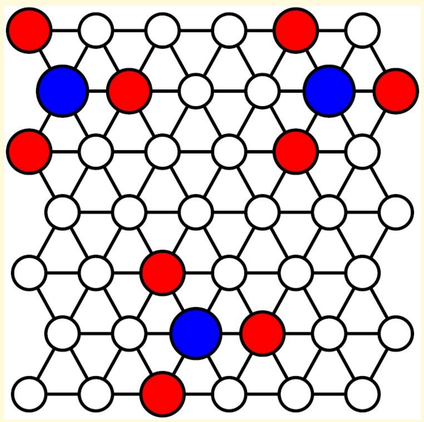
Concepts related to each other in semantic network

Topic Selection (Search)



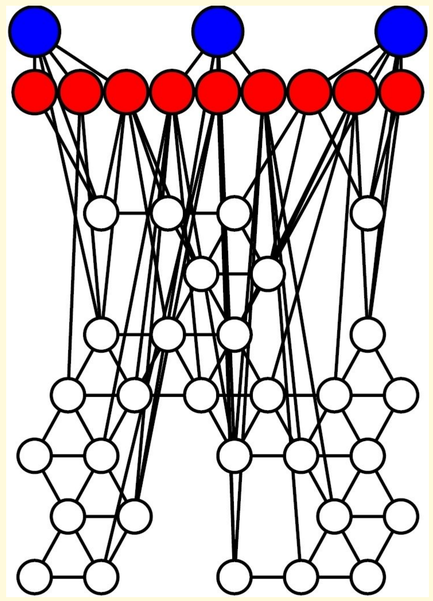
Particular concepts selected as relavant to topic of desired document

Clustering



Concepts found for groupings of selected concepts

Document Structure



Cluster concepts form basis for hierarchy of generated document

Proximity

Semantic Proximity
- Concepts in Knowledge base interrelate
- Interconcept relation has proximity (distance)

Document Proximity
- Document structure conveys conceptual proximity
- Goal is to have generate documents reflect underlying semantic proximity

Document Structure

Hierarchy
- Clustering into groups
- Siblings are proximate
- Each cluster node is section intro
- Uniformity

Sequence
- From uniform numeric property
- Adjacency is proximity
- To maintiain proximity (segue)

Cross-reference
- Also conveys proximity

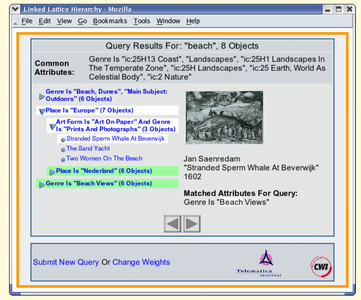
Means of Clustering

Common Properties
- Algorithm: Concept lattice
- Previous work: Topia

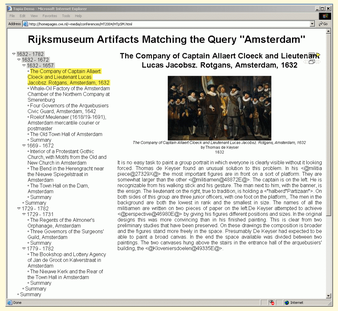
Link Hubs
- Algorithm: recursive concept lattice
- Superset of property-based

Numeric (Axis)
- Algorithm: K-means
- As with astronomy

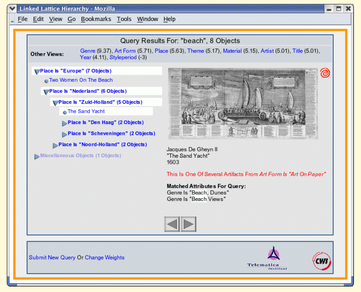
Generalized Proximity
- Proximity table
- Best-of search for corresponding doc struc



Generated Presentation



Numeric Clustering

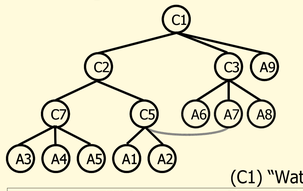


With Uniformity

Concept Lattices

Example: Rijksmuseum Collection, query "water"

Resulting Document Structure



Objects	Properties: (C1) "Water"	(C2) Genre: Water ice and snow	(C3) Genre: Buildings in landscapes	(C4) Genre: Field meadows	(C5) Genre: Dutch Landscapes	(C6) Artist: Jacob van Ruisdael	(C7) Genre: Buildings in landscapes	(C8) Genre: Riverscapes	(C9) Artist: Paul Joseph Constantin Gabriel
Watercourse at Abcoude (A1)		X		X	X				X
Watercourse near 's-Graveland (A2)		X			X				
Mountainous landscape with waterfall (A3)		X				X	X	X	
A water mill (A4)		X					X	X	
Landscape with waterfall (A5)		X				X	X	X	
Water mill (A6)			X			X			
Windmill on a polder waterway (A7)			X	X	X				X
A waterside ruin in Italy (A8)			X						
The battle of Waterloo, 18 june 1815 (A9)				X					
Concept Size	**5**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	

Proximity Table

From Rijksmuseum Example

	A1	A2	A3	A4	A5	A6	A7	A8	A9	C2	C3	C4	C5	C6	C7	C8
A2	2															
A3	2	2														
A4	2	2	2													
A5	2	2	2	2												
A6	4	4	2	4	2											
A7	2	2	4	4	4	2										
A8	4	4	4	6	6	2	2									
A9	2	4	4	4	4	4	4	4								
C2	1	1	1	1	1	3	3	5	3							
C3	3	3	3	3	3	1	1	1	3	4						
C4	1	3	3	3	3	5	1	3	3	2	2					
C5	1	1	3	3	3	5	1	3	3	2	2	2				
C6	3	3	1	3	1	1	3	3	5	2	2	4	4			
C7	3	3	1	1	1	3	5	3	5	2	4	4	4	2		
C8	3	3	1	1	1	3	5	5	5	2	4	4	4	2	2	
C9	1	3	3	3	3	3	1	3	3	2	2	2	2	4	4	4

http://homepages.cwi.nl/~media/conferences/HT2005poster/

Telematica Instituut