Ontology Visualisation
OntoQuery - Lecture 3

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Note: for copyright reasons most of the pictures had to be removed from this on-line version of the slides.
Ben Shneiderman’s Mantra for Information Visualisation:

- data types: 1-dimensional, 2-dimensional, 3-dimensional, multi-dimensional, temporal, tree, network

- tasks: overview, zoom, filter, details on demand, relate, history, extract
Relational databases:
types of relations influence graph structures

<table>
<thead>
<tr>
<th>cardinality</th>
<th>domains</th>
<th>graph structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>one-to-many</td>
<td>different</td>
<td>partition, classification</td>
</tr>
<tr>
<td>one-to-many</td>
<td>same</td>
<td>directed graph, tree</td>
</tr>
<tr>
<td>many-to-many</td>
<td>different</td>
<td>bipartite graph</td>
</tr>
<tr>
<td>many-to-many</td>
<td>same</td>
<td>graph, poly-hierarchy</td>
</tr>
</tbody>
</table>
1) One-to-many relation with two different domains: partition or classification

ER diagram

AGE

1

PERSON

many

51 year old
Paul
Sue
Steve
Mary
Charlie
Ellen
John
50 year old
52 year old

Venn diagram

50 year old
Paul
Sue

51 year old
Steve
Mary
Charlie

52 year old
Ellen
John

Bar chart

50 year old

51 year old

52 year old

Lattice
2) One-to-many relation with the same domains:

- directed graph (because the relation consists of tuples)

- “imperfect” tree: tree-like but has a few cross-links
  examples: Unix directory structure, Yahoo directory

- tree

Visualisations: lists, file system displays, hyperbolic trees, ...
2.1) Tree of Porphyry (Lull’s version)

(picture removed)
2.2) Printed tree: Roget’s Thesaurus

Synopsis of Categories:

CLASS ONE: ABSTRACT RELATIONS

I. EXISTENCE
   A. Being in the Abstract
      1. Existence
      2. Nonexistence
   B. Being in the Concrete
      3. Substantiality
      4. Unsubstantiality
   C. Conjunctive Quantity

34. Greatness
35. Smallness
36. Superiority
37. Inferiority
38 Increase
39. Decrease
2.3) File hierarchy display (MacOS):
2.4) File hierarchy display (Microsoft):

(picture removed, see
http://protege.stanford.edu/plugins/instancetree/screenshots.html)

http://protege.stanford.edu/plugins/instancetree/index.html
2.5) Hyperbolic tree:

(picture removed)

(Source: Fluit et al. (2003))
2.6) Fisheye:

(picture removed)

(Source: Mappuccino, www.cybergeography.org/atlas)
3) Many-to-many relation with two different domains:

Cross tables:

<table>
<thead>
<tr>
<th>type</th>
<th>type</th>
</tr>
</thead>
<tbody>
<tr>
<td>instance</td>
<td>value</td>
</tr>
<tr>
<td>instance</td>
<td>value</td>
</tr>
</tbody>
</table>

Visualisations: 2-dimensional display, bipartite (clustered) graph, emerging hierarchy
3.1) 2-dimensional display: time and location

(picture removed, French train time table)

(Source: Marey (1885) according to Tufte (1983))
3.2) 2-dimensional display: multi-level information

(picture removed, Napoleon’s march)

(Source: Minard (1844) according to Tufte (1983))
3.3) Bipartite Graph: Documents and topics

(picture removed)

(Source: Kartoo; http://www.cybergeography.org/atlas/)
3.4) Emerging Hierarchy - Venn Diagram:

(picture removed)

(Source: Cougar; Fluit et al. (2003))
3.5) Another example of a Venn Diagram:

(picture removed)

(Source: InfoCrystal; Fluit et al. (2003))
3.6) Cluster Map

(picture removed)

(Source: Fluit et al. (2003))
Instead of Venn Diagrams and Cluster Maps:

why not use concept lattices?
3.7) Clustering

(picture removed)

(Source: MapNet; http://www.cybergeography.org/atlas/)
4) Many-to-many relation with the same domains: graph, network or poly-hierarchy
4.1) Ramon Lull’s Wheels

(picture removed)
4.2) Data structure graph (UML-, ER-like)

(picture removed)

(Source: protege.stanford.edu/plugins/ontoviz/ontoviz.html)
4.3) Conceptual Graphs

- Semantic Networks

- Mindmaps (eg. www.thebrain.com)

- Topicmaps
4.4) Spring Embedder Graphs

(picture removed)

(Source: TouchGraph; www.cybergeography.org/atlas)
4.5) TGVizTab

TGVizTab is a plugin for Protege which allows visualizing ontologies using TouchGraph

http://www.ecs.soton.ac.uk/~ha/TGVizTab/TGVizTab.htm

Similar: KAON OIModeller