Picture-Text Cooperation: Lettering in Legal Visualization

Vytautas ČYRAS
Vilnius University

Friedrich LACHMAYER
Vienna and University of Innsbruck

Kristina LAPIN
Vilnius University

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1. Introduction
Repertoire in lettering

• Formulations
  – words
  – sentences
  – abbreviations
  – signs

• Formatting
• Figure caption
• Etc.

Sample figure from JURIX 2012 by Buchanan et al.
2. Types and instances
Graphics-text cooperation: types and instances

• types

• instances

Sample figure
http://en.wikipedia.org/wiki/Entity%E2%80%93relationship_model
Intension and extension

Not to be confused with *intention* or *intentionality*,

[link](http://en.wikipedia.org/wiki/IntenSion)
Intensional definition and extensional definition

• An **intensional definition** – specifying all the properties
  – bachelor is 'unmarried man'.

• The **extensional definition** – listing of all the unmarried men in the world

http://en.wikipedia.org/wiki/Intensional_definition

3. Legal meanings
Legal meanings – the object of legal visualization

• K. Röhl and S. Ulbrich „Recht anschaulich“, 2007
  – Logical pictures (logische Bilder)

• H.-G. Fill “Visualisation for semantic information systems”, 2009
  – Business informatics

• Knowledge visualization vs. information visualization
4. UML and legal meanings
Does UML suit to visualize legal meanings?

Pro arguments:

- UML is a general-purpose (modeling) language
- W. Kahlig „Rechtsmodellierung im e-Government“, 2008
- UML diagrams visualize system’s architectural blueprints
  - System’s elements such as
    - Activities (jobs)
    - Components
    - How the system will run
    - How the system is expected to be used

Contra arguments

- UML is used in software engineering, not law
  - Visualizing the design of a system
- Legal meanings ≠ software
- Lachmayer’s visualizations are not targeted at the design of a system (software)
  - Understanding law
  - Legal education
- Different semantics
  - Relations
  - Imagination
4. Legal relations
Subsumption 1: terminological
Subsumption 2: normative

Decision = legal act
= official version of the story

Natural language
Classifying relations

- *Vinculum juris* between persons
- Relation between things
- Subsumption
- Strong and weak relations
  - strong and weak permission
- In legal thesauruses
  - synonymy, near synonymy, antonymy, hyperonymy/hyponymy, implemented as [Schweighofer, LOIS project]
Historical remarks

• Ulrich Klug (1982): $R(A,B)$

• What is new?
  – To give a name to $R$
  – Direction in asymmetric relations
    • $A \rightarrow R B$ e.g. right, employee, self-defence
    • $A \leftarrow R B$ e.g. duty, employer

• Different sorts: Causality
  Imputation, goal, dolus
  General relation, context
Relation in mathematics

- A relation $R$ over the sets $X_1, \ldots, X_n$ is a subset of their Cartesian product, $R \subseteq X_1 \times \ldots \times X_n$

- Example. $R$: $X$ thinks that $Y$ likes $Z$,

<table>
<thead>
<tr>
<th>Person $A$</th>
<th>Person $B$</th>
<th>Person $C$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>Bob</td>
<td>Denise</td>
</tr>
<tr>
<td>Charles</td>
<td>Alice</td>
<td>Bob</td>
</tr>
<tr>
<td>Charles</td>
<td>Charles</td>
<td>Alice</td>
</tr>
<tr>
<td>Denise</td>
<td>Denise</td>
<td>Denise</td>
</tr>
</tbody>
</table>

$X_1 = X_2 = X_3 = X = \{\text{Alice, Bob, Charles, Denise}\}$
Extensional relational structure \((D, R)\)

**Definition.** An extensional relational structure is a tuple \((D, R)\) where

- \(D\) is a set called the *universe of discourse*
- \(R\) is a set of relations on \(D\)

Example

$D = \{I1, I2, I3, I4\}$

$R = \{\begin{array}{c}
I1 \\
I2 \\
I3 \\
I4
\end{array} \begin{array}{c}
I1 \\
I2 \\
I3 \\
I2 I1
\end{array} \begin{array}{c}
I2 I3 I1
\end{array} \}$

- Person
- Manager
- Researcher
- reports-to
- cooperates-with

Person(I2)
Person(I1)
Manager(I1)
Researcher(I2)

Person(I3)
Person(I4)

I3
I2

I1

reports-to
cooperates-with
Kinds of relations in law

Causality

Finality (telos, teleology)

Compliance

Non-compliance, contradiction, conflict
Explicit/implicit, direct/indirect

TERTIUM COMPARATIONIS
Simple and legally qualified relations

• Simple:

• Legally qualified:

  – E.g. in a judgement:

  – A court established the fact that $A$ caused $B$:

  $Fact(A, is-a, B)$
  $Fact(A, causa, B)$
Symbolization

- $R(A, B)$

Institutional relations

- $\text{Norm}(\text{ought})$ – Obligation
- $\text{Norm}(\text{fact})$ – Fact as a relation
- $\text{Norm}(\text{if } A \text{ then } B)$ – E.g. delict
Thank you

Vytautas.Cyras@mif.vu.lt

F. Lachmayer see www.legalvisualization.com,
http://jusletter-it.weblaw.ch/visualisierung/