Analogical Methods in Legal Informatics

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Theses

• **Analogical thinking** continues to be important in law
  – Consider this in legal informatics
  – Digitalisation is visible to **different extents**

• The **human vs. machine** dichotomy, rather than the **continuous vs. discrete** dichotomy, is central to legal informatics
Digitalisation and two modes of the law

• **Basic mode.** Laymen:
  – Are governed primarily by customary law
  – Experience the law in a **situational** and not a textual way
  – Do not know the text of the highway code, but instead they know its content

• **Expert mode**
  – The law goes up **textually** to the professional lawyer
    • Indirectly to the layman involved in a case
  – Argumentation is in professional language rather than natural language
1. A framework for the analysis of digitalisation in legal informatics
Situationally reactive schema

• A subject appears in a **situation**
  – Receives an **input** from the environment and reacts with an **output**
  – Input–output behaviour depends on the situation

• **Analogue**, no digitalisation
Cognitive–reactive schema

• The subject recognises the input
  – E.g., sees a friend or a foe
• The reaction is driven by a pattern
• Cognitive subsumption first, then normative subsumption
• Animals
Spoken language

- A collectively developed cultural phenomenon
- Communication requires standardised means
- Language changes input’s interpretation
  - Management in the schema
- Distinction from the cognitive–reactive schema
Written language

- **Verbal writing** (Latin), **pictorial writing** (Chinese)
- **Continuous** properties in pictorial writing
  - **Discrete** properties in verbal writing and grammar
- **Syntax** makes the language stricter – an advantage
Communication

- **Pictures, speech and writing**
  - **Directly** to a receiver or **via media** (print, television, computer)

- **Language is objectivised** and becomes an object

- **Various technologies**
  - Acoustic-visual media

![Diagram](black-box-input-output-situationally-reactive-schema)

- **Cognitive–reactive patterns**
- **Spoken language**
- **Written language**
Mechanisation and digitalisation

- Technical languages, algorithmic languages, logical notations
Subjects

- Internet of things
- **Hybrid entities** act in a similar way to persons
  - Robots, autonomous cars and electronic organisations
Analogue/digital analysis

• Various aspects

[Diagram showing input and output processes, black boxes, and various types of communication like picture, speech, and writing.]
2. The analogue vs. digital dichotomy in human–computer interaction (HCI)
Definition of ‘analogue’ (‘analog’)

• ‘Analogue’ refers to a continuous representation, ‘digital’ – discrete

• An analogy relationship between the state of an analogue device and the model

• What ‘analogue’ means?
  – On one hand, the term “analog” suggests that there is some special relationship (an analogy) between that state of an analog device and the system it’s modeling; on the other hand, in most people’s minds the terms “analog” and “digital” are synonymous with “continuous” and “discrete” [MacLennan 1994]
Brain processes are analogue

• At the physical level, neurons transmit electrochemical signals
  – Electrochemical models involve differential equations and thus continuous representations

• Computer processors are digital
No reasons for conflict between analogue and digital

• In matters of formality, interpretability, and so forth, analog computation and digital computation are **not essentially different** [MacLennan 1994]

• People communicate with computers through language
  – Both continuous and discrete
    - models can be represented in computers
    - interaction styles in HCI
  – Interfaces: command line, menu, form-fill, point and click, natural language, 3D interface, etc.
Languages in HCI

• E.g., for analogue and digital clocks:
  – **Task language**. Set time to a certain value
  – **Input language**. Wheel vs. buttons
  – **System language**. Mechanical movement vs. integrated circuits
  – **Output language**. Minute and hour hands vs. liquid-crystal display

http://users.csc.calpoly.edu/~fkurfess/Courses/486/W19/
Cognition in HCI

- **Mental models** (imagined worlds) are neither continuous nor discrete
- **Cognition processes:**
  attention, perception and recognition, memory, learning, reading, speaking and listening, and problem solving, planning, reasoning, and decision making

[Sharp/Preece/Rogers 2019]
3. Reasoning by analogy in law
What is ‘analogical method’?

• The term ‘analogical method’ is related to ‘analogy’ (Aristotle’s *analogia*)
  – not the distinction between continuous and discrete
• ‘Analogy’ and ‘reasoning by analogy’ are related with case law
Models ≠ analogies

• Models are tools for prediction and explanation, whereas analogical arguments aim at establishing plausibility. [Bartha 2019]
  – If we broaden our perspective beyond analogical arguments, however, the connection between models and analogies is restored.

• Legal informatics develops models
4. Methods in legal informatics
Schweighofer’s model

8 views
Representations of law

1. Text corpus view
2. Metadata view
3. Citation network view
4. User view
5. Logical view
6. Ontological view
7. Visualisation view
8. Argumentation view

4 methods
Legal methodology

1. Interpretation
   (search, reading, understanding)
2. Documentation (search, processing)
3. Conceptual and logical analysis
4. Facts analysis

4 syntheses
Types of products

1. Commentary / handbook
2. Dynamic electronic legal commentary
3. Citizens information
4. Case-based synthesis
Analogue vs. digital isn’t a suitable characterisation

- Interpretation is a **mental** activity
- Documentation: **digital** prevail
- Visualisation: analogue + digital
Conclusions

1. The **basic mode** and the **expert mode** of law

2. **Humans vs. machines** dichotomy grounds analogical methods in legal informatics
   - Not continuous vs. discrete dichotomy
Thank you

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