IIb Argumentation with Rules and with Cases

Topics:
- Reasoning with Rules
- Case-based Reasoning

Goals:
- Acquire knowledge about reasoning with rules
- Acquire knowledge about case-based reasoning
- Acquire insight into the relations between reasoning with rules and case-based reasoning

Literature:
Van Eemeren et al. (in preparation). Sections 11.8, 11.9

Machines can decide legal cases (?
Deciding legal cases consists of applying the law.
The law consists of rules.
Machines can apply rules.

THEREFORE:
Machines can decide legal cases.

Some hard questions
Deciding legal cases consists of applying the law.
- Is applying the law sufficient for deciding cases?
- How does one apply the law?
The law consists of rules.
- Does it?
- Where are they?
Machines can apply rules.
- Can they?

THEREFORE:
Machines can decide legal cases.
- Well, I don't know!
Working hypothesis:
*Deciding legal cases can be automated.*

Research agenda:
*Find out how!*

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**Law and artificial intelligence**

The tension in the law between *legal security* on the one hand and *justice* on the other is related to the *gof-ai vs. new-ai* dichotomy.

The former are *top-down* and focus on *explicit knowledge* (rules, logic), the latter are *bottom-up* and use *implicit knowledge* (discretion, case analogy, learning, self-organisation).

The law has a long history of struggling with this tension and developed pragmatic approaches.

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**Legal codes**

Example:

1. Inflicting bodily harm is punishable with up to two years of imprisonment or a fine of the fourth category.
2. When the fact causes grievous bodily harm, the accused is punished with up to four years of imprisonment or a fine of the fourth category.
3. []

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**Theory construction**

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**Precedents**

Example:

Supreme Court July 9, 2002, NJ 2002, 499

Theft requires the taking away of a good. Can one steal an already stolen car? The Supreme Court's answer is: yes.

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**Reasoning with rules and with cases**

Rule-based reasoning:

Apply general rules

*Example:*

John is a thief. (There is a rule that) Thieves are punishable. 
THEREFORE: John is punishable.

Case-based reasoning:

Follow analogous cases

*Example:*

John is a thief. (There is a precedent in which) Peter was punishable as a thief. 
THEREFORE: John is punishable.
### Reasoning with rules

- **d₁**: x is a contract ⇒ x only binds its parties
- **d₂**: x is a lease of house y ⇒ x binds all owners of y
- **d₃**: x is a lease of house y, tenant has agreed in x that x only binds its parties ⇒ x only binds its parties

contract lease of a house:
both d₁ and d₂ seem to apply; application of d₂ blocks d₁ (by a form of specificity defeat)
also tenant has agreed that only parties are bound:
application of rule d₁ blocks the application of rule d₂,

hence the application of d₁ is no longer blocked

Prakken 1997

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### Reason-Based Logic

punishable: thief(x) ⇒ punishable(x)

Thief(john)

THEREFORE

Applicable(thief(john) ⇒ punishable(john))

This gives a reason that the rule ought to be applied.

If there are no reasons against the rule’s application, this leads to the obligation to apply the rule.

Reasons are weighed, but not numerically.

Hage 1997

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### Dworkin (1978): rules versus principles

Legal rules seem to lead directly to their conclusion when they are applied.

Legal principles are not as direct, and merely give rise to a reason for their conclusion.

### Dworkin (1978): rules versus principles

<table>
<thead>
<tr>
<th></th>
<th>Rule</th>
<th>Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Conclusion</td>
<td>Reasoning</td>
</tr>
<tr>
<td>Legal rules</td>
<td>Ownership</td>
<td>Selling</td>
</tr>
<tr>
<td>Legal principles</td>
<td>Ownership</td>
<td>Selling</td>
</tr>
<tr>
<td>OTHER rules and principles</td>
<td>Ownership</td>
<td>Selling</td>
</tr>
</tbody>
</table>

### Example

Mary's bike is stolen.
John buys the bike from the thief.
Who owns the bike?

Both Mary and John have a reasonable claim to the bike:
Ownership is not broken by theft.
Buying gives ownership.

The law provides rules to resolve conflicting principles in a generic way instead of case by case.

### An integrated model of rules and principles

The differences between rules and principles are merely a matter of degree.

Rules and principles have the same logical structure, but have different behavior in actual reasoning.

A rule and its underlying principles

A rule replaces its underlying principles when it applies

Interfering rules and principles
Case-based reasoning

Case-based reasoning is a common type of argumentation in the law, in which legal conclusions are drawn on the basis of previously decided cases.

If some decided case is sufficiently similar to the case at hand, then under the doctrine of stare decisis one should not depart from that decision, and the same conclusion should hold.

Issue:
Can a dismissal be voided?

Precedent case:
+ The employee’s behavior was always good
- There was a serious act of violence
Outcome: + (voided)

Current case:
+ The employee’s behavior was always good
- There was a serious act of violence
+ The working atmosphere was not affected
Outcome: ?

Ashley’s HYPO (1990)
Factors are generalised facts pleading for or against an issue.

Cases are treated as sets of factors.

For precedent cases, the outcome is known.
Overview

Legal decision making
Case-based reasoning: Hypo
Case-based reasoning: entangled dialectical arguments
Are case-based and rule-based reasoning logically different?

Approaches to the modeling of case-based reasoning

<table>
<thead>
<tr>
<th>Rule extraction method</th>
<th>Case comparison method</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Extracting rules from decided cases</td>
<td>(1) Selecting relevant case facts</td>
</tr>
<tr>
<td>(2) Showing that rule conditions are satisfied</td>
<td>(2) Establishing an analogy between cases</td>
</tr>
</tbody>
</table>

- (3a) Applying extracted rules to the case at hand
- (3b) Pointing out exceptions to extracted rules
- (3a) Following decided cases in the case at hand
- (3b) Distinguishing decided cases from the case at hand

Roth 2003

Models of case-based reasoning either focus on case comparison, but do not make explicit which conclusions could be drawn by following analogous cases or focus on rule extraction, thereby obscuring the role of case analogy.
Dialectical arguments and case-based reasoning

The present approach focuses on case comparison and makes explicit which conclusions can be drawn by following analogous cases. Cases are compared in terms of the dialectical arguments that occur in them.

Entangled dialectical arguments

Dialectical arguments can contain both reasons for and reasons against conclusions (internal conflicts).

A statement can be supported or attacked by more than one reason (accrual).

It can be supported or attacked that a statement supports or attacks another statement (entanglement).

Case comparison in terms of dialectical arguments

Settled case

Problem case

c: Dismissal-Can-Be-Voided
a: Always-Behaved-Good-Employee
b: Serious-Ac-Of-Violence
d: Working-Atmosphere-Not-Affected

There is more dialectical support for c in the problem case, so c should follow by analogy with the settled case.

The same analysis can be done using Hypo's expressiveness.

Factors and non-factors: the comparison basis

Comparison outcomes depend on the particular division made between factors and non-factors.

Arguing for a change of this division can downplay or emphasize distinctions.

The entangled factor hierarchy

Cases comparable

Cases incomparable

Roth 2003

Downplaying a distinction
Overview

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Case-based reasoning: entangled dialectical arguments

Are case-based and rule-based reasoning logically different?

Rules and precedents

Rules and precedents as formal sources of law (Hart’s rules of recognition)

Role depends on jurisdictional sphere

Legal systems

Rules and precedents

Comparative law research (MacCormick & Summers 1997):

- Rules and precedents are both significant sources
- This does not depend on whether precedents are officially considered to be formally binding

Logical differences?

To what extent are there logical differences between the role of rules and precedents when deciding cases?

Is deciding cases logically different in a legal system with only rules and in one with only precedents?

Existing formal models seem to take the logical distinction for granted.

Rule application

There is a rule with conditions A, B, C, ... and conclusion Z.
In the current case, the conditions A, B, C, ... are fulfilled.

THEREFORE
Conclusion Z follows.
Precedent adherence

There is a precedent with A, B, C, ... as relevant factors for conclusion Z.
The current case matches the relevant factors A, B, C, ... of the precedent.
THEREFORE
Conclusion Z follows.

Side comments

1. The technique used is that of semi-formal argumentation schemes
2. Schemes are defeasible
3. The schemes are not meant to be an absolutely correct/exact/unique representation
4. Scheme specification can be bent towards a context and goal

Logically, the basic patterns are equal

A, B, C, ... --> Z
A, B, C, ...  
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Z

Argumentation in Artificial Intelligence, With Applications in the Law
Course at the Institute of Logic and Cognition, Sun Yat-Sen University

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