Argumentation with Value Judgments
An Example of Hypothetical Reasoning

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December 15, 2010
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Goal: Flexible formalism for modeling legal reasoning with values authentic to methodology.

Systemic assumptions

- Legal system coordinates individual and collective interests.
- Considered interests are grouped into *values*.
- Legal sources state norms containing imperatives governing individual behavior.
- Norms do not work mechanically but contain *value judgments* which coordinate the interests involved.
- Legal reasoning is about arguing for and against case solutions being in accordance with or in violation of the value judgments contained in these norms.

Environment: Scheme-driven argument \((p \rightarrow c)\) inference system.
The Carney Case


- Police had evidence of someone trading drugs in a motor home parked in downtown San Diego.
- Police searched the motor home without obtaining a warrant.
- Evidence of drug trade was confiscated and the defendant arrested.
- **Issue:** Should police have obtained a warrant or does a motor home fall under the automobile exception of the 4th amendment?
- **Conflicting values:** *Expectation of Privacy vs. Effective Law Enforcement*
**Facts**

- **Fact patterns** are atomic or compound propositions representing a part of the domain of discourse.
- Facts are closed under union: \( f_1 \cup f_2 = f_3 \)
- Transitive subsumption relationship: \( f_1 \sqsubseteq f_2 \)
- Example:
  - \( f_1 \): A cadillac is being searched.
  - \( f_2 \): A vehicle is being searched.
  - \( f_1 \sqsubseteq f_2 \) because a cadillac is arguably a vehicle.
A rule is a proposition $f_1 \Rightarrow f_2$ assigning a conclusion $f_2$ to an antecedent fact pattern $f_1$.

Rules are propositions which serve as the basis for argument schemes, not logical inferences \textit{per se}. [see Gordon & Walton 2009]

If a rule $r$ stems from a legal source (as opposed to common sense knowledge), we refer to it as a \textit{norm}.
A legal system can be viewed as a coordination of interests or groups of interests.

A value is a legal concept abstracting a set of one or more interests of individuals or groups of actors.

Changes in fact patterns can be characterized as promoting or demoting a given value.

Carney Example: Requiring a search warrant for the police search of a vehicle promotes the value of privacy and demotes effective law enforcement.
A solution to a conflict situation is a change of a fact pattern in a given situation.

Changes in facts entail the argumentative (non-)derivability of other facts via the applicable rules and norms: \( s \vdash c \) or \( s \nvdash c \).

A situation \( s \) hence consists of:
- Set of fact patterns \( F_s \).
- Set of CSK inference rules \( C_s \).
- Set of applicable legal norms \( L_s \).

Situations can be modified using the \( \cup \) operator, e.g. \( s' = s \cup x \), where \( x \) is a new fact pattern, rule or norm.
Effects

Carney Example: In situation $s$, the police search of a vehicle is at issue. Requiring a search warrant ($wa$) promotes *privacy* and demotes *effective law enforcement*.

Degrees of promotion and demotion can be represented using an ordinal scale: e.g. $++$, $+ +$, $+$, $\approx$, $-$, $- -$, $- - -$

Example: Medium promotion of privacy, small demotion of law enforcement.

- $e_{Pr}(wa, s) = ++$
- $e_{LE}(wa, s) = -$
To argue about promotion and demotion of a value $v$ through facts, we assume the availability of a set of fact pattern specifications $d^x_v$, where:

- $x \in \{+++, ++, +, \approx, -, --, ---\}$

Example for medium promotion of privacy, $d^{+++}_{Pr}$:
- A private space cannot be searched without a judge reviewing the decision to do so.

Example for small demotion of law enforcement, $d^{--}_{LE}$:
- The ability of a police officer to obtain evidence of a presumed offense is constrained for some qualified set of circumstances.

The argumentative presence or absence of these patterns in a situation ($s \cup f \models p$ or $s \cup f \not\models p$) flags the promotion or demotion of $v$ to the respective degree, i.e., whether the facts in question concern the value’s scope of protection.
Value Judgments

- Hypothesis: A legal decision is made in a certain way because its effect on applicable values is preferable over the effects of the other alternatives.
- Determination of a fact imposition’s positive effects outweighing the negative effects shall be referred to as a *value judgment*.
- Formalism: $E^+(f, s) > E^-(f, s)$
- Core Idea: Value orderings are fact-relative, i.e. there is no single abstract hierarchy of values. [compare Bench-Capon 2003]
- In scenarios of more than two applicable values, the value judgment does not give information as to which precise value made the balance “tip over”. This is subject to argumentation.
Hypothesis: Legal reasoning is largely concerned with the mapping and application of value judgments from one factual context to another ...

... by means of an argument that a new set of facts relates to the original factual context in a way that justifies the imposition of a certain conclusion in light of the applicable values.

Argument schemes vary depending on the nature of the legal source and context, e.g. case-based, statute, etc.
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Assumption: Scheme driven argumentation engine with corresponding set of common argument schemes.

Formalism-specific Schemes:

- If \( f \Rightarrow c \) then \( f \rightarrow c \) is an argument from norm.
- If \( s, s' \in S \), \( m \) is a proposition, \( m' \in F \), \( v \in V \), \( d_v^x \in D \) then
  \[
  (s \cup m = s') \land (s' \vdash m') \land (s \not\vdash m') \land (m' \subseteq d_v^x) \rightarrow e_v(m, s) = x
  \]
  is an argument for fact effect.

Verbalized: If there is a fact \( m' \) which is not argumentatively entailed by situation \( s \), but is entailed by situation \( s' = s \cup m \), and \( m' \) falls within the scope of protection (as specified by \( d_v^x \)), then there is an argument for fact \( m \) having effect \( x \) on value \( v \).
Hypothetical Reasoning is a discourse pattern with which a given norm is evaluated by posing hypothetical situations which test certain properties of the norm.

Most prominently applied in U.S. Supreme Court oral argument and studied to a considerable extent in AI&Law [see Ashley et al. 2007, Bench-Capon & Prakken 2009].

Process Description

- Advocate proposes test which decides case at bar in her favor.
- Test is challenged by posing hypothetical situations whose result under the test is debatable.
- Advocate reacts to the hypothetical by upholding the test, modifying it or distinguishing/analogizing the hypothetical.
- Optionally argue some more and repeat.

Goal: Produce a "good" norm to adopt for future cases.
Proposed test: $f \Rightarrow c$, implicitly $E^+(c, s \cup f) > E^-(c, s \cup f)$.

Judge thinks rule too broad: Think of hypothetical $h \sqsubset f$ where submitted value judgment is questionable because value $v$ is underserved in $h$, e.g. $e_v(c, s \cup h) = --$, potentially tipping the balance towards $E^-(c, s \cup h) > E^+(c, s \cup h)$.

- Reaction 1: Argue that $h \not\sqsubset f$, thereby distinguishing.
- Reaction 2: Agree that $h \sqsubset f$, but disagree about the effect on $v$ (e.g. $e_v(c, s \cup h) = -$ instead of $--$) and uphold the value judgment using an argument from lesser severity.
Proposed test: $f \Rightarrow c$, implicitly $E^+(c, s \cup f) > E^-(c, s \cup f)$. Judge thinks rule too broad: Think of hypothetical $h \sqsubseteq f$ where submitted value judgment is questionable because value $v$ is underserved in $h$, e.g. $e_v(c, s \cup h) = --$, potentially tipping the balance towards $E^-(c, s \cup h) > E^+(c, s \cup h)$.

- **Reaction 3:** Agree both that $h \sqsubseteq f$ and that $v$ is underserved in $h$. However, uphold the rule and value judgment because value $w$ is greatly facilitated by the rule (e.g. $e_w(c, s \cup h) = +++$) so that the underserving of $v$ is outweighed: Justification from trumping principle.

- **Reaction 4:** Agree that $h \sqsubseteq f$, that $v$ is underserved in $h$ and concede that $E^-(c, s \cup h) > E^+(c, s \cup h)$. Hence, modify the test to $f' \Rightarrow c$, where $h \not\sqsubseteq f'$. 
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Proposed test: Self-propelled \((sp)\) vehicle \((v)\) with wheels \((w)\) shall not require a warrant to be searched: \(v \cup w \cup sp \Rightarrow \neg wa\)

Value judg’t: \(E^+(\neg wa, s \cup \{v, w, sp\}) > E^-(\neg wa, s \cup \{v, w, sp\})\)

- \(e_{Pr}(\neg wa, s \cup \{v, w, sp\}) = -\)
- \(e_{LE}(\neg wa, s \cup \{v, w, sp\}) = ++\)

Hypothetical: What if vehicle is in mobile home park and hooked up to water and electricity but still has wheels on? \(h = \{v, w, sp, mhp, hwe\}\), hence \(h \sqsubseteq \{v, w, sp\}\).

- Suggests greater home-likeness; search more intrusive.
- Underserving: \(e_{Pr}(\neg wa, s \cup \{v, w, sp\}) = --\)
- Example specification for \(d_{Pr}^{++}\): Search might reveal private documents/items in trailer not expected in a car.
- Balance tips over towards \(E^-(...) > E^+(...)\)?
Advocate:

- "not suggesting that there is no expectation of privacy in those circumstances"
- "society is not willing to recognize that expectation of privacy as justifying a different rule from another motor vehicle"

i.e. not disputing suggested $e_{PR}(\neg wa, s \cup \{v, w, sp\}) = \neg \neg$

Argues that still:

$E^+(\neg wa, s \cup \{v, w, sp\}) > E^-(\neg wa, s \cup \{v, w, sp\})$

Upholds the test through justification **from trumping principle** (effective law enforcement).
Opposing test: Warrant required if place to be searched exhibits "indicia of home": \( ioh \Rightarrow wa \)

Value judgment: \( E^+(wa, s \cup ioh) > E^-(wa, s \cup ioh) \)

- \( e_{Pr}(wa, s \cup ioh) = ++ \)
- \( e_{LE}(wa, s \cup ioh) = - \)

Hypothetical: "somebody drives a great big stretch Cadillac down and puts it in a parking lot, and pulls all the curtains around it"

- arguably \( cd \sqsubseteq ioh \)
- However, one would want the Cadillac to be searchable because it appears to be mainly a vehicle: \( e_{LE}(wa, s \cup cd) = -- \)
- Example specification for \( d_{LE} \): Evidence can be moved out of reach instantaneously.
- suggesting \( E^-(wa, s \cup cd) > E^+(wa, s \cup cd) \)
Advocate:

"[If it is] reasonably objectively observable that it has the attributes of a home in it, [then] we have to give it the same protections that we ordinarily give dwelling compartments."

i.e. conceding overbreadth.

... narrows to "reasonably objectively observable attributes of a home"

... modifies the test to $oah \Rightarrow wa$, since arguably $cd \not\subset oah$. 
Process model for hypothetical reasoning: [Ashley et al. 2007]
(Case-based) legal reasoning with values: [Bench-Capon, Atkinson & Chorley 2005; Bench-Capon & Sartor 2003; Prakken 2002; Greenwood, Bench-Capon & McBurney 2003]
Value-based argumentation frameworks: [Bench-Capon 2003]
Argument schemes: [Gordon & Walton 2009]
(Formal) legal theory: [Alexy 1985, 2003; Hage 1996; Schauer 1989]
Discussion and Conclusion

Discussion

- Changes in facts affect values.
- Value judgments order value effects in fact-sensitive way.
- Specific argument schemes for effects and value judgments.
- Greater flexibility than threshold-based approaches.
- Challenge: Find fact specifications of values.
- Challenge: Scenarios with more than two applicable values.

Future Work

- Model other areas of legal reasoning using value judgment formalism.
- Specific argument schemes for mapping and applying value judgments in a fact-sensitive way.
- Commence first implementation.
- Refine fact-aspect of formalism.
Thank you!

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Appendix
Bench-Capon & Prakken have modeled hypothetical reasoning in Carney using *thresholds* associated with values, which are explicitly referred to within legal rules.

Fact patterns are partially ordered with regard to thresholds.

Rules are then prioritized according to an abstract value hierarchy.

By contrast, in our model

- Values not elements of rules.
- Value-focused reasoning is modeled as meta-argumentation *about* facts and their effects on values.
- Greater flexibility because model uses *balances* instead of static thresholds.
Rule in *Carney*: Sufficient degree of exigency ($t_e$) outweighs expectation of privacy ($t_p$): $r_1 : t_e \land t_p \Rightarrow \neg wa$

Value judgment: $E_{LE}^+ (\neg wa, s \cup \{t_e, t_p\}) > E_{Pr}^- (\neg wa, s \cup \{t_e, t_p\})$

Even higher degree of privacy outweighing exigency requires new threshold (e.g. security locker ($sl \sqsubseteq t'_p$) inside camping truck): $E_{Pr}^- (\neg wa, s \cup \{t_e, sl\}) > E_{LE}^+ (\neg wa, s \cup \{t_e, sl\})$

In threshold approach, this requires new rule: $r_2 : t_e \land t'_p \Rightarrow wa$

Now imagine such serious crime ($sc \sqsubseteq t'_e$) (e.g. nuclear terrorism) to provide an even higher exigency: $E_{LE}^+ (\neg wa, s \cup \{sc, t'_p\}) > E_{Pr}^- (\neg wa, s \cup \{sc, t'_p\})$

Requires new rule: $r_3 : t'_e \land t'_p \Rightarrow \neg wa$

Rules need to be prioritized according to abstract value hierarchy. Value judgment approach more flexible because of "balances".