Computational Law
The Cop in the Backseat

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CodeX: The Stanford Center for Legal Informatics
Stanford University
Variety of Regulations

Laws

Business Rules

Personal Rules

Contracts
Complexity of Regulations

The University may terminate this lease when the Lessee, having made application and executed this lease in advance of enrollment, is not eligible to enroll or fails to enroll in the University or leaves the University at any time prior to the expiration of this lease, or for violation of any provisions of this lease, or for violation of any University regulation relative to resident Halls, or for health reasons, by providing the student with written notice of this termination 30 days prior to the effective date of termination; unless life, limb, or property would be jeopardized, the Lessee engages in the sales of purchase of controlled substances in violation of federal, state or local law, or the Lessee is no longer enrolled as a student, or the Lessee engages in the use or possession of firearms, explosives, inflammable liquids, fireworks, or other dangerous weapons within the building, or turns in a false alarm, in which cases a maximum of 24 hours notice would be sufficient.
It is one of the greatest anomalies of modern times that the law, which exists as a public guide to conduct, has become such a recondite mystery that it is incomprehensible to the public and scarcely intelligible to its own votaries.

- Lee Loevinger 1949
Information Problem
Computational Law is that branch of legal informatics concerned with the mechanization of legal analysis.
Predictive Coding is not Computational Law
Concerned most with eDiscovery
Does not *apply* the law.

Outcome Prediction is not Computational Law
Concerned with analysis of judges, attorneys, etc.
Rather than the substance of laws and contracts

Complaw systems apply the law autonomously, usually for non-experts.
Databases

<table>
<thead>
<tr>
<th>manages</th>
<th>office</th>
<th>gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>john</td>
<td>ken</td>
<td>john</td>
</tr>
<tr>
<td></td>
<td></td>
<td>female</td>
</tr>
<tr>
<td>john</td>
<td>kat</td>
<td>jill</td>
</tr>
<tr>
<td></td>
<td></td>
<td>female</td>
</tr>
<tr>
<td>Jill</td>
<td>Mary</td>
<td>ken</td>
</tr>
<tr>
<td></td>
<td></td>
<td>male</td>
</tr>
<tr>
<td>Jill</td>
<td>Mike</td>
<td>kat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>female</td>
</tr>
</tbody>
</table>

Sentential Representation

John manages Ken.  John is in office 22.  John is male.
John manages Kat.  Jill is in office 24.  Jill is female.
Jill manages Mark. Ken is in office 22.  Ken is male.
Jill manages Mike. Kat is in office 24.  Kat is female.
Office mates are people who share an office.
officemate(X,Y) :- office(X,Z) ∧ office(Y,Z)

Managers and subordinates may not be office mates.
illegal :- manages(X,Y) ∧ officemate(X,Y)
Deductive Reasoning Systems

Regulations_1 \ldots \text{ Regulations}_n

Facts \quad \text{Automated Reasoner} \quad \text{Conclusions}
Office mates are people who share an office. Managers and subordinates may not be office mates.

Automated Reasoner

John manages Ken. John is in 22. Ken is in 22.

Violation detected.
Office mates are people who share an office. Managers and subordinates may not be office mates.

John manages Ken.
John is in 22.

Ken not in 22.
All projects have managers and subordinates.
No manager may share an office with a subordinate.
All skunkworks personnel must be housed in a common room.

Automated Reasoner

Inconsistency detected.
Beliefs

… if the Secretary of State is satisfied that …

Defaults

… unless the contrary is shown, …

Metalevel

… as defined in subsection (1) …
11.06.12
COLORADO BECOMES THE FIRST STATE TO LEGALIZE MARIJUANA

State

Federal
“Law is not a matter of simply applying rules to facts via Modus Ponens.”

- Edwina Rissland

Many legal decisions are made through case-based / analogical reasoning, bypassing explicit reasoning about laws and statutes.

While there is research on analogical reasoning, there is no widely accepted standard for what constitutes a “correct” answer.
Other Opportunities

Building Codes
Electronic Commerce (transportation, shipping,…)
Privacy (HIPAA, COPPA, etc.)
Labor Law
Financial Management (stocks, retirement funds)
Civil Procedures
Contracts
One thing that makes this topic compelling today is the huge increase in *digitally mediated activity*, e.g. governmental websites, corporate intranets, electronic commerce.

**Opportunity - Embedded Law**
Avoiding mistakes by embedding law in applications
Integrated access to structured data on the Web (think databases, XML)

Focus on end-users, ad hoc queries
Which congressmen have DUIs?

Retail Data Economy - $$
Data as a utility, like power
Getting paid for providing data

Legal Issues:
Govt rules: HIPAA, COPPA
Contracts with users, data providers
Ubiquitous Computing
Example

What is that flower?

Can I pick it?

You are in Massachusetts
Picking wild orchids is prohibited in Massachusetts
[Chapter 266 of the General Laws, Section 116A, 1935]
The Cop in the Backseat
The FAA in the Cockpit