20 Years of ICAIL – Reflections on the Field of AI and Law

Thomas F. Gordon

President
International Association for Artificial Intelligence and Law

May, 2007
Outline

- 20 years of ICAIL
- Are we making progress? Convergence?
- Impact of AI and Law on theory and practice
- The AI and Law community
- Recommendations
- Closing Remarks
20 Years of ICAIL !!

- 1987 Boston
- 1989 Vancouver
- 1991 Oxford
- 1993 Amsterdam
- 1995 College Park, Maryland
- 1997 Melbourne
- 1999 Oslo
- 2001 St Louis
- 2003 Edinburgh
- 2005 Bologna
- 2007 Palo Alto
ICAIL Prehistory
1950s – 1960s Legal Applications of Classical Logic

- Karl Engisch, Logical Studies on Applying Law; 1960.
- Carlos Alchourron. Logic of Norms; 1969.
ICAIL Prehistory
1970s – Birth of AI and Law


ICAIL Prehistory – 1980s

- Carole Hafner; An Information Retrieval System Based on a Computer Model of Legal Knowledge, 1981.
- Anne Gardner, An Artificial Intelligence Approach to Legal Reasoning. 1984

- Carole Hafner, Conceptual Organization of Case Law
- Edwina Rissland & Kevin Ashley; A Case-Based System for Trade Secrets Law (HYPO)
- Richard Susskind, Expert Systems in Law
- Donald Waterman & Mark Petersen, Expert Systems for Legal Decision Making
- Thomas Gordon; The importance of nonmonotonicity for legal reasoning.
ICAIL 1989 - Vancouver

- Kevin Ashley; Modeling Legal Argument: Reasoning with Cases and Hypotheticals
- Thorne McCarty; A Language for Legal Discourse (LLD)
- Edwina Rissland & David Skalak; CABARET: Combining Case-Based and Rule-Based Reasoning

- Trevor Bench-Capon & Frans Coenen; Isomorphism and LKS
- Karl Branting; Rules and Precedents as Complementary Warrants
- Judith P. Dick: Representation of Legal Text for Conceptual Retrieval
- Daphne Gelbart, J. C. Smith: Beyond Boolean Search: FLEXICON
- Thomas Gordon; An abductive theory of legal issues.
- Graham Greenleaf, Andrew Mowbray, Alan Tyree: The DataLex Legal Workstation
- Peter Johnson & David Mead; LKS for Public Administration
- Andrew Jones & Marek Sergot; Deontic Logic
- Marc Lauritsen; Building Legal Practice Systems
AI & Law Highlights: 1993-1994

- Layman Allen and Charles Saxon; Modeling Hohfeldian concepts, e.g. rights, privileges, powers and immunities
- Vincent Aleven and Kevin Ashley; CATO – Teaching law students how to use dialectical information to argue effectively with cases.
- Don Berman & Carole Hafner; Teleological Structure: the Missing Link
- Tom Gordon; Pleadings Game – Computational Model of Dialectical Legal Procedures
- Jaap Hage: Monological Reason-Based Logic
- Ron Loui, Jeff Norman, et. al; Reasoning with Policy, Precedents and Rationales
- Henry Prakken; Logical Framework for Modeling Legal Argument
- Edwina L. Rissland, David B. Skalak, M. Timur Friedman: BankXX: A Program to Generate Argument Through Case-Base Research

- Kathleen Freeman & Arthur Farley; A Model of Argumentation
- Jaap Hage, Ronald Leenes & Arno Lodder; Hard Cases, A Procedural Approach
- Andrew Stranieri, John Zeleznikow, et al.; Split-Up: Hybrid Rule - Neural Approach
- Howard Turtle; Text Retrieval in the Legal World
- Henry Prakken & Giovanni Sartor, Dialectical Model of Conflicting Arguments
- Bart Verheij; Rules, Reasons, Arguments
- Haijme Yoshino; Legal Meta-Inference

- Trevor Bench-Capon; Toulmin Dialogue Game
- Karl Branting, James C. Lester, Charles B. Callaway; Automated Drafting of Self-Explaining Documents
- Joost Breuker, Andre Valente, & Radboud Winkels; Legal Ontologies
- Thorne McCarty; Some Arguments About Legal Arguments
- Henry Prakken & Giovanni Sartor, Reasoning with Precedents in a Formal Dialogue Game
- Pepijn Visser & Trevor Bench-Capon; Comparison of Four Ontologies for LKS
- Caroline Uyttendaele, Marie-Francine Moens, et al; Automatic Abstracting of Legal Cases: The SALOMON Experience
AI & Law Highlights: 1999 – 2000

- Trevor Bench-Capon, Geldard & Leng; Dialectical Argument with Argument Games
- Stefanie Brüninghaus, Kevin D. Ashley: Toward adding knowledge to learning algorithms for indexing legal cases
- Jaap Hage; Dialectical Models in AI and Law
- Arno Lodder; Dialogical Models of Argumentation
- Erich Schweighofer, Andreas Rauber, Michael Dittenbach: Automatic text representation, classification and labeling in European law
- Bart Verheij; Argument Assistants
- Gerard Vreeswijk; Formal Dispute with a Standing Order
AI & Law Highlights: 2001 – 2002

- Trevor Bench-Capon, Henry Prakken, and Giovanni Sartor; Teleological case-based legal reasoning (several papers)
- Alexander Boer, Rinke Hoekstra & Radboud Winkels; METALex: Legislation in XML
- Stefanie Brüninghaus, Kevin D. Ashley: Improving the representation of legal case texts with information extraction methods
- Jack G. Conrad, Daniel P. Dabney: A cognitive approach to judicial opinion structure: applying domain expertise to component analysis.
- Carole Hafner & Donald Berman; Role of Context in Case-Based Legal Reasoning
- Thorne McCarty; Ownership Case Study
ICAIL 2003 – Edinburgh
AI & Law Highlights: 2003 – 2004

- Alexander Artikis, Marek Sergot & Jeremy Pitt; An Executable Specification of an Argumentation Protocol
- Trevor Bench-Capon; Try To See It My Way: Modeling Persuasion in Legal Discourse
- Trevor Bench-Capon & Giovanni Sartor; Legal Reasoning with Cases, Theories & Values
- Alexander Boer, Tom M. van Engers, Radboud Winkels: Using Ontologies for Comparing and Harmonizing Legislation
- Stefanie Brüninghaus, Kevin D. Ashley: Predicting Outcomes of Case-Based Legal Arguments
- Floris Bex, Henry Prakken, Chris Reed & Doug Walton; Argumentation Schemes and Generalizations in Reasoning about Evidence
ICAIL 2005 – Bologna

- T. Bench-Capon, K. Atkinson and A. Chorley; Persuasion and Value in Legal Argument.
- Guido Governatori, Antonino Rotolo, Giovanni Sartor; Temporalised Normative Positions in Defeasible Logic
- Henry Prakken; AI & Law, Logic and Argument Schemes
- Henry Prakken, Chris Reed, Douglas N. Walton; Dialogues about the burden of proof
- Giovanni Sartor; Legal Reasoning: A Cognitive Approach
- Doug Walton; Argumentation Methods for AI and Law
Convergence?

- Legal Argumentation is the central topic of AI and Law
- Limitations of deductive and inductive logic
- Needed: normative models of argument and dialogue
- Legal philosophy failed to provide the necessary theoretical foundation for our field
- AI and Law, in collaboration with the field of Argumentation in Philosophy, is developing this theoretical foundation.
- A unified theory of legal argument is beginning to emerge, as a result of this collaboration.
Legal Argumentation is our Main Topic

- “Experts can do more with the rules than follow them … lawyers can argue about the rules themselves.” Gardner, 1987.
- Loui & Norman; “Rationals and Argument Moves”, 1995
- Verheij, “Rules, Reasons, Arguments”, 1996
The Modern Field of Argumentation in Philosophy is a Contemporary Development
Basic Elements of the Unified Theory of Argument

- **Argumentation Schemes**
  - Argument from Rules
  - Argument from Cases
  - Argument from Ontologies
  - Argument from Evidence
  - Argument from Purpose and Policy
  - Argument from Values

- **Dialogue Types and their Protocols**
  - Administrative Procedures
  - Pleading, Trial
  - Appellate Court Proceedings
  - Arbitration
  - Negotiation
  - Deliberative Democracy (eParticipation)
Argumentation Tasks
Scientific Impact of AI and Law

- Only Anecdotal Evidence !!
- Impact on Philosophy
- Impact on AI
- Impact on Legal Theory
Impact of AI and Law on Philosophy


- Doug Walton often cites AI and Law research in his books on argumentation.
Impact of AI and Law on Artificial Intelligence Research?

Russel & Norvig, the leading textbook on AI:
- Contains few references to the AI and Law literature
- Does not cover computational models of argumentation
- Uses only probability theory to model reasoning under uncertainty

Artificial Intelligence Journal
- Special Issue on AI and Law (2003)
- Special Issue on Argumentation (2007)
  - 5/12 articles by ICAIL authors, including 4 ICAIL presidents
Impact of AI and Law on Legal Theory

A Treatise of Legal Philosophy and General Jurisprudence
Volume 1: The Law and The Right; Volume 2: Foundations of Law,
Volume 3: Legal Institutions and the Sources of Law, Volume 4:
Scientia Juris, Volume 5: Legal Reasoning
Volume package A Treatise of Legal Philosophy and General
Jurisprudence
Pattaro, E., Rottleuthner, H., Shiner, R.A., Peczenik, A., Sartor, G.
2005, XCVIII, 1958 p., 16 illus., Hardcover
Practical Impact of AI and Law

- Rule-Based Systems for Public Administration
- Legal Document Assembly
- Information Retrieval
RuleBurst.
Six offices on three continents.
130,000 users in Business, Government and Financial Services sectors.
In a relatively young industry where many players have disappeared, RuleBurst has gone from strength to strength.
That's because RuleBurst is run by people who aren't simply experts in software, but by those who have a real understanding of how business works.

Founded in 1989, RuleBurst delivers the RuleBurst 8 policy and business rules engine solution and the Oasis enterprise government, risk and compliance management solution.

RuleBurst's head office is in Canberra, Australia, with offices in London, Washington DC, Sydney, Melbourne and Brisbane.

RuleBurst 8
Business Rules Management
RuleBurst has over 15 years' experience in building enterprise rules-based systems. We have become the experts in helping organisations rapidly capture their business rules in plain language from the most voluminous and complex information sources, culminating in our specialist rules approach — at least five times faster than a conventional process.

Find out more about RuleBurst ...

Oasis
Governance Risk Compliance Management
RuleBurst's Oasis product leads the market in the development, configuration and implementation of governance risk compliance management (GRCM) systems. Oasis Smart Enterprise Assurance products strengthen your control performance, quality monitoring and delivery of transparent real-time reporting.

Find out more about Oasis ...

RuleBurst wins US$1.68m IRS contract (20 Sep 2006)
"Corporate law departments are starting to show great interest in document automation for client self-service. Cisco and Microsoft, for instance, now provide do-it-yourself sales contracts, non-disclosure agreements, and software licenses to their business users. …

Now large international law firms sell subscriptions to online expert systems that deliver sophisticated legal analysis …”

Marc Lauritsen , 2007
Legal Information Retrieval

- Westlaw applies probabilistic reasoning methods (Bayesian Networks) and Natural Language Processing (NLP) in its full text legal information system. [Turtle, AI and Law Journal, 1995]

- Lexis/Nexis now has a similar features, with its FREESTYLE system (source: Schweighofer, 1999)

- The Semantic Web is creating a great opportunity for Conceptual Retrieval methods.
The AI and Law Community

- Interdisciplinary Makeup
- Vitality of the Community
- Issues
International Association for Artificial Intelligence and Law
Growth of the AI & Law Community
Institutional Problems with the Field of AI and Law

- Interdisciplinary fields like AI and Law have weak institutional support
  - Lawyers working in AI and Law tend to drift to computer science departments
  - Graduate students at computer science departments tend to drift away from the AI and Law field

- AI and Law impact on legal education and practice is not optimal
  - Law schools courses on legal philosophy, jurisprudence, legal theory, legal methods or legal research and writing are typically not informed by AI and Law results.
Legal Theory at Law Schools Needs Greater Funding and Staff, But ...

- Law schools are professional schools and practice-oriented
- Law is traditionally taught as an art or craft, with little attention to theoretical or methodological foundations
- Legal philosophy, theory and methods are not part of the core curriculum
  - Course offerings on legal theory and related topics are sporadic and unsystematic
  - The courses are optional and very few students elect to take them
- Chicken and egg problem
  - Legal theory must demonstrate its practical relevance to obtain greater resources
  - Legal theory needs greater and sustained resources to produce practical results
Collaboration Model for Law and Computer Science Departments

International Association for Artificial Intelligence and Law
Recommendations for the AI and Law Field

- Research on Legal Theory needs to be driven by task requirements of law students, practicing lawyers and developers of legal information technology

- AI and Law needs to consolidate its results
  - Unified theory of legal argumentation
  - Open architecture for AI and Law system, with standard APIs and interchange formats
  - More sharing of content (models of legal sources, test cases) and code (components)
  - A shared repository of AI and Law resources, like Source Forge for Open Source software

- New textbooks on legal methods, informed by the state of the art of AI and Law, are needed, primarily for law students
The Central Role of Legal Models for eGovernance
Application Opportunities for Demonstrating Practical Relevance

- eGovernment – Rule Based Systems for Public Administration
- Corporate Governance – Business Rules
- Regulatory Compliance
- Deregulation and “Better Regulation”.
- eDemocracy / eParticipation
- Model-Driven Legislative Drafting
- Semantic Web

Bottom Line: Focus first on providing solutions for private companies with deep pockets and a willingness to innovate. Law professionals tend not to be early adopters of new technology.
Illustration of the Need for Legal Knowledge Systems

- A2LL: Software for the German federal government, for determining rights to unemployment benefits
- Software development costs: over 90 million Euros and rising; 50 million Euros were planned
- Personnel: 160 programmers
- Quality: Buggy and incomplete
- Damage: Over 28 million Euros
Closing Remarks

- Reinterpreting the purpose and goals of AI and Law
- On the need for vision, endurance and patience
- On the importance of our work
Goals of Artificial Intelligence

<table>
<thead>
<tr>
<th>Empirical</th>
<th>Normative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems that think like humans</td>
<td>Systems that think rationally</td>
</tr>
<tr>
<td>Systems that act like humans</td>
<td>Systems that act rationally</td>
</tr>
</tbody>
</table>

Think

Act
On the Need for Endurance and Patience

- It took 20 years for rule-based legal expert systems to become established ... and they are still not widespread.

- It may take another 20 years for more advanced AI and Law method to succeed (CBR, conceptual retrieval, argumentation systems)

- We are tackling difficult problems which philosophy has failed to solve in over 2000 years.

- Non-deductive forms of reasoning have been largely neglected since the ancient Greeks.

- Only since the late 1950s, with the birth of the fields AI and Informal Logic, has work begun again in earnest.
The Importance of AI and Law

- The quality of legal practice will remain uncertain, without advances in Legal Theory providing normative standards for legal reasoning and argumentation.

- Empirical evidence suggests that clerks in public agencies incorrectly apply the law in circa 30% of all cases.

- Between 1960 and 2000 the US Code of Federal Regulations grew from 20,000 to 140,000 pages.

- AI and Law research is urgently needed to assure the performance of legal tasks can be efficient, fair, transparent, and legally correct in the face of this growing complexity.