



FACOLTÀ DI GIURISPRUDENZA
ALMA MATER STUDIORUM – UNIVERSITÀ DI BOLOGNA

SEMINARIO DI INFORMATICA GIURIDICA
PROMOSSO DALLA CATTEDA DELLA
PROF.SSA MONICA PALMIRANI
A.A. 2011/2012
VIA ZAMBONI 22, AULA 1

RESEARCH PROGRESS IN ARTIFICIAL INTELLIGENCE AND LAW: AN INTELLECTUAL SURVEY

Prof. Kevin D. Ashley

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The course will comprise a weekly three-hour seminar for four weeks.

Week 1. Computational Models of Case-based and Analogical Legal Reasoning: Surveys models developed by researchers from common law and civil law backgrounds culminating in computer programs to generate arguments that a legal rule should apply to a given fact situation (or not) in light of underlying values using defeasible logics and rudimentary argument schema.

Week 2. Argumentation: Addresses how recent advances in argumentation theory, argument schema and critical questions, diagrammatic argument representations, and integrating probabilistic reasoning (e.g., Bayesian belief networks) into computational argument models, impact ways in which researchers computationally model legal argument and the interpretation of legal norms, and design, implement, and evaluate legal expert systems, legal decision-making by automated agents, and intelligent tutoring systems for teaching law students.

Week 3. Representing Legal Concepts and Case Knowledge in Ontologies: Surveys the state of the art in representing legal information and knowledge in a format acceptable for AI and Law applications. Future advances in computational modeling of legal argument and in legal information retrieval depend on developing new techniques for representing legal concepts and case knowledge in ontologies that computer programs can use and manipulate and on improving the specifications ontologies must satisfy.

Week 4. Legal Information Retrieval, Extraction, and Text Processing: Surveys the state of the art in legal information retrieval and information extraction from texts, including from: comparatively well-structured texts such as legal statutes, regulations, and case opinions versus comparatively unstructured texts as in e-Discovery, which involves retrieving, often from enormous databases of digital information, all documents that may be relevant to legal issues in particular litigation contexts.

Introduction to AI & Law: Artificial Intelligence and Law is a subfield of AI research that focuses on computationally modeling legal reasoning for the purpose of building tools to assist in legal practice and pedagogy and of studying legal reasoning in order to contribute to cognitive science and jurisprudence. From the viewpoint of cognitive science and AI, legal reasoning is especially interesting because it falls somewhere between the comparatively well-structured domains of mathematical and scientific reasoning for which AI researchers have developed useful methodologies and the comparatively unstructured common sense domains of ordinary discourse that AI researchers someday hope to model. From a jurisprudential viewpoint, AI and Law offers the promise of embodying theories in a computational form that can be applied systematically to a range of examples; as the theories fail on the margins, the computational models can be improved in an effort to make scientific progress in studying law.

Course Materials: Readings will be distributed electronically via a TWEN course website at lawschool.westlaw.com. In order to access the site, students will need to use a Westlaw password and a course password which the instructor will distribute via email. Readings marked [*] below are required. Unmarked readings are recommended but not required.

Course requirement: Students will be expected to prepare one-page written critiques of certain readings. In order to stimulate classroom discussion and foster understanding of the readings, prior to each weekly seminar students will be asked to prepare and submit short (1 page) critiques in English of the readings indicated below. These one-page critiques should be submitted electronically to the instructor the day before each seminar session. The critiques should comprise four parts:

- (a) a brief statement of what the paper is about, and short descriptions of:
- (b) the strengths of the approach,
- (c) the weaknesses of the approach, and
- (d) the relevance of the paper to some project, paper, or topic of interest to the student.

Students should prepare a one-page critique for *each* required reading [*]. The instructor may assign individual students the responsibility to also prepare a one-page critique for one particular recommended reading per week. The instructor may assign individual students responsibility for being prepared to lead discussions of particular readings at the next class.

Please send an email to monica.palmirani@unibo.it for a better organization of the lectures.

PROGRAMME

- 12th October**
13:00-16:00
Aula 1
- Computational Models of Case-based and Analogical Legal Reasoning**
Readings to be discussed:
- [*] Vincent Aleven (2003) "Using Background Knowledge in Case-Based Legal Reasoning: A Computational Model and an Intelligent Learning Environment". 150 *Artificial Intelligence* 183-238.
 - L. Karl Branting (1991) "Building Explanations from Rules and Structured Cases". *International Journal of Man-Machine Studies*, 34(6):797--837.
 - [*] K. D. Ashley and S. Brüninghaus (2006) "Computer Models for Legal Prediction." *Jurimetrics Journal* Vol. 46, pp. 309-352.
 - McLaren, Bruce M. and Ashley, Kevin D. (2011) "Can Temporal Representation and Reasoning make a Difference in Automated Legal Reasoning? Lessons from an AI-based Ethical Reasoner." *Proc. Thirteenth Int'l Conference on Artificial Intelligence and Law (ICAIL 2011)*, pp. 229-238. ACM Press.
 - [*] Trevor Bench-Capon and Giovanni Sartor (2003) "A Model of Legal Reasoning with Cases Incorporating Theories and Values". 150 *Artificial Intelligence* 97-143.
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- 19th October**
13:00-16:00
Aula 1
- Argumentation**
Readings to be discussed:
- [*] Gordon, T. F., and Walton, D. (2009) Legal reasoning with argumentation schemes. *Proc. 12th Int'l Conf. Artificial Intelligence and Law ICAIL 2009*.
 - [*] Atkinson, K. and Bench-Capon, T. (2007): Argumentation and standards of proof. In *Proc. 11th Int'l Conf. Artificial Intelligence and Law ICAIL 2007*. 107-116. ACM Press.
 - [*] Grabmair, M. and Ashley, K.D. (2011) "Facilitating Case Comparison Using Value Judgments and Intermediate Legal Concepts." *Proceedings Thirteenth International Conference on Artificial Intelligence and Law (ICAIL 2011)*, pp. 161-170. ACM Press.
 - M. Grabmair, T.F. Gordon, and D. Walton (2010) *Probabilistic Semantics for the Carneades Argument Model Using Bayesian Networks*, Proceedings of the Third International Conference on Computational Models of Argument (COMMA), 255-266, IOS Press.
 - Ashley, K. and I. Goldin (submitted) "Toward AI-enhanced Computer-supported Peer Review in Legal Education".
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- 26th October**
13:00-16:00
Aula 1
- Representing Legal Concepts and Case Knowledge in Ontologies**
Readings to be discussed:
- Ashley, K. and Brüninghaus, S. (2003). A Predictive Role for Intermediate Legal Concepts," In the *Proceedings 16th Annual Conference on Legal Knowledge and Information Systems*, Jurix-03. pp. 153-162. Utrecht, The Netherlands. December. IOS Press, Amsterdam.
 - Bench-Capon, T.J.M and P.R.S. Visser. (1997) Ontologies in Legal Information Systems; The Need for Explicit Specifications of Domain Conceptualisations. *Proceedings, Sixth International Conference on Artificial Intelligence and Law*. Pp. 132 - 141. ACM Press: NY.
 - Breuker, J., Valente, A., and Winkels, R. (2004) Legal Ontologies in Knowledge Engineering and Information Management. *Artificial Intelligence and Law*, V.12, No. 4, pp. 241-277. Springer.
 - [*] Saravanan, M., B. Ravindran, and S. Raman (2009) Improving Legal Information Retrieval Using an Ontological Framework, *Artificial Intelligence and Law*, 17: 101-124.
 - [*] Ashley, K. (2009) "Ontological Requirements for Analogical, Teleological, and Hypothetical Legal Reasoning" In *Proc. Twelfth Int'l Conference on Artificial Intelligence and Law*. pp. 1-10. ACM Press.
 - [*] Francesconi, E., Montemagni, S., Peters, W., and Tiscornia, D. (2010) Integrating a Bottom-Up and Top-Down Methodology for Building Semantic Resources for the Multilingual Legal Domain. In *Semantic Processing of Legal Texts*. LNAI 6036, pp. 95-121. Springer: Berlin.
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- 2nd November**
13:00-16:00
Aula 1
- Legal Information Retrieval, Extraction, and Text Processing**
Readings to be discussed:
- Howard R. Turtle. 1995 "Text Retrieval in the Legal World" in *Artificial Intelligence and Law*, 3: 5-54. Kluwer: Dordrecht, The Netherlands.
 - [*] Daniels, J.J. and Rissland, E.L.(1997) Finding Legally Relevant Passages in Case Opinions. In *Proceedings of the Sixth International Conference on Artificial Intelligence and Law*. ICAIL-97 pp. 39-46. Association for Computing Machinery. New York.
 - [*] Brüninghaus, S. and Ashley, K.D. (2005). "Reasoning with Textual Cases," in *Proceedings, Fourth International Conference on Case-Based Reasoning ICCBR-05* pp. 137-151.
 - [*] Khalid Al-Kofahi, Alex Tyrrell, Arun Vacher, and Peter Jackson, (2001). "A Machine Learning Approach to Prior Case Retrieval." ICAIL-2001 88-93.
 - Ashley, K. and Bridewell, W. (2010) Emerging AI & Law approaches to automating analysis and retrieval of electronically stored information in discovery proceedings. pp. 311-320.
 - [*] Henseler, H. (2010) Network-based filtering for large email collections in E-Discovery. pp. 413-430