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The course aims to provide an overview of argumentation as it is studied in Artificial Intelligence, led by applications in the field of law. The course goals are:

- Acquire knowledge of the study of argumentation in Artificial Intelligence
- Acquire knowledge of the applications in the field of law
- Develop critical reflection about the subject matter and the state-of-the-art in the field

Lecture Ia: Introduction

Topics:
Argumentation in Artificial Intelligence
Historical Background

Goals:
- Get an overview of the course and its subject matter
- Acquire insight about the historical background

Literature:
Van Eemeren et al. (in preparation). Sections 11.1-11-3.

Background:
Toulmin, S.E. (1958/2003). Chapter III. The Layout of Arguments. *The Uses of Argument*. Cambridge: Cambridge University Press.
Reiter, R. (1980). A Logic for Default Reasoning. *Artificial Intelligence* 13, 81-132.
Pollock, J.L. (1987). Defeasible Reasoning. *Cognitive Science* 11, 481-518.

For more information on Toulmin & argumentation in Artificial Intelligence, see:
Verheij, B. (2009). The Toulmin Argument Model in Artificial Intelligence. Or: How Semi-Formal, Defeasible Argumentation Schemes Creep into Logic. *Argumentation in Artificial Intelligence* (eds. Rahwan, I., & Simari, G.), 219-238. Dordrecht: Springer.
Verheij, B. (2005). Evaluating Arguments Based on Toulmin's Scheme. *Argumentation* 19 (3), 347-371.

Lecture Ib: Abstract Argumentation and Argument Structure

Topics:

Abstract Argumentation
Argument Structure

Goals:
- Acquire knowledge of abstract argumentation and its semantics
- Acquire insight into the relation between argument structure and abstract argumentation

Literature:

Van Eemeren et al. (in preparation). Sections 11.4-11.5.

Background:

Dung, P.M. (1995). On the Acceptability of Arguments and its Fundamental Role in Nonmonotonic Reasoning, Logic Programming and n-Person Games. *Artificial Intelligence* 77, 321-357.

Pollock, J.L. (1995). *Cognitive Carpentry: A Blueprint for how to Build a Person.* Cambridge, MA: The MIT Press.

Prakken, H. (2010). An Abstract Framework for Argumentation with Structured Arguments. *Argument and Computation* 1, 93-124.

Verheij, B. (2003). DefLog: on the Logical Interpretation of Prima Facie Justified Assumptions. *Journal of Logic and Computation* 13(3), 319-346.

Lecture IIa: Argument Schemes and Argumentation Dialogues

Topics:

Argument Schemes
Argumentation Dialogues

Goals:
- Understand the nature and role of argument schemes
- Understand the nature and role of argumentation dialogues

Literature:

Van Eemeren et al. (in preparation). Sections 11.6, 11.7.

Background:

Hage, J. C. (2000). Dialectical Models in Artificial Intelligence and Law. *Artificial Intelligence and Law, 8*, 137-172.

Verheij, B. (2003). Dialectical Argumentation with Argumentation Schemes: An Approach to Legal Logic. *Artificial Intelligence and Law* 11 (1-2), 167-195.

Walton, D.N., & Krabbe, E.C.W. (1995). *Commitment in Dialogue: Basic Concepts of Interpersonal Reasoning*. Albany, NY: State University of New York Press.

Walton, D.N., Reed, C.A., & Macagno, F. (2008). *Argumentation Schemes.* Cambridge: Cambridge University Press.

Lecture 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.

Background:

Ashley, K.D. (1990). *Modeling Legal Argument. Reasoning with Cases and Hypotheticals*. Cambridge, MA: The MIT Press.

Hage, J.C. (1997). *Reasoning with Rules. An Essay on Legal Reasoning and Its Underlying Logic*. Dordrecht: Kluwer Academic Publishers.

Prakken, H., & Sartor, G. (1996). A Dialectical Model of Assessing Conflicting Arguments in Legal Reasoning. *Artificial Intelligence and Law* 4, 331-368.

Rissland, E.L., & Ashley, K.D. (2002). A Note on Dimensions and Factors. *Artificial Intelligence and Law 10*, 65-77.

For more information on rules and principles, see:

Verheij, B., Hage, J.C., & van den Herik, H.J. (1998). An Integrated View on Rules and Principles. *Artificial Intelligence and Law* 6 (1), 3-26.

For more information on case-based reasoning with an entangled factor hierarchy, see:

Roth, B. (2003). *Case-based reasoning in the law. A formal theory of reasoning by case comparison.* Dissertation Universiteit Maastricht.

Roth, B., & Verheij, B. (2004). Cases and Dialectical Arguments - An Approach to Case-Based Reasoning. *On the Move to Meaningful Internet Systems 2004: Otm 2004 Workshops, Proceedings (Lecture Notes in Computer Science, Vol. 3292)*, 634-651.

Roth, B., & Verheij, B. (2004). Dialectical Arguments and Case Comparison. *Legal Knowledge and Information Systems. JURIX 2004: The Seventeenth Annual Conference* (ed. Gordon, T.F.), 99-108. Amsterdam: IOS Press.

For more information on the relation between rule-based and case-based reasoning, see:

Verheij, B. (2008). About the Logical Relations between Cases and Rules. *Legal Knowledge and Information Systems. JURIX 2008: The Twenty-First Annual Conference* (eds. Francesconi, E., Sartor, G., & Tiscornia, D.), 21-32. Amsterdam: IOS Press.

Lecture IIIa: Reasoning with Evidence

Topics:

Reasoning with Evidence

Goals:

-        Acquire knowledge about three styles of reasoning with evidence: argumentative, narrative and probabilistic

Literature:

Van Eemeren et al. (in preparation). Sections 11.12

Background:

Bex, F.J. (2011). *Arguments, Stories and Criminal Evidence, a Formal Hybrid Theory*. Dordrecht: Springer.

Bex, F.J., van Koppen, P.J., Prakken, H., & Verheij, B. (2010). A Hybrid Formal Theory of Arguments, Stories and Criminal Evidence. *Artificial Intelligence and Law* 18 (2), 123-152.

Bex, F.J., & Verheij, B. (2012). Solving a Murder Case by Asking Critical Questions: An Approach to Fact-Finding in Terms of Argumentation and Story Schemes. *Argumentation* 26 (3), 325-353.

Fenton, N.E., Neil, M., & Lagnado, D.A. (2013). A General Structure for Legal Arguments Using Bayesian Networks. *Cognitive Science* 37 (1), 61-102.

Vlek, C., Prakken, H., Renooij, S., & Verheij, B. (2013). Modeling Crime Scenarios in a Bayesian Network. *The 14th International Conference on Artificial Intelligence and Law (ICAIL 2013). Proceedings of the Conference*, 150-159. New York (New York): ACM.

For more information on argument schemes for anchored narratives theory:

Verheij, B., & Bex, F.J. (2009). Accepting the Truth of a Story about the Facts of a Criminal Case. *Legal Evidence and Proof: Statistics, Stories, Logic (Applied Legal Philosophy Series)* (eds. Kaptein, H., Prakken, H., & Verheij, B.), 161-193. Farnham: Ashgate.

Lecture IIIb: Argument Strength and Probabilities

Topics:

Argument Strength and Probabilities

Goals:

- Reflect on argument strength and probabilities
- Reflect on the future of argumentation in Artificial Intelligence and Law

Literature:

Van Eemeren et al. (in preparation). Sections 11.12

Background:

Pollock, J.L. (2010). Defeasible Reasoning and Degrees of Justification. *Argument & Computation* 1 (1), 7-22.

Verheij, B. (2012). Jumping to Conclusions. A Logico-Probabilistic Foundation for Defeasible Rule-Based Arguments. *Logics in Artificial Intelligence. 13th European Conference, JELIA 2012. Toulouse, France, September 2012. Proceedings (LNAI 7519)* (eds. L. Fariñas del Cerro, A. Herzig, J. Mengin), 411-423. Springer, Berlin.