CS 289 Knowledge representation and reasoning
Fall 1995 Stuart Russell

Readings

This document lists the weekly readings for the course. The chapters in Russell & Norvig should be largely review for those who have taken 188 or equivalent. We will not necessarily cover all of these papers in detail in class. Other than the papers marked with an asterisk, which will be handed out later, all the papers are in the reader available from Copy Central on Bancroft.

Week 1 (8/28, 8/30): Artificial intelligence and knowledge representation

Russell & Norvig, Chapters 1,2.

Week 2 (9/6): Propositional logic

Russell & Norvig, Chapter 6.

Bart Selman, Hector Levesque, and David Mitchell (1992). "A new method for solving hard satisfiability problems." In *Proc. Tenth National Conference on Artificial Intelligence*, San Jose, CA, 440–446.

Week 3 (9/11, 9/13): First-order logic

Russell & Norvig, Chapter 7.

Levesque, H. J. (1986). "Knowledge representation and reasoning." *Annual Reviews of Computer Science*, **1**, 255–287.

Week 4 (9/18, 9/20): Representing the commonsense world

Russell & Norvig, Chapter 8.

Michelangelo Grigni, Dimitri Papadias, and Christos Papadimitriou (1995). "Topological inference." In *Proc. Fourteenth International Joint Conference on Artificial Intelligence*, Montreal, Canada, 901–906.

Pat Hayes "The Second Naive Physics Manifesto." Chapter 1 of Hobbs & Moore (Eds.) *Formal theories of the commonsense world.* Ablex, 1985.

Pat Hayes 'Naive Physics I: An Ontology for Liquids'. Chapter 3 of Hobbs & Moore.

Week 5 (9/25, 9/27): Inference algorithms

Russell & Norvig, Chapters 9, 10.

Robinson, J. A. "A machine-oriented logic based on the resolution principle." *JACM* **12**(1), 23-41, 1965.

*Stickel, M. E. (1988). "A PROLOG technology theorem prover: Implementation by an extended

PROLOG compiler." *Journal of Automated Reasoning*, **4**(4), 353–80.

Week 6 (10/2, 10/4): Complexity of logical inference

Levesque, H. J., and Brachman, R. J. (1985). "A fundamental tradeoff in knowledge representation and reasoning (revised version)." In R. J. Brachman and H. J. Levesque (Eds.), *Readings in Knowledge Representation*, Los Altos, CA: Morgan Kaufmann, 41–70.

Francesco Donini, Maurizio Lenzirini, Daniele Nardi, and Werner Nutt (1991). "Tractable concept languages." In *Proceedings of the Twelfth International Joint Conference on Artificial Intelligence*, Sydney, Australia: Morgan Kaufmann, 458–463.

Bart Selman and Henry Kautz (1995). "Knowledge compilation and theory approximation." *Journal of the ACM*, to appear.

Week 7 (10/9, 10/11): Planning and plan execution

Russell & Norvig, Chapters 11, 13.

Avrim Blum and Merrick Furst (1995). "Fast planning through planning graph analysis." In *Proc. Fourteenth International Joint Conference on Artificial Intelligence*, Montreal, Canada, 1636–1642.

Craig Knoblock (1995). "Planning, executing, sensing, and replanning for information gathering." In *Proc. Fourteenth International Joint Conference on Artificial Intelligence*, Montreal, Canada, 1686–1693.

Week 8 (10/16, 10/18): Alternative agent architectures

Rod Brooks "Intelligence without representation." *Artificial intelligence* **47**, 139-159, 1991.

Phil Agre and David Chapman 'Pengo: An implementation of a theory of activity'. In *Proceedings of the Sixth National Conference on Artificial Intelligence*, Seattle, WA: Morgan Kaufmann, 1987.

Benson, S., and Nilsson, N. (1995). "Reacting, Planning, and Learning in an Autonomous Agent." To appear in *Machine Intelligence*, **14**.

Week 9 (10/23, 10/25): Software agents

Pattie Maes (1994). "Agents that reduce work and information overload." *Communications of the ACM*, **37**(7), 31–40.

Michael Genesereth and Steven Ketchpel (1994). "Software agents." *Communications of the ACM*, **37**(7), 48–53.

Oren Etzioni and Daniel Weld (1994). "A softbot-based interface to the Internet." *Communications of the ACM*, **37**(7), 72–76.

R. V. Guha and Doug Lenat (1994). "Enabling agents to work together." *Communications of the ACM*, **37**(7), 127–142.

Henry Kautz, Bart Selman, and Michael Coen (1994). "Bottom-up design of software agents." *Communications of the ACM*, **37**(7), 143–146.

Week 10 (10/30, 11/1): Propositional and first-order probability

Pearl, Chapters 1, 2.

Russell & Norvig, Chapter 14.

Fahiem Bacchus, Adam Grove, Joe Halpern, and Daphne Koller (1993). "Statistical foundations for default reasoning." In *Proceedings of the Thirteenth International Joint Conference on Artificial Intelligence*, Chambery, France: Morgan Kaufmann.

Fahiem Bacchus, Joseph Y. Halpern, and Hector Levesque (1995). "Reasoning about noisy sensors in the situation calculus." In *Proc. Fourteenth International Joint Conference on Artificial Intelligence*, Montreal, Canada, 1933–1940.

Week 11 (11/6, 11/8): Probabilistic networks

Pearl, Chapters 3, 4.

Russell and Norvig, Chapter 15.

Ross D. Shachter, Stig K. Anderson, and Peter Szolovits (1994). "Global conditioning for probabilistic inference in belief networks." In *Proc. Tenth Conference on Uncertainty in Artificial Intelligence*, Seattle, WA, Morgan Kaufmann, 514–522.

David Heckerman, John S. Breese, and Koos Rommelse (1995). "Decision-theoretic troubleshooting." *Communications of the ACM*, **38**(3), 49–56.

Malcolm Pradhan, Gregory Provan, Blackford Middleton, and Max Henrion (1994). "Knowledge engineering for large belief networks." In *Proc. Tenth Conference on Uncertainty in Artificial Intelligence*, Seattle, WA, Morgan Kaufmann, 484–490.

Week 12 (11/13, 11/15): Probabilistic networks contd.

Arthur Delcher, Adam Grove, Simon Kasif, and Judea Pearl (1995). "Logarithmic-time updates and queries in probabilistic networks." In *Proc. Eleventh Conference on Uncertainty in Artificial Intelligence*, Montreal, Canada, Morgan Kaufmann, 116–124.

Fung, R. and Chang, K. C. (1990). "Weighting and integrating evidence for stochastic simulation in Bayesian networks." In M. Henrion, R. D. Shachter, L. N. Kanal, and J. F. Lemmer (Eds.) *Uncertainty in Artificial Intelligence* **5**. Amsterdam: North Holland, 1990.

*Dagum, P. and Luby, M. (1993). "Approximating probabilistic inference in Bayesian belief networks is NP-hard." *Artificial Intelligence*, **60**(1), 141–153.

Wellman, M. P. (1990). "Fundamental concepts of qualitative probabilistic networks." *Artificial Intelligence*, **44**(3), 257–303.

Week 13 (11/20, 11/22): Decision theory and sequential decisions

Pearl, Chapter 6.1–6.2.

Russell & Norvig, Chapters 16, 17.1–17.3.

Michael P. Wellman and Jon Doyle (1992). "Modular utility representation for decision-theoretic planning." In *Proceedings of the First International Conference on AI Planning Systems*, College Park, Maryland: Morgan Kaufmann, 1992.

Fahiem Bacchus and Adam Grove (1995). "Graphical models for preference and utility." In *Proceedings of the Eleventh Conference on Uncertainty in Artificial Intelligence*, Montreal, Canada: Morgan Kaufmann.

Dean, T., Kaelbling, L. P., Kirman, J., and Nicholson, A. (1993). "Planning with deadlines in stochastic domains." In *Proceedings of the Eleventh National Conference on Artificial Intelligence*, Washington, DC: AAAI Press, 574–579.

Week 14 (11/27, 11/29): Partially observable environments

Russell & Norvig Chapter 17.4–17.7.

Anthony Cassandra, Leslie Kaelbling, and Michael Littman (1994). "Acting optimally in partially observable stochastic domains." In *Proceedings of the Twelfth National Conference on Artificial Intelligence*, Seattle, WA, 1994.

Uffe Kjaerulff "A computational scheme for dynamic Bayesian networks." Technical report, Dept. of Mathematics and Computer Science, Aalborg University, April 1993.

Paul Dagum, Adam Galper and Eric Horvitz "Dynamic network models for forecasting." *Proc. Eighth Conference on Uncertainty in Artificial Intelligence.*

Jeff Forbes, Tim Huang, Keiji Kanazawa, and Stuart Russell (1995). "The BATmobile: Towards a Bayesian Automated Taxi." In *Proc. Fourteenth International Joint Conference on Artificial Intelligence*, Montreal, Canada, 1878–1885.

Week 15 (12/4, 12/6): Decision-theoretic planning

Denise Draper, Steve hanks, and Daniel Weld (1994). "Probabilistic planning with information gathering and contingent execution." In *Proc. 2nd International Conference on AI Planning Systems*, San Mateo, CA, Morgan Kaufmann, 31–36.