

10. References

Agre, P.E. (1995) “Computational Research on Interaction and Agency”, Artificial Intelligence, Vol. 72, pp.1-52

Agre, P.E. and Chapman, D. (1987) “Pengi: An Implementation of a Theory of Activity”, Proceedings of the Sixth National Conference on Artificial Intelligence. Los Altos, CA: Morgan Kaufmann, pp. 268-272.

Albus, J.S. (1981) “Brains, Behavior, and Robotics”, Peterborough, NH: Byte Books/McGraw-Hill

Altman, J. and Sudarshan, K. (1975) “Postnatal Development of Locomotion in the Laboratory Rat”, Animal Behaviour, Vol. 23, pp. 896-920

Arbib, M.A. and Cobas, A. (1991) “Schemas for Prey-Catching in Frog and Toad”, in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior “From Animals to Animats”, pp. 142-150

Arbib, M.A. and Lee, H.B. (1993) “Anuran Visuomotor Coordination for Detour Behavior: From Retina to Motor Schemas”, in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) “From Animals to Animats 2” Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 42-51

Aylett, R. (Ed.) (1994) “Models or Behaviours, Which Way Forward for Robotics?”, AISB94 Workshop Series, University of Leeds, 12th and 13th April 1994

Baerends, G.P. (1976) “The Functional Organization of Behaviour”, Animal Behaviour, Vol. 24, pp.726-738

Ball, N. (1994) "Organizing an Animat's Behavioural Repertoires Using Kohonen Feature Maps", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 128-137

Barto, A.G. and Sutton, R.S. (1982) "Simulation of Anticipatory Responses in Classical Conditioning by a Neuron-like Adaptive Element", Behavioural Brain Research, Vol. 4, pp. 221-235

Baird, L.C. and Klopff, A.H. (1993) "Extensions to the Associative Control Process (ACP) Network: Hierarchies and Provable Optimality", in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) "From Animals to Animats 2" Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 163-171

Becker, J.D. (1970) "An Information-processing Model of Intermediate-level Cognition", Stanford Artificial Intelligence Project, Memo AI-119, Computer Science Dept., Stanford University (Ph.D. thesis)

Becker, J.D. (1973) "A Model for the Encoding of Experiential Information", in: Schank, R.C. and Colby, K.M. (Eds.) "Computer Models of Thought and Language", San Francisco: W.H. Freeman and Company, pp. 396-434

Beer, R.D. and Chiel, H.J. (1991) "The Neural Basis of Behavioral Choice in an Artificial Insect", in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior "From Animals to Animats", pp. 247-254

Berkson, W. and Wettersten, J. (1984) "Learning from Error: Karl Popper's Psychology of Learning", LaSalle, IL: Open Court

Blackman, D. (1974) "Operant Conditioning: An Experimental Analysis of Behaviour", London: Methuen & Co.

Boden, M.A. (1994) "Autonomy and Artificiality", AISB Quarterly, No. 87 (Spring 1994), pp. 22-28

Bolles, R.C. (1979) "Learning Theory", New York: Holt-Rinehart-Winston

Bonarini, A. (1994) "Some Methodological Issues about Designing Autonomous Agents which Learn Their Behaviors: The ELF Experience", in: Trappl, R (Ed.) "Cybernetics and Systems Research" (Proc. 12th Euro. Meeting of Cybernetics and Systems Research), Singapore: World Scientific Publishing, pp. 359-366

Bond, A.H. and Mott, D.H. (1981) "Learning of Sensory-motor Schemas in a Mobile Robot", in: Proceedings of the Joint Conference on Artificial Intelligence, (IJCAI-81), pp. 159-161

Booker, L.B., Goldberg, D.E. and Holland, J.H. (1990) "Classifier Systems and Genetic Algorithms", in: Carbonell, J. G. (Ed.) "Machine Learning: Paradigms and Methods", Cambridge, MA: The MIT Press (a Bradford Book), pp. 235-282

Booker, L.B. (1991) "Instinct as an Inductive Bias for Learning Behavioral Sequences", in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior "From Animals to Animats", pp. 230-237

Bower, G.H. and Hilgard, E.R. (1981) "Theories of Learning" Englewood Cliffs: Prentice Hall Inc. (Fifth edition)

Brooks, R.A. (1986) "A Robust Layered Control System For A Mobile Robot", IEEE Journal of Robotics and Automation, Vol. RA-2, No. 1, March 1986, pp. 14-23

Brooks, R.A. (1990) "The Behavior Language; User's Guide", MIT Artificial Intelligence Laboratory, A.I. Memo 1227, April 1990

Brooks, R.A. (1991a) "Intelligence Without Reason", MIT AI Laboratory, A.I. Memo No. 1293, April 1991. (Prepared for Computers and Thought, IJCAI-91, pre-print)

Brooks, R.A. (1991b) "Intelligence Without Representation", Artificial Intelligence, Vol. 47, pp. 139-159

Brooks, R.A. and Maes, P. (Eds.) (1994) "Artificial Life IV: Proceedings of the Fourth International Workshop on the Synthesis and Simulation of Living Systems", Cambridge, MA: The MIT Press

Buchanan, B.G., Mitchell, T.M., Smith, R.G. and Johnson, C.R., Jr. (1979) "Models of Learning Systems" Stanford Heuristic Programming Project Memo HPP-77-39 (Computer Science Dept. Report No. STAN-CS-79-692), January 1979

Campbell, B.A. and Masterson, F.A. (1969) "Psychophysics of Punishment", in: Campbell, B.A. and Church, R.M. (Eds.) "Punishment and Aversive Behavior", New York: Appleton-Century-Crofts, pp. 1-42

Carbonell, J. G. (Ed.) (1990) "Machine Learning: Paradigms and Methods", Cambridge, MA: The MIT Press (a Bradford Book)

Catania, A.C. and Harnad, S. (Eds.) (1988) "The Selection of Behavior, The Operant Behaviorism of B.F. Skinner: Comments and Consequences", Cambridge: The Cambridge University Press

Catania, A.C. (1988) "The Operant Behaviorism of B.F. Skinner", in: Catania, A.C. and Harnad, S. (Eds.) "The Selection of Behavior", Cambridge: The Cambridge University Press, pp. 3-8.

Chapman, D. (1989) "Penguins Can Make Cakes", AI Magazine, Vol. 10, No. 4 (Winter 1989) pp. 45-50

Chesters, W. and Hayes, G. (1994) "Connectionist Environment Modelling in a Real Robot", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 189-197

Chrisman, L. (1992) "Reinforcement Learning with Perceptual Aliasing: The Perceptual Distinctions Approach", in: Proceedings of the American Association for Artificial Intelligence (AAAI-92), San Jose, CA, pp. 183-188

Cliff, D. (1991) "Computational Neuroethology: A Provisional Manifesto", in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior "From Animals to Animats", pp. 29-39

Cliff, D. (1994) "AI and A-Life: Never Mind the Blocksworld", AISB Quarterly, No. 87 (Spring 1994), pp. 16-21

Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) (1994) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", Cambridge, MA: The MIT Press

Dawkins, R. (1986) "The Blind Watchmaker", Harmondsworth: Penguin Books Ltd.

Dewsbury, D.A. (1978) "Comparative Animal Behavior", New York: McGraw-Hill Book Company

Dolhinow, P.J. and Bishop, N. (1972) "The Development of Motor Skills and Social Relationships Among Primates Through Play", in Dolhinow, P.J. (Ed.) "Primate Patterns", New York: Holt Rinehart Winston, pp. 312-337

Dorigo, M. (1995) "ALECSYS and the AutonoMouse: Learning to Control a Real Robot by Distributed Classifier Systems", Machine Learning, Vol. 19, pp. 209-240

Dorigo, M. and Bersini, H. (1994) “A Comparison of *Q*-learning and Classifier Systems”, in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior “From Animals to Animats 3”, pp. 248-255

Dorigo, M. and Colombetti, M. (1994) “Robot Shaping: Developing Autonomous Agents Through Learning”, Artificial Intelligence, Vol. 71, pp. 321-370

Drescher, G.L. (1987) “A Mechanism for Early Piagetian Learning”, in: Proceedings of the American Association for Artificial Intelligence (AAAI-87), pp. 290-294

Drescher, G.L. (1991) “Made-up Minds: A Constructivist Approach to Artificial Intelligence”, Cambridge, MA: The MIT Press

Fikes, R.E. and Nilsson, N.J. (1971) “STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving”, Artificial Intelligence, Vol. 2, pp. 189-208

Foner, L.N. and Maes, P. (1994) “Paying Attention to What's Important: Using Focus of Attention to Improve Unsupervised Learning”, in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior “From Animals to Animats 3”, pp. 256-265

Friedman, L. (1967) “Instinctive Behavior and its Computer Synthesis”, Behavioral Science, Vol. 12, pp. 85-108

Gaussier, P. and Zrehen, S. (1994) “A Topological Neural Map for On-Line Learning: Emergence of Obstacle Avoidance in a Mobile Robot”, in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior “From Animals to Animats 3”, pp. 282-290

Ginsberg, M.L. (1989) "Universal Planning: An (Almost) Universally Bad Idea" AI Magazine, Vol. 4, No. 10 (Winter 1989), pp. 40-44

Giszter, S. (1994) "Reinforcement Tuning of Action Synthesis and Selection in a 'Virtual Frog'", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 291-300

Goodwin, R. and Simmons, R. (1992) "Rational Handling of Multiple Goals for Mobile Robots", in: "Proceedings of the First International Conference on Artificial Intelligence Planning Systems", June 1992, College Park, MD. (pre-print)

Haigh, K.Z. and Veloso, M.M. (1996) "Planning with Dynamic Goals for Robot Execution", in: "Proceedings of the AAAI Fall Symposium "Plan Execution: Problems and Issues""", AAAI Press, November 1996 (pre-print, to appear)

Hall, J.F. (1966) "The Psychology of Learning", Philadelphia and New York: J.B. Lippincott Company

Hallam, B.E., Hallam, J.C.T. and Halperin, J.R.P. (1994) "An Ethological Model for Implementation in Mobile Robots", Adaptive Behavior, Vol. 3, No. 1, pp. 51-79

Harrison, P. (1983) "Operational Research: Quantitative Decision Analysis", London: Mitchell Beazley Publishers

Hartley, R. (1993) "Propulsion and Guidance in a Simulation of the Worm *C. Elegans*", in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) "From Animals to Animats 2" Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 122-128

Heitkötter, J. and Beasley, D. (Eds.) (1995) "The Hitch-Hiker's Guide to Evolutionary Computation: A List of Frequently Asked Questions", Available via anonymous FTP from "<rtfm.mit.edu:/pub/usenet/news.answers/ai-faq/genetic/>", about 90 pages

Hergenhahn, B.R. and Olson, M.H. (1993) "An Introduction to Theories of Learning", Englewood Cliffs, N.J.: Prentice-Hall (fourth edition)

Hess, E.H. (1959) "Imprinting: An Effect of Early Experience", Science, Vol. 130, pp. 133-141

Highfield, R. (1996) "Working Out How Time Flies", Science Feature in the Daily Telegraph, Wednesday February 21, 1996, p. 14

Hinde, R.A. (1970) "Animal Behaviour: A Synthesis of Ethology and Comparative Psychology", New York: McGraw-Hill (second edition)

Hinton, G.E. (1986) "Learning Distributed Representations of Concepts", in: "Proceedings of the Eighth Annual Conference of the Cognitive Science Society", Amherst, MA

Hinton, G.E. (1990) "Connectionist Learning Procedures", in: Carbonell, J. G. (Ed.) "Machine Learning: Paradigms and Methods", Cambridge, MA: The MIT Press (a Bradford Book), pp. 185-234

Holland, J.H. (1975) "Adaptation in Natural and Artificial Systems", Ann Arbor: The University of Michigan Press

Hubel, D.H. and Wiesel, T.N. (1962) "Receptive Fields, Binocular Interaction, and Functional Architecture in the Cat's Visual Cortex", Journal of Physiology, Vol. 160, pp. 106-154

Humphrys, M. (1995) "W-learning: Competition Among Selfish *Q*-learners" University of Cambridge Computer Laboratory Technical Report No. 362, April 1995.

Jahoda, G. (1969) "The Psychology of Superstition", London: Allen Lane, The Penguin Press

Jochem, T.M., Pomerleau, D.A. and Thorpe, C.E. (1993) "MANIAC: A Next Generation Neurally Based Autonomous Road Follower", in: "Proceedings of the International Conference on Intelligent Autonomous Systems: IAS-3", Pittsburgh, Pennsylvania, (pre-print)

Jones, T.L. (1971) "A Computer Model of Simple Forms of Learning", Technical Report AD-720 337 (AI-TM-236). Massachusetts Institute of Technology, Cambridge, Massachusetts

Kaelbling, L.P. (1994) "Associative Reinforcement Learning: Functions in k -DNF", Machine Learning, Vol. 15, pp. 279-298

Kaelbling, L.P. (1996) "Introduction" [to special issue on reinforcement learning], Machine Learning, Vol. 22, pp. 7-9

Kamin, L.J. (1969) "Predictability, Surprise, Attention, and Conditioning", in: Campbell, B.A. and Church, R.M. (Eds.) "Punishment and Aversive Behavior", New York: Appleton-Century-Crofts, pp. 279-296

Kearsley, G. (1996) "Explorations in Learning and Instruction: The Theory Into Practice Database". George Washington University Psychology Dept. technical report at "<http://gwis2.circ.gwu.edu/~kearsley/>"

King, N. (1987) "The First Five Minutes", London: Simon and Schuster

Kirsh, D. (1991) "Today the Earwig, Tomorrow Man?", Artificial Intelligence, Vol. 47, pp. 161-184

Klahr, D. (1994) "Children, Adults, and Machines as Discovery Systems", Machine Learning, Vol. 14, pp. 313-320

Kleitman, N. and Crisler, G. (1927) "A Quantitative Study of a Salivary Conditioned Reflex", American Journal of Physiology, Vol. 79, pp. 571-614 (cited Bower and Hilgard, 1981, p. 51)

Klopf, A.H. (1988) "A Neuronal Model of Classical Conditioning", *Psychobiology*, Vol. 16, No. 2, pp. 85-125

Klopf, A.H., Morgan, J.S. and Weaver, S.E. (1993) "Modeling Nervous System Function with a Hierarchical Network of Control Systems that Learn", in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) "From Animals to Animats 2" Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 254-261

Knuth, D.E. (1973) "The Art of Computer Programming, Volume 3: Sorting and Searching", Reading, MA: Addison-Wesley Publishing Company

Koch, S. (1954) "Clark L. Hull", in: Estes, W.K., Koch, S., MacCorquodale, K., Meehl, P.E., Mueller, C.G., Schoenfeld, W.N. and Verplanck, W.S. (Eds.) "Modern Learning Theory: A Critical Analysis of Five Examples", New York: Appleton-Century-Crofts, pp. 1-176

Krechevsky, I. (1933) ""Hypotheses" in Rats", *Psychological Review*, Vol. 39, pp. 516-532

Langley, P. (1996) "Elements of Machine Learning", Palo Alto: Morgan Kaufmann Publishers

Langton, C. (Ed.) (1989) "Artificial Life, The Proceedings of an Interdisciplinary Workshop on the Synthesis and Simulation of Living Systems", SFI Studies in Sciences of Complexity, Los Alamos, September 1987, Reading, MA: Addison-Wesley Publishing Co.

Levine, M. (1970) "Human Discrimination Learning: The Subset-sampling Assumption", *Psychological Bulletin*, Vol. 74, No. 6, pp 397-404

Levy, S. (1992) "Artificial Life, The Quest for a New Creation", Harmondsworth: Penguin Books

Liaw, J-S. and Arbib, M.A. (1993) "Neural Mechanisms Underlying Direction-Selective Avoidance Behavior", *Adaptive Behavior*, Vol. 1, No. 3 (Winter 1993), pp. 227-261

Lieberman, D.A. (1990) "Learning, Behavior and Cognition", Belmont, CA: Wadsworth Publishing Company

Lin, L-J. (1991) "Programming Robots Using Reinforcement Learning and Teaching", in: *Proceedings of the American Association for Artificial Intelligence (AAAI-91)*, pp. 781-786

Lin, L-J. and Mitchell, T.M. (1993) "Reinforcement Learning with Hidden States", in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) "From Animals to Animats 2" *Proceedings of the Second International Conference on Simulation of Adaptive Behavior*, pp. 271-280

Littman, M.L. (1994) "Memoryless Policies: Theoretical Limitations and Practical Results", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) *Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3"*, pp. 238-245

Lofts, B. (1970) "Animal Photoperiodism", London: Edward Arnold (Publishers) Ltd.

Lorenz, K.Z. (1950) "The Comparative Method in Studying Innate Behaviour Patterns", in: "Physiological Mechanisms in Animal Behaviour, Symposium of the Society of Experimental Biology", Vol. 4, London: Academic Press, pp. 221-268

MacCorquodale, K. and Meehl, P.E. (1953) "Preliminary Suggestions as to a Formalization of Expectancy Theory", *Psychological Review*, Vol. 60, No. 1, pp. 55-63

MacCorquodale, K. and Meehl, P.E. (1954) "Edward C. Tolman", in: Estes, W.K., Koch, S., MacCorquodale, K., Meehl, P.E., Mueller, C.G., Schoenfeld, W.N. and

Verplanck, W.S. (Eds.) "Modern Learning Theory: A Critical Analysis of Five Examples", New York: Appleton-Century-Crofts, pp. 177-266

Maclin, R. and Shavlik, J.W. (1996) "Creating Advice-Taking Reinforcement Learners", Machine Learning, Vol. 22, pp. 251-281

Mahadevan, S. and Connell, J. (1991) "Scaling Reinforcement Learning to Robotics by Exploiting the Subsumption Architecture", in: Birnbaum, L.A. and Collins, G.C. (Eds.) "Machine Learning, Proceedings of the Eighth International Workshop (ML91)", San Mateo, CA: Morgan Kaufmann Publishers, Inc., pp. 328-332

Maes, P. (1989) "The Dynamics of Action Selection", Proceedings of the 11th International Joint Conference for Artificial Intelligence (IJCAI-89), pp. 991-997

Maes, P. (1991) "A Bottom-up Mechanism for Behavior Selection in an Artificial Creature", in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior "From Animals to Animats", pp. 238-246

Maes, P. (1993) "Behavior-based Artificial Intelligence", in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) "From Animals to Animats 2" Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 2-10

Maes, P. and Brooks, R.A. (1990) "Learning to Coordinate Behaviors", in: Proceedings of the American Association for Artificial Intelligence (AAAI-90), pp. 796-802

Maes, P., Mataric, M.J., Meyer, J-A., Pollack, J. and Wilson, S.W. (Eds.) "From Animals to Animats 4" Proceedings of the Fourth International Conference on Simulation of Adaptive Behavior, Cambridge, MA: The MIT Press

McCallum, R.A. (1995) "Instance-Based Utile Distinctions for Reinforcement Learning with Hidden State", in: Proceedings of the 12th International Machine Learning Conference, Lake Tahoe, CA. (pre-print)

McCulloch, W.S. and Pitts, W.H. (1943) “A Logical Calculus of the Ideas Immanent in Nervous Activity”, *Bulletin of Mathematical Biophysics*, Vol. 5, pp. 115-133

McFarland, D. and Sibly, R.M. (1975) “The Behavioural Final Common Path”, *Philosophical Transactions of the Royal Society (Series B)*, Vol. 270, pp. 265-293

Meyer, J-A. and Wilson, S.W. (Eds.) (1991) *Proceedings of the First International Conference on Simulation of Adaptive Behavior “From Animals to Animats”*, Cambridge, MA: The MIT Press

Meyer, J-A. and Guillot, A. (1991) “Simulation of Adaptive Behavior in Animats: Review and Prospect”, in: Meyer, J-A. and Wilson, S.W. (Eds.) *Proceedings of the First International Conference on Simulation of Adaptive Behavior “From Animals to Animats”*, pp. 2-14

Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) (1993) “From Animals to Animats 2” *Proceedings of the Second International Conference on Simulation of Adaptive Behavior*, Cambridge, MA: The MIT Press

Michalski, R.S. (1980) “Pattern Recognition as Rule-Guided Inductive Inference” *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. PAMI-2, No. 4, pp. 349-361

Millán, J. del R. (1994) “Learning Efficient Reactive Behavioral Sequences from Basic Reflexes in a Goal-Directed Autonomous Robot”, in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) *Proceedings of the Third International Conference on Simulation of Adaptive Behavior “From Animals to Animats 3”*, pp. 266-274

Millán, J. del R. and Torras, C. (1991) “Learning to Avoid Obstacles through Reinforcement”, in: Birnbaum, L.A. and Collins, G.C. (Eds.) “Machine Learning, Proceedings of the Eighth International Workshop (ML91)”, San Mateo, CA: Morgan Kaufmann Publishers, Inc., pp. 298-302

Minsky, M. (1963) "Steps Toward Artificial Intelligence", in: Feignbaum, E.A. and Feldman, J. (Eds.) "Computers and Thought", New York: McGraw-Hill, pp. 406-450

Minsky, M. (1985) "The Society of Mind", New York: Simon and Schuster (A Touchstone Book)

Minsky, M. and Papert, S. (1969) "Perceptrons: An Introduction to Computational Geometry", Cambridge, MA: The MIT Press

Minton, S., Carbonell, J.G., Knoblock, C.A., Kuokka, D.R., Etzioni, O. and Gil, Y. (1990) "Explanation-Based Learning: A Problem Solving Perspective", in: Carbonell, J. G. (Ed.) "Machine Learning: Paradigms and Methods", Cambridge, MA: The MIT Press (a Bradford Book), pp. 63-118

Moore, A.W. and Atkeson, C.G. (1993) "Prioritized Sweeping: Reinforcement Learning With Less Data and Less Time", Machine Learning, Vol. 13, pp. 103-130

Mott, D.H. (1981) "Sensori-motor Learning in a Mobile Robot", AI Laboratory Memo. Department of Computer Science and Statistics, Queen Mary College, University of London, Ph.D. Thesis.

Mowrer, O.H. (1956) "Two-factor Learning Theory Reconsidered, with Special Reference to Secondary Reinforcement and the Concept of Habit", Psychological Review, Vol. 63, pp. 114-128

Mura, F. and Franceschini, N. (1994) "Visual Control of Altitude and Speed in a Flying Agent", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 91-99

Nehmzow, U. and McGonigle, B. (1994) "Achieving Rapid Adaptations in Robots by Means of External Tuition", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson,

S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior “From Animals to Animats 3”, pp. 301-308

Newell, A. and Simon, H.A. (1972) “Human Problem Solving”, Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Nilsson, N.J. (1965) “Learning Machines: Foundations of Trainable Pattern-Classifying Systems”, New York: McGraw-Hill

Nilsson, N.J. (1980) “Principles of Artificial Intelligence”, New York: Springer-Verlag (Symbolic Computation Series)

Norman, D.A. (1969) “Memory and Attention, an Introduction to Human Information Processing”, New York: Wiley & Sons, Inc.

Payton, D.W., Rosenblatt, J.K. and Keirsey, D.M. (1990) “Plan Guided Reaction”, IEEE Transactions on Systems, Man, and Cybernetics, Vol. 20, No. 6, pp. 1370-1382

Peng, J. and Williams, R.J. (1992) “Efficient Learning and Planning Within the Dyna Framework”, in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) “From Animals to Animats 2” Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 281-290

Peng, J. and Williams, R.J. (1996) “Incremental Multi-Step *Q*-learning”, Machine Learning, Vol. 22, pp. 283-290

Pinker, S. (1994) “The Language of Instinct, The New Science of Language and Mind”, Harmondsworth: Penguin Books Ltd.

Pomerleau, D.A. (1994) “Neural Network-Based Vision for Precise Control of a Walking Robot”, Machine Learning, Vol. 15, No. 2, pp. 125-136

Popper, K.R. (1959) "The Logic of Scientific Discovery", London: Routledge. This is the 1992 reprint of the 1959 translation into English of the 1934 original (in German) "*Logik der Forschung*".

Premack, D. (1976) "Intelligence in Ape and Man", Hillsdale, NJ: Lawrence Erlbaum Associates

Puterman, M.L. (1994) "Markov Decision Processes, Discrete Stochastic Dynamic Programming", New York: John Wiley and Sons

Razran, G. (1971) "Mind in Evolution: An East-West Synthesis of Learned Behavior and Cognition", Boston: Houghton Mifflin Company

Rescorla, R.A. (1988) "Pavlovian Conditioning, It's Not What You Think It Is", American Psychologist, Vol. 43, No. 3, pp. 151-160

Restle, F. (1962) "The Selection of Strategies in Cue Learning", Psychological Review, Vol. 69, No. 4, pp. 329-343

Reynolds, V. (1976) "The Origins of a Behavioural Vocabulary: the Case of the Rhesus Monkey", Journal of the Theory of Social Behaviour, Vol. 6, No. 1, pp. 105-142

Ring, M. (1993) "Two Methods for Hierarchy Learning in Reinforcement Environments", in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) "From Animals to Animats 2" Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 148-155

Riolo, R.L. (1991) "Lookahead Planning and Latent Learning in a Classifier System", in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior "From Animals to Animats", pp. 316-326

Rivest, R.L. and Schapire, R.E. (1990) "A New Approach to Unsupervised Learning in Deterministic Environments", in: Kodratoff, Y. and Michalski, R.S.

(Eds.) "Machine Learning: An Artificial Intelligence Approach, Volume III", San Mateo, CA: Morgan Kaufmann, pp. 670-684

Roitblat, H.L., Moore, P.W.B., Nachtigall, P.E. and Penner, R.H. (1991) "Biomimetic Sonar processing: From Dolphin Echolocation to Artificial Neural Networks", in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior "From Animals to Animats", pp. 66-76

Rosenblatt, F. (1962) "Principles of Neurodynamics: Perceptrons and the Theory of Brain Mechanisms", New York: Spartan Books

Rosenblatt, J.K. and Payton, D.W. (1989) "A Fine-Grained Alternative to the Subsumption Architecture for Mobile Robot Control", Proceedings of the IEEE/INNS International Joint Conference on Neural Networks, Vol. II, pp. 317-323

Ross, S. (1983) "Introduction to Stochastic Dynamic Programming", New York: Academic Press

Rumelhart, D.E., Hinton, G.E. and Williams, R.J. (1986) "Learning Representations by Back-Propagating Errors", Nature, Vol. 323, pp. 533-536

Schmajuk, N.A. (1994) "Behavioral Dynamics of Escape and Avoidance: A Neural Network Approach", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 118-127

Schölkopf, B. and Mallot, H.A. (1995) "View-Based Cognitive Mapping and Path Planning", Adaptive Behavior, Vol. 3, No. 3 (Winter 1995), pp. 311-348

Schoppers, M.J. (1987) "Universal Plans for Reactive Robots in Unpredictable Environments", Proceedings of the Tenth International Joint Conference on Artificial Intelligence, Milan, August 23-28, 1987, pp. 1039-1046

Schoppers, M.J. (1989) "In Defense of Reaction Plans as Caches" AI Magazine, Vol. 10, No. 4 (Winter 1989), pp. 51-59

Schoppers, M.J. (1995) "The Use of Dynamics in an Intelligent Controller for a Space Faring Rescue Robot" Artificial Intelligence, Vol. 73, pp. 175-230

Schwartz, B. (1989) "Psychology of Learning and Behavior", New York: W.W. Norton & Co. (third edition)

Scutt, T. (1994) "The Five Neuron Trick: Using Classical Conditioning to Learn How to Seek Light", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 364-370

Sejnowski, T.J., Koch, C. and Churchland, P.S. (1988) "Computational Neuroscience", Science, Vol. 241, pp. 1299-1306

Sejnowski, T.J. and Rosenberg, C.R. (1987) "Parallel Networks that Learn to Pronounce English Text", Complex Systems, Vol. 1, pp. 145-168

Shen, W-M. (1993) "Discovery as Autonomous Learning from the Environment", Machine Learning, Vol. 12, pp. 143-165

Shen, W-M. (1994) "Autonomous Learning from the Environment", New York: Computer Science Press/W.H. Freeman and Company

Shettleworth, S.J. (1975) "Reinforcement and the Organization of Behavior in Golden Hamsters: Hunger, Environment, and Food Reinforcement", Journal of Experimental Psychology: Animal Behavior Processes, Vol. 104, No. 1, pp. 56-87

Simon, H.A. (1983) "Why Should Machines Learn?", in: Michalski, R.S., Carbonell, J.G. and Mitchell, T.M. (Eds.), "Machine Learning: An Artificial Intelligence Approach", Palo Alto, CA: Tioga Publishing Company, pp. 25-37

Singh, S.P. and Sutton, R.S. (1996) “Reinforcement Learning with Replacing Eligibility Traces”, Machine Learning, Vol. 22, pp. 123-158

Skinner, B.F. (1948) “Superstition in the Pigeon”, Journal of Experimental Psychology, Vol. 38, pp. 168-172

Sutton, R.S. (1988) “Learning to Predict by the Methods of Temporal Differences”, Machine Learning, Vol. 3, pp. 9-44

Sutton, R.S. (1990) “Integrated Architectures for Learning, Planning, and Reacting Based on Approximating Dynamic Programming”, in: Porter B.W. and Mooney, R.J. (Eds.) Machine Learning, Proceedings of the Seventh International Conference on Machine Learning, Morgan Kaufmann Publishers, pp. 216-224

Sutton, R.S. (1991) “Reinforcement Learning Architectures for Animats”, in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior “From Animals to Animats”, pp. 288-296

Sutton, R.S. (1992) “Introduction: The Challenge of Reinforcement Learning”, Machine Learning, Vol. 8, pp. 225-227

Tenenberg, J., Karlsson, J. and Whitehead, S.D. (1993) “Learning via Task Decomposition”, in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) “From Animals to Animats 2” Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 337-343

Thistlethwaite, D. (1951) “A Critical Review of Latent Learning and Related Experiments”, Psychological Bulletin, Vol. 48, No. 2, pp. 97-129

Thorndike, E.L. (1911) “Animal Intelligence”, New York: Macmillan Company (1965 facsimile of 1911 edition, New York and London: Hafner Publishing Company)

Tinbergen, N. (1951) "The Study of Instinct", London: The Oxford University Press

Toates, F. (1994) "What is Cognitive and What is not Cognitive", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 102-107

Tolman, E.C. and Honzik, C.H. (1930a) "Introduction and Removal of Reward, and Maze Performance in Rats" University of California Publ. Psychol., Vol. 4, pp 257-275 (cited Bower and Hilgard, 1981, pp 338-340)

Tolman, E.C. and Honzik, C.H. (1930a) ""Insight" in Rats" University of California Publ. Psychol., Vol. 4, pp 215-232 (cited Bower and Hilgard, 1981, pp 335-338)

Tolman, E.C. (1932) "Purposive Behavior in Animals and Men" New York: The Century Co. (Century Psychology Series)

Tolman, E.C. (1938) "The Determiners of Behavior at a Choice Point", Psychological Review, Vol. 45, No. 1, pp. 1-41

Tolman, E.C. (1948) "Cognitive Maps in Rats and Men", Psychological Review, Vol. 55, pp. 189-208

Travers, M. (1989) "Animal Construction Kits", in: Langton, C. (Ed.) "Artificial Life, SFI Studies in Sciences of Complexity", Reading, MA: Addison-Wesley Publishing Co., pp. 421-442

Tyrrell, T. (1993) "Computational Mechanisms for Action Selection" University of Edinburgh, Ph.D. thesis

Tyrrell, T. (1994) "An Evaluation of Maes's Bottom-Up Mechanism for Behavior Selection", Adaptive Behavior, Vol. 1, No. 4, pp. 387-420

Venturini, G. (1994) "Adaptation in Dynamic Environments Through a Minimal Probability of Exploration", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 371-379

Verplanck, W.S. (1954) "Burrhus F. Skinner", in: Estes, W.K., Koch, S., MacCorquodale, K., Meehl, P.E., Mueller, C.G., Schoenfeld, W.N. and Verplanck, W.S. (Eds.) "Modern Learning Theory: A Critical Analysis of Five Examples", New York: Appleton-Century-Crofts, pp. 267-316

Vershure, P.F.M.J. and Pfeifer, R. (1993) "Categorization, Representations, and The Dynamics of System-Environment Interaction: A Case Study in Autonomous Systems", in: Meyer, J-A., Roitblat, H.L. and Wilson, S.W. (Eds.) "From Animals to Animats 2" Proceedings of the Second International Conference on Simulation of Adaptive Behavior , pp. 210-217

Walter, W.G. (1953) "The Living Brain", London: Gerald Duckworth & Co. Ltd.

Watkins, C.J.C.H. (1989) "Learning from Delayed Rewards", King's College, Cambridge University (Ph.D. thesis)

Watkins, C.J.C.H. and Dayan, P. (1992) "Technical Note: *Q*-learning", Machine Learning, Vol. 8, pp. 279-292

Webb, B. (1994) "Robotic Experiments in Cricket Phonotaxis", in: Cliff, D., Husbands, P., Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the Third International Conference on Simulation of Adaptive Behavior "From Animals to Animats 3", pp. 45-54

Widrow, B. and Hoff, M.E. (1960) "Adaptive Switching Circuits", 1960 WESCON Convention Record, Part IV, pp. 96-104

Wilson, S.W. (1985) "Knowledge Growth in an Artificial Animal", in: Greffenstette, J.J. (Ed.) "Proceedings of the First International Conference on

Genetic Algorithms and Their Applications”, Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 16-23

Wilson, S.W. (1991) “The Animat Path to AI”, in: Meyer, J-A. and Wilson, S.W. (Eds.) Proceedings of the First International Conference on Simulation of Adaptive Behavior “From Animals to Animats”, pp. 15-21

Whitehead, S.D. and Ballard, D.H. (1991) “Learning to Perceive and Act by Trial and Error”, Machine Learning, Vol. 7, pp. 45-83

Whitehead, S.D. and Lin, L-J. (1995) “Reinforcement Learning of Non-Markov Decision Processes”, Artificial Intelligence, Vol. 73, pp. 271-306

Wyatt, J. (1995) “Issues in Putting Reinforcement Learning onto Robots” Presented at AISB 1995 Robotics Summer School. DAI, Edinburgh University, March 1995.

11. SUBJECT and AUTHOR INDEX

A		
α	<i>See</i> reinforcement rate	
ACP model	43	
action	73	
action cost	74, 113, 149	
action dispersion probability	156, 157	
action patterns	75	
action repetition rate	156	
action selection	80	
Action Selection Mechanisms	12, 105	
activation	48, 70	
activation trace	69	
actuators	73	
Adisp	<i>See</i> action dispersion probability	
ADROIT	14	
AGIL	38	
Agre, P.E.	11, 94	
Albus, J.S.	16, 42	
ALECSYS	38	
ALP	51, 89, 188	
alternative path experiments	126	
Altman, J.	20	
ALVINN	41	
analogic-matching	50	
animat	11	
animat-centric view	127	
appetitive actions	13	
approximate universal plan	219	
Arbib, M.A.	20, 72	
Arep	<i>See</i> action repetition rate	
Artificial Neural Networks	38	
Association List	208	
association unit	39	
at (@) notation	97, 127	
Atkeson, C.G.	35, 200	
autonomy (behavioural)	133	
aversion	27, 76, 214	
Aylett, R.	10	
B		
β	<i>See</i> extinction rate	
backpropagation	40	
Baerends, G.P.	14	
Baird, L.C.	43	
Ball, N.	38	
Ballard, D.H.	30, 94	
Barto, A.G.	25, 26	
basal level threshold	103, 137	
Beasley, D.	37	
Becker, J.D.	49, 57	
Beer, R.D.	20	
behavior language	15	
behavior units	14	
behaviour based model	11	
Behaviour List	93, 102	
behaviour priority	84	
Berkson, W.	68	
Bersini, H.	38	
best_valence_level	213	
bestcost	125, 138	
bid amount	37	
biological plausibility	21	
biomimetics	21	
Bishop, N.	78	
Blackman, D.	69, 80, 81	
blind-trials	66	
Boden, M.A.	106	
Bolles, R.C.	23	
Boltzmann distribution	33, 170	
Bonarini, A.	55	
Bond, A.H.	49	
Booker, L.B.	35, 149	
Bower, G.H.	18, 23, 29, 45, 58, 81, 168, 209, 221	
Brooks, R.A.	9, 11, 14, 31, 57, 216	
Buchanan, B.G.	222	
bucket-brigade algorithm	37, 104	
C		
cache (universal plan)	218	
Campbell, B.A.	214	
Carbonell, J.G.	24, 223	
Catania, A.C.	43, 46	
cathexis	47, 77, 208	
causality	127	
CFSC2	55	
Chapman, D.	94	
Chesters, W.	41	

<i>Chiel, H.J.</i>	20	drive	28
<i>Chrisman, L.</i>	30	dual path blocking	117
<i>Churchland, P.S.</i>	20	dual-path extinction	222
circadian rhythm	73	Dynamic Expectancy Model	21, 57, 86, 89, 146
classical conditioning	23, 24, 209	Dynamic Policy Map	78, 112, 138, 218
Classifier Systems	35	dynamic programming	32, 170
classifiers	36	Dyna-PI	149, 205
<i>Cliff, D.</i>	10, 20, 106	Dyna-Q+	34, 114, 149, 195, 206
CMAC	42	DynaWorld/Standard	149
<i>Cobas, A.</i>	20, 72	E	
cognitive map	48	ϵ	<i>See</i> basal level threshold
cognitive viewpoint	44	elicitor-cathexis	48
<i>Colombetti, M.</i>	38	encapsulation	70
composite action	53, 100	Estes, William K.	29, 168
compound actions	74	etho-engineer	223
computational neuroethology	20	ethogram	11, 57
computational neuroscience	21	ethology	12
conditioned reinforcer	80	<i>Etzioni, O.</i>	223
conditioned stimulus	24	Execution Cycle	131
conflictor link	17	expectancy	46
Connection Machine	89	expectancy postulates	46
connectionism	38	expectancy theory	45, 120, 208
<i>Connell, J.</i>	30	expectandum	47
consummatory actions	13	Expectation Based Learning	22, 223
corroboration	60	experience replay	31
cost estimate	79, 113	experimental extinction	25
creation (hypothesis)	62, 133, 143	Explanation Based Learning	223
creation bonus	110, 114, 143	exploration bonus	35, 114
credit assignment problem	30	explore-exploit tradeoff	33, 38
<i>Crisler, G.</i>	67	extended context	54
critic	222	extended result	54
cumulative reward	194	extinction	46, 77, 81
curiosity	199	extinction (goal)	184
D		extinction rate	61, 110, 188
$\Delta(\delta)$	<i>See</i> rebuildpolicynet	F	
<i>Dawkins, R.</i>	38	falsification	68
<i>Dayan, P.</i>	32	FDMSSSE	32, 64
default (exploratory) behaviours	85	FIFO buffer	49
deictic marker	94	<i>Fikes, R.E.</i>	115
deictic representation	94	filter.exe	155
<i>Dewsbury, D.</i>	20	first appearances effect	128
differentiation	25, 51, 62	fixed action patterns	13
discriminated operant	42	fixed interval schedule	81
<i>Dolinow, P.J.</i>	78	fixed ratio schedule	81
don't care (#)	36, 99	fixed schedule experiments	158
<i>Dorigo, M.</i>	38	<i>Foner, L.</i>	72
DoWorldAction	148	forgetting	63
<i>Drescher, G.L.</i>	49, 57, 58, 89, 107, 223		

<i>Franceschini, N.</i>	20	<i>Highfield, R.</i>	72
<i>Friedman, L.</i>	14	<i>Hilgard, E.R.</i>	18, 23, 29, 45, 58, 81,
<i>FSMSSE</i>	32, 64	<i>168, 209, 221</i>	
G			
γ	<i>See selection factor</i>		
<i>Gaussier, P.</i>	41	<i>Hinde, R.A.</i>	78
<i>General Problem Solver</i>	107	<i>Hinton, G.E.</i>	40, 41
generalisation	25, 129	<i>Hoff, M.E.</i>	30
generalised inference	47	<i>Holland, J.H.</i>	35, 38
genetic algorithm	38, 129	<i>Honzik, C.H.</i>	159, 201
genetic crossover	38	<i>Hubel, D.H.</i>	72
<i>Genghis (robot)</i>	31	<i>Hull, Clark L.</i>	28, 104, 113
<i>Gil, Y.</i>	223	<i>Humphrys, M.</i>	35
<i>Ginsberg, M.L.</i>	219	<i>Husbands, P.</i>	10
<i>Giszter, S.</i>	31	<i>hypo_activation_trace</i>	108
goal (definition)	76	<i>hypo_age</i>	108, 114
goal cancellation level	126, 141, 190	<i>hypo_cneg</i>	109
goal extinction	77, 141, 188	<i>hypo_cpos</i>	109
goal extinction point	77, 124	<i>hypo_first_seen</i>	108
Goal List	93, 104	<i>hypo_identifier</i>	108
goal priority	76, 104, 112, 153, 210	<i>hypo_last_seen</i>	108
goal recovery mechanism	125, 141, 189	<i>hypo_maturity</i>	114, 128
goal satisfaction	76, 105	<i>hypothalamus</i>	72
goal setting behaviours	84, 102, 137	<i>Hypothesis List</i>	93, 105
goal strength function	210	<i>hypothesis template</i>	127
goal valence	76	<i>Hypothetico-Corroboration</i>	59, 69
goal_recovery_rate	125	<i>Hypothetico-Deductive</i>	59, 69
<i>GOFAI</i>	106		
<i>Goldberg, D.E.</i>	35	I	
<i>Goodwin, R.</i>	211	<i>implicit activation</i>	107, 133
graph-search	112	<i>Imprinting</i>	20, 102
<i>Guillot, A.</i>	48	<i>induced valence</i>	78
H			
habituation	19, 193	<i>induction, learning by</i>	129
<i>Haigh, K.Z.</i>	211	<i>inference</i>	47
<i>Hall, J.F.</i>	23	<i>innate behaviour</i>	102
<i>Hallam, B.E.</i>	14	<i>innate releasing mechanism</i>	13
<i>Hallam, J.C.T.</i>	14	<i>Input Token List</i>	93, 94, 148
<i>Halperin, J.R.P.</i>	14	<i>instrumental conditioning</i>	42
<i>Harnad, S.</i>	43	<i>instrumental learning</i>	127
<i>Harrison, P.</i>	130	<i>intelligence without reason</i>	11
<i>Hartley, R.</i>	20	<i>internal kernel</i>	98
hash table	95		
<i>Hayes, G.</i>	41	J	
<i>Heitkötter, J.</i>	37	<i>Jahoda, G.</i>	69
<i>Hergenhahn, B.R.</i>	23	<i>JCM</i>	49, 89
HERO (robot)	211	<i>Jochem, T.M.</i>	41
<i>Hess, E.H.</i>	20	<i>Johnson, C.R. Jr.</i>	222
K			
		<i>joint probability</i>	130
		<i>Jones, T.L.</i>	55
		<i>Kaelbling, L.P.</i>	29
		<i>Kamin, L.J.</i>	62

<i>Karlsson, J.</i>	35	M	
<i>Kearsley, G.</i>	23	<i>MacCorquodale, K.</i>	45, 110, 212
<i>Keirsey, D.M.</i>	16	machina docilis	26
kernels	49	machina speculatrix	26
<i>Khepera</i> (robot)	41	machine learning, model of	223
<i>King, N.</i>	128	<i>Maclin, R.</i>	34
<i>Kirsh, D.</i>	11	<i>Maes, P.</i>	9, 10, 11, 16, 31, 57, 72, 77
<i>Klahr, D.</i>	66	<i>Mahadevan, S.</i>	30
<i>Kleitman, N.</i>	67	<i>Mallot, H.A.</i>	72
<i>Klopf, A.H.</i>	26, 43	MANIAC	41
<i>Knoblock, C.A.</i>	223	marginal attribution	54
<i>Knuth, D.E.</i>	95	Markov Decision Process	222
<i>Koch, C.</i>	20	Markov environment	31
<i>Koch, S.</i>	28	markov property	32
Kohonen feature map	38	<i>Masterson, F.A.</i>	214
<i>Krechevsky, I.</i>	65	<i>Mataric, M.J.</i>	10
<i>Kuokka, D.R.</i>	223	mathematical learning theory	29
L			
λ	<i>See</i> learning probability rate		
<i>Langley, P.</i>	24	maturation	19, 101, 102
<i>Langton, C.G.</i>	9	maturity threshold	128, 130, 144
latent extinction	81	<i>McCallum, R.A.</i>	30
latent learning	45, 55, 197	<i>McCulloch, W.S.</i>	38
law of effect	26	<i>McFarland, D.</i>	75
learning element	222	<i>McGonigle, B.</i>	41
learning probability rate	143, 156, 158, 164, 213	means ends analysis	107
Learning, definition of	18	means-end-field	48
learning-to-learn	211	means-ends-readiness	107
<i>Lee, H.B.</i>	20	<i>Meehl, P.E.</i>	45, 110, 212
<i>Levine, M.</i>	66	meta-level learning	211
<i>Levy, S.</i>	9	μ -experimentation	60
<i>Liaw, J-S.</i>	72	μ -experiments	59
<i>Lieberman, D.A.</i>	23	<i>Meyer, J-A.</i>	10, 48
<i>Lin, L-J.</i>	30, 31	μ -hypothesis	59, 60, 93, 105
LISP	146	<i>Michalski, R.S.</i>	99
list (SRS/E)	90	Microsoft Windows	146
list element values	90	<i>Millán, J. del R.</i>	31
list elements	90	<i>Minsky, M.</i>	18, 30, 40, 147
<i>Littman, M.L.</i>	149	<i>Minton, S.</i>	223
LIVE system	56	<i>Mitchell, T.M.</i>	30, 222
<i>Loftus, B.</i>	73	mnemonization	46, 61, 208
log file	155	modus ponens	46
logic of scientific discovery	67	modus tolens	67
Long Term Memory	49	Monte-Carlo method	32
<i>Lorenz, K.Z.</i>	13, 20	<i>Moore, A.W.</i>	35, 200
lower confidence bound	129, 144	<i>Moore, P.W.B.</i>	21
Lprob	<i>See</i> learning probability rate	<i>Morgan, J.S.</i>	43
		motivation	28
		motivational kernel	52
		<i>Mott, D.H.</i>	49, 57

<i>Mowrer, O.H.</i>	44	play	78, 114
multiple goals	209	policy map	57, 116, 218
multiple-path	184	policy value	79, 80, 115, 125
<i>Mura, F.</i>	20	<i>Pollack, J.</i>	10
mutation	38	<i>Pomerleau, D.A.</i>	41
N			
<i>Nachtigall, P.E.</i>	21	POP-2	52
need strength	47	<i>Popper, K.R.</i>	67, 127, 211
negatively accelerating curve	110	predecessor link	17
<i>Nehmzow, U.</i>	41	prediction	60
net response strength	28	Prediction List	94, 109
<i>Newell, A</i>	107	<i>Premack, D.</i>	12
<i>Nilsson, N.J.</i>	40, 112, 115	primary behaviours	84, 102, 137
<i>Norman, D.A.</i>	89	primary generalization	47
novel event	62, 126, 143	primary item	53, 73
novelty	52	primary reinforcers	217
O			
object permanence	53, 98, 111	primitive item	94
occam's razor	127	prioritized sweeping	35, 200
occult occurrence	69, 107, 110, 130	punishment	27
<i>Olson, M.H.</i>	23	<i>Puterman, M.L.</i>	31
one-shot learning	29, 169, 221	Q	
operant conditioning	42	θ	<i>See lower confidence bound</i>
originator	59	Θ	<i>See upper confidence bound</i>
oscill	113, 170	<i>Q</i> -learning	32, 116
oscillatory factor	28, 113	QMC Mk. IV robot	75
P		quality-values	32
pain	214	R	
panic reaction	125	R2 (robot)	41
<i>Papert, S.</i>	40	rand()	156
parturition	63, 83, 167	random walk	156
path blocking	126, 184, 193	rapid extinction conundrum	221
pathavailable	138	raw_sign_prob	100
pattern extraction	126, 128	<i>Razran, G.</i>	18, 26, 192, 217
Pavlov, Ivan P.	24	reaction potential	48
<i>Payton, D.W.</i>	16	reactive agent	11
<i>Peng, J.</i>	34, 149	rebuildpolicynet	116, 136, 138, 143
<i>Penner, R.H.</i>	21	REBUILDPOLICYTRIP	117, 123, 138, 191
Perceptron	39	recency	111
performance element	222	redundant attribution	55
persistence (of behaviour)	124	reification	74
<i>Pfeifer, R.</i>	106	reinforcement	61, 217
phobia	215	reinforcement learning	26, 116
Piaget, Jean	53, 58	reinforcement measure	61, 110
<i>Pinker, S.</i>	11	reinforcement rate	61, 110
<i>Pitts, W.H.</i>	38	<i>Rescorla, R.A.</i>	26
place cells	72	Response List	93, 100, 149
place learning	45, 201	response_activation_trace	101
		response_cost	101
		response_identifier	101

response_string	101, 148	<i>Singh, S.P.</i>	34		
<i>Restle, F.</i>	66	single-hypothesis assumption	66		
<i>Reynolds, V.</i>	75	situated agent	11		
Rhesus Monkey	75	Skinner box	43, 126, 130, 150, 194		
<i>Riolo, R.L.</i>	38, 55, 62, 149	<i>Skinner, B.F.</i>	42, 69		
<i>Rivest, R.L.</i>	219	<i>Smith, R.G.</i>	222		
Rogue	211	specialisation (learning by)	51, 128, 144		
<i>Roitblat, H.L.</i>	10, 21	spontaneous recovery	82		
<i>Rosenberg, C.R.</i>	41	spreading activation	17, 112, 217		
<i>Rosenblatt, F.</i>	39	spreading valence	79, 112		
<i>Rosenblatt, J.K.</i>	16	S-R behaviourism	11, 27, 44, 217		
<i>Ross, S.</i>	32, 170	SRS/E	22, 89, 130, 208		
rseed	156, 167	stationary policy	32		
Rubik's Cube	219	stimulus sampling theory	29, 160, 168		
<i>Rumelhart, D.E.</i>	40	STM to LTM encoding	51		
S					
sampling strategy	127, 143	stochastic policy	32		
<i>Schapire, R.E.</i>	219	strength of expectancy	110		
schema confidence weight	50, 108	strength value	37		
schema representation	49	STRIPS	115		
<i>Schmajuk, N.A.</i>	44	sub-goal	79		
<i>Schölkopf, B.</i>	72	sub-set sampling assumption	66		
<i>Schoppers, M.J.</i>	218, 220	substantia nigra	72		
<i>Schwartz, B.</i>	23, 214	subsumption architecture	14, 31		
<i>Scutt, T</i>	26	subsumption point	134		
secondary cathexis	48, 208	sub-valence	112		
secondary reinforcers	218	successor link	17		
<i>Sejnowski, T.J.</i>	20, 41	<i>Sudarshan, K.</i>	20		
selection factor	114, 172	superstitious learning	69, 107		
sensitisation	19	<i>Sutton, R.S.</i>	25, 26, 29, 30, 34, 57,		
sensitive period	20	114, 149, 171, 185, 205			
sensory preconditioning	209	synthetic item	53, 98		
<i>Shavlik, J.W.</i>	34	T			
<i>Shen, W-M.</i>	56, 62	tabula rasa	86, 126		
<i>Shettleworth, S.J.</i>	75, 128	Template List	211		
Short Term Memory	49, 72, 97	temporal differences method	30, 34		
siamese fighting fish	14	temporal discrimination	69, 96		
<i>Sibly, R.M.</i>	75	<i>Tenenberg, J.</i>	35		
sign	70	terminating condition	63, 133		
Sign List	93	<i>Thistlthwaite, D.</i>	200		
sign_activation_trace	99	<i>Thorndike, E.L.</i>	26		
sign_count	99	<i>Thorpe, C.E.</i>	41		
sign_first_seen	99	three-spined stickleback	13		
sign_identifier	99	three-term contingency	46		
sign_last_seen	99	threshold unit	39		
sign-gestalt	73	time_shift	108, 142, 143		
<i>Simmons, R.</i>	211	timebase shifting	62, 143		
<i>Simon, H.A.</i>	18, 107	<i>Tinbergen, N.</i>	57, 71		
		<i>Toates, F.</i>	44		

token	70	variable interval schedule	81
token negation	97	variable ratio schedule	81
token_first_seen	95	<i>Veloso, M.M.</i>	211
token_identifier	95	<i>Venturini, G.</i>	38
token_last_seen	95	<i>Verplanck, W.S.</i>	43
token_prob	95	<i>Vershure, P.F.M.J.</i>	106
token_string	95	Visual C++	146
tokenisation	70, 94	VL21	99
tokens	69		
<i>Tolman, E.C.</i>	44, 48, 65, 101, 159, 201, 216		
top-goal	76, 93, 104	W	
<i>Torras, C.</i>	31	Ω	<i>See</i> goal cancellation level
Towers of Hanoi	56	<i>Walter, W.G.</i>	26
<i>Travers, M.</i>	14	<i>Watkins, C.J.C.H.</i>	32, 57, 83, 206
trial and error	27, 54, 85, 86, 124, 156	<i>Watson, John B.</i>	27
triune brain hypothesis	16	<i>Weaver, S.E.</i>	43
<i>Tyrrell, T.</i>	12, 15, 18, 77	<i>Webb, B.</i>	20
		<i>Wettersten, J.</i>	68
U		<i>Whitehead, S.D.</i>	30, 35, 94
unconditioned reflex	24	<i>Widrow, B.</i>	30
unconditioned stimulus	24	<i>Wiesel, T.N.</i>	72
unexpected event	62, 126	<i>Williams, R.J.</i>	34, 40, 149
universal plans	218	<i>Wilson, S.W.</i>	10, 11, 38
unsupervised learning	126	W-learning	35
unvalenced actions	125	world tally	153
upper confidence bound	129, 144	<i>Wyatt, J.</i>	169
V			
valence	47, 76	X	
valence break point	80, 125, 141, 189	XBL	<i>See</i> Expectation Based Learning
valence level	112		
valence level pre-bias	213, 217, 223	Y	
valence path	115, 155	Ψ	<i>See</i> maturity threshold
VALENCE BREAK POINT FACTOR	125		