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Resources on Reinforcement Learning



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Resources on Reinforcement Learning

INTRODUCTION & TUTORIAL

- [Online book Reinforcement Learning by Sutton and Barto \(http://www.cs.ualberta.ca/%7Esutton/book/the-book.html\)](http://www.cs.ualberta.ca/%7Esutton/book/the-book.html) (HTML) . Check [Prof. Richard S. Sutton Page here \(http://www.cs.ualberta.ca/%7Esutton/index.html\)](http://www.cs.ualberta.ca/%7Esutton/index.html)
- [FAQ about Reinforcement Learning \(http://www.cs.ualberta.ca/%7Esutton/RL-FAQ.html\)](http://www.cs.ualberta.ca/%7Esutton/RL-FAQ.html)
- [Reinforcement Learning by Dayan and Watkins \(http://www.gatsby.ucl.ac.uk/%7Edayan/papers/dw01.pdf\)](http://www.gatsby.ucl.ac.uk/%7Edayan/papers/dw01.pdf)
- [Temporal Difference Learning and TD-Gammon \(http://www.research.ibm.com/massive/tdl.html\)](http://www.research.ibm.com/massive/tdl.html) By Gerald Tesauro (classical paper mark the success of RL)
- [Reinforcement Learning: A Survey \(http://www-2.cs.cmu.edu/afs/cs/project/jair/pub/volume4/kaelbling96a-html/rl-survey.html\)](http://www-2.cs.cmu.edu/afs/cs/project/jair/pub/volume4/kaelbling96a-html/rl-survey.html) by Leslie Pack Kaelbling, Michael L. Littman and Andrew W. Moore
- [Extending Q-Learning to General Adaptive Multi-Agent Systems \(http://books.nips.cc/papers/files/nips16/NIPS2003_CN16.pdf\)](http://books.nips.cc/papers/files/nips16/NIPS2003_CN16.pdf) by Gerald Tesauro
- [Mark Humphrys dissertation contain how Q learning work, discrete Q learning \(http://www.compapp.dcu.ie/%7Ehumphrys/PhD/ch2.html\)](http://www.compapp.dcu.ie/%7Ehumphrys/PhD/ch2.html)
- [Harmon's Reinforcement Learning Tutorial \(PDF\) \(http://www.nbu.bg/cogs/events/2000/Readings/Petrov/rltutorial.pdf\)](http://www.nbu.bg/cogs/events/2000/Readings/Petrov/rltutorial.pdf) - classical teaching material
- [Statistical Data Mining of Andrew Moore \(http://www.autonlab.org/tutorials/\)](http://www.autonlab.org/tutorials/)
- [Geri Tesauro Multi Agent Learning Mini Tutorial \(PPT\) \(http://www.cs.rutgers.edu/%7Emittman/topics/nips02/nips02/tesauro.ppt\)](http://www.cs.rutgers.edu/%7Emittman/topics/nips02/nips02/tesauro.ppt)
- [Hagen and Krose short Intro to Reinforcement Learning \(PDF\) \(http://citeseer.ist.psu.edu/cache/papers/cs/208/ftp:zSzzSzftp.wins.uva.nlzSzpubzSzcomputer-systemszSzaut-syszSzreportszSzHagKro97b.pdf/tenhagen97short.pdf\)](http://citeseer.ist.psu.edu/cache/papers/cs/208/ftp:zSzzSzftp.wins.uva.nlzSzpubzSzcomputer-systemszSzaut-syszSzreportszSzHagKro97b.pdf/tenhagen97short.pdf)
- [Gosavi Reinforcement Learning tutorial \(http://www.eng.buffalo.edu/%7Eagosavi/tutorial.pdf\)](http://www.eng.buffalo.edu/%7Eagosavi/tutorial.pdf)
- [Colorado State Univ Reinforcement Learning and Control \(http://www.cs.colostate.edu/%7Eanderson/res/rl/\)](http://www.cs.colostate.edu/%7Eanderson/res/rl/)
- [Teknomo tutorial on Simple learning \(../Learning/index.html\)](#)
- [Calgary Intro to AI - Reinforcement Learning PPT \(http://pages.cpsc.ucalgary.ca/%7Ejacob/Courses/Winter2000/CPSC533/Slides/05.3-Reinforcement.ppt\)](http://pages.cpsc.ucalgary.ca/%7Ejacob/Courses/Winter2000/CPSC533/Slides/05.3-Reinforcement.ppt)
- [Wiering handout on RL and NN \(PDF\) \(http://www.cs.uu.nl/docs/vakken/rl/RL_NEURAL_NETWORKS_HANDOUTS.pdf\)](http://www.cs.uu.nl/docs/vakken/rl/RL_NEURAL_NETWORKS_HANDOUTS.pdf)
- [Salsa Introduction to Reinforcement Learning \(http://www.cs.indiana.edu/%7Egasser/Salsa/rl.html\)](http://www.cs.indiana.edu/%7Egasser/Salsa/rl.html)

ARTICLES

- [Reinforcement Learning With Self-Modifying Policies \(http://www.idsia.ch/%7Ejuergen/ssabook/ssabook.html\)](http://www.idsia.ch/%7Ejuergen/ssabook/ssabook.html)

- Bayesian Q-Learning by R. Dearden, N. Friedman, and S. Russell (<http://www.cs.bham.ac.uk/%7Enfr/Abstracts/DEF1.html>)
- Multigrid Q-Learning (<http://www.biographixmedia.com/stew/pubs/multiGridQlearning.pdf>) by Charles W. Anderson and Stewart G. Crawford-Hines
- Improving Generalisation for Temporal Difference Learning: The Successor Representation (<http://www.gatsby.ucl.ac.uk/%7Edayan/papers/d93b.pdf>) by Peter Dayan
- Reinforcement Learning for Stochastic Cooperative Multi-Agent-Systems (<http://amy.informatik.uos.de/riedmiller/publications/riedml.lauer.04.pdf>) by Martin Lauer and Martin Riedmiller
- Feudal Reinforcement Learning (<http://www.cs.toronto.edu/%7Ehinton/absps/dh93.pdf>) by Peter Dayan and Geoffrey E Hinton
- A New Q-Learning Algorithm Based on the Metropolis Criterion (http://www.cs.lth.se/home/Jacek_Malec/psfiles/guoliumalec.pdf) by Maozu Guo, Yang Liu, and Jacek Malec

APPLICATIONS

- Oil Market Modeling Using Q-Learning (<http://www.cis.cornell.edu/boom/2005/ProjectArchive/oil/boom.html>) by Michael Wunder
- Pricing in agent economies using multi-agent Q-learning (http://www.research.ibm.com/infoecon/paps/html/gtdt99_mag/mag.html) by Gerald Tesauro and Jeffrey O. Kephart
- Multi-agent Q-learning and Regression Trees for Automated Pricing Decisions (<http://www.research.ibm.com/infoecon/paps/html/qtrees/qrt.html>) by Manu Sridharan and Gerald J. Tesauro
- Reinforcement Learning and its Application to Othello (<http://www.few.eur.nl/few/people/mvanwezel/rl.othello.ejor.pdf>) by Nees Jan van Eck, Michiel van Wezel
- Reinforcement Learning applied to a Radar Tracking Task (<http://web.media.mit.edu/%7Enitin/java/RLRadar/RLRadar.html>) (Java Applet provided)
- Car Simulation Using Reinforcement Learning (<http://www.cs.ubc.ca/%7Ezhijin/540report.pdf>) by Zhijin Wang

SOFTWARE & CODE

- [RIL- Reinforcement Learning Toolbox - C++ free download \(http://www.igi.tugraz.at/ril-toolbox/\)](http://www.igi.tugraz.at/ril-toolbox/)
- [Dr. Mark Humphrys provides Q-Learning code in C++ using lookup table \(http://www.compapp.dcu.ie/%7Ehumphrys/Notes/RL/Code/index.html\)](http://www.compapp.dcu.ie/%7Ehumphrys/Notes/RL/Code/index.html)
- [Kardi Teknomo's Q Learning by Example Matlab code and MS Excel \(index.html\)](#)
- [Check Sutton's Software page \(Reinforcement Learning implementattion in C, C++ and Lisp\) \(http://www.cs.ualberta.ca/%7Esutton/software.html\)](http://www.cs.ualberta.ca/%7Esutton/software.html)
- [Java Code of Reinforcement Learning \(http://cs.gettysburg.edu/projects/javaRL/\)](http://cs.gettysburg.edu/projects/javaRL/) provided by Gettysburg College. See the [paper related to the code here \(http://cs.gettysburg.edu/%7Etneller/papers/pdpta03.pdf\)](http://cs.gettysburg.edu/%7Etneller/papers/pdpta03.pdf) .
- [Connectionist Q-learning Java Framework \(http://elsy.gdan.pl/\)](http://elsy.gdan.pl/) is an Open Source Java library for developing simple or complicated learning systems
- [Thierry Masson wrote Java applet of Q-learning \(http://thierry.masson.free.fr/IA/en/qlearning_about.htm\)](http://thierry.masson.free.fr/IA/en/qlearning_about.htm)

Q-LEARNING

- Zarul Hamzah essay: Are we learning now? (http://www.doc.ic.ac.uk/%7End/surprise_96/journal/vol2/zah/article2.html)
- Michael Bowling (<http://www.cs.ualberta.ca/~bowling>) reading for
- EPFL- Java Black Jack and Reinforcement Learning (<http://islwww.epfl.ch/~anperez/BlackJack/classes/RLJavaBJ.html>) (Applet)

OTHER EXCELLENT RESOURCES

- AAAI - American Association for Artificial Intelligence (<http://www.aaai.org/>) Reinforcement learning page (<http://www.aaai.org/AITopics/html/reinf.html>)
- Reinforcement Learning Repository (<http://www-anw.cs.umass.edu/rlr/>)
- Reinforcement Learning warehouse AI Depot (<http://reinforcementlearning.ai-depot.com/Main.html>) (nice introduction)
- Machine Learning and Friends at CMU (<http://www-2.cs.cmu.edu/Groups/reinforcement/web/homepage.html>)

Books (references)

- Mitchell, T. M. (1997) Machine Learning, McGrawHill
- Sutton, R.S. and Barto, A.G. (1998), Reinforcement Learning (<http://www.cs.ualberta.ca/%7Esutton/book/the-book.html>) an Introduction, MIT Press

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