CS394N Neural Networks: Reading Assignments etc.

This page contains the references to the reading assignments, and also where to find them.
Required = covers topics discussed in class.
Optional = more in-depth reading for those interested.

Aug 27 INTRO TO NEURAL NETS

Haykin, S. (2008). Introduction. In *Neural Networks and Learning Machines*. Upper Saddle River, NJ: Prentice-Hall.
(Required)

Lecture: **overheads**, **pdf**
Nettalk demo

Sep 03 COMPETITIVE LEARNING AND SELF-ORGANIZING MAPS

Haykin, S. (2008). Self-Organizing Maps. In *Neural Networks and Learning Machines*, Chapter 9. Upper Saddle River, NJ: Prentice-Hall.
(Required)

Lecture:
Competitive learning **overheads**, **pdf**
Self-organizing maps **overheads**, **pdf**
2D->2D SOM demo, **3D->2D SOM demo**, **Websom demo**

Sep 03 PERCEPTRONS

Haykin, S. (2008). Rosenblatt's Perceptron. In *Neural Networks and Learning Machines*, Chapter 1. Upper Saddle River, NJ: Prentice-Hall.
(Required)

Minsky, M., and Papert, S. (2008). *Perceptrons: An Introduction to Computational Geometry*. Cambridge, MA: MIT Press. Expanded edition.
(Optional)

Overheads included in the backprop overheads (below).

Sep 10 BACKPROPAGATION

Haykin, S. (2008). Multilayer Perceptrons. In *Neural Networks and Learning Machines*, Chapter 4. Upper Saddle River, NJ: Prentice-Hall.
(Required)

Haykin, S. (1999). Neurodynamics. In *Neural Networks and Learning Machines*, Sections 13.1-13.6. Upper Saddle River, NJ: Prentice-Hall.
(Optional)

Haykin, S. (2008). Dynamically Driven Recurrent Networks. In *Neural Networks and Learning Machines*, Sections 15.1-15.8. Upper Saddle River, NJ: Prentice-Hall.
(Optional)

Lecture: **overheads**, **pdf**
Backprop demo

Sep 10 DEEP LEARNING

Haykin, S. (2008). Stochastic Methods Rooted in Statistical Physics In *Neural Networks and Learning Machines*, Chapter 11. Upper Saddle River, NJ: Prentice-Hall.
(Sections 11.7-11.9 required, the rest of this chapter optional)

D. C. Ciresan, U. Meier, J. Masci, J. Schmidhuber (2012). Multi-Column Deep Neural Network for Traffic Sign Classification. *Neural Networks* 32:333-338. (optional)

G. E. Hinton, S. Osindero, and Y-W. Teh (2006). **A fast algorithm for deep belief nets**. *Neural Computation* 18:1557-1524.
(Optional)

P. Baldi (2012). **Autoencoders, Unsupervised Learning, and Deep Architectures**. *Journal of Machine Learning Research* 27:37-49.
(Optional)

Lecture: **overheads**, **pdf**
DBN demo
Deep learning website

Sep 17 REINFORCEMENT LEARNING

Haykin, S. (2008). Dynamic Programming. In *Neural Networks and Learning Machines*, Chapter 12. Upper Saddle River, NJ: Prentice-Hall.
(Required)

Sutton, R. S. and Barto, A. G. (1998). *Reinforcement Learning: An Introduction*. Cambridge, MA: MIT Press.
(Optional)

Kumar, S. and Miikkulainen, R. (1999). **Confidence Based Dual Reinforcement Q-Routing: An adaptive online network routing algorithm** In *Proceedings of the Sixteenth International Joint Conference on Artificial Intelligence* (IJCAI-99, Stockholm, Sweden).
(Optional)

Lecture: **overheads**, **pdf**
Aibo walk

OpenNERO

Sep 17 NEUROEVOLUTION

Miikkulainen, R. (2011). Neuroevolution. In *Encyclopedia of Machine Learning*. Berlin, New York: Springer.
(Required)

Floreano, D., Durr, P., and Mattiussi, C. (2008). ``Neuroevolution: From Architectures to Learning. *Evolutionary Intelligence* 1:47-62.
(Optional)

X. Yao (1999). Evolving Artificial Neural Networks. *Proceedings of the IEEE*, 87:1423-1447.
Optional: Sections III C through V.
(Optional)

Mitchell, M. (1996). *An Introduction to Genetic Algorithms*. Cambridge, MA: MIT Press.
(Optional)

Lecture: **pdf-overheads**
Pole balancing demo
Novelty search demo
Rocket control demo
Multilegged walking demo
Collision warning demo
Competitive coevolution demo

Sep 24 GAME PLAYING

Miikkulainen, R., Bryant, B. D., Cornelius, R., Karpov, I. V., Stanley, K. O., and Yong, C. H. (2006). Computational Intelligence in Games. In Yen, G. Y. and Fogel, D. B. (editors), *Computational Intelligence: Principles and Practice*. IEEE Computational Intelligence Society.
(Required)

Lucas, S. M. (2006). Computational Intelligence and AI in Games: A New IEEE Transactions *IEEE Transactions on Computational and AI in Games* 1:1-3.
(Optional; rest of the first issue is a good overview)

Lecture: **pdf-overheads**
The original (Torque-based) NERO game
OpenNERO
BotPrize

Sep 24 SUBSYMBOLIC ARTIFICIAL INTELLIGENCE

Miikkulainen, R. (1997), **Natural Language Processing with Subsymbolic Neural Networks.** In A. Browne (editor), *Neural Network Perspectives on Cognition and Adaptive Robotics*. Bristol, UK; Philadelphia, PA: Institute of Physics Press.
(Required)

Grasemann, U., Hoffman, R., and Miikkulainen, R. (2011). **Modeling Acute and Compensated Language Disturbance in Schizophrenia**. In *Proceedings of the 33rd Annual Meeting of the Cognitive Science Society*. (Optional)

Miikkulainen, R. (1993). *Subsymbolic Natural Language Processing: An Integrated Model of Scripts, Lexicon, and Memory*. Cambridge, MA: MIT Press.
(Optional)

Bechtel, W., and Abrahamsen, A. (2002). *Connectionism and the Mind*. Cambridge, MA: Blackwell.
(Optional)

Lecture: **overheads1**, **pdf1**; **pdf-overheads2**.

Oct 08 BIOLOGICAL NEURAL NETS

Dayhoff, J. (1990). Chapters 7 and 8 in *Neural Network Architectures: An Introduction*. Van Nostrand Reinhold, New York.
(Required)

Lecture: **overheads**, **pdf**

Oct 08 BIOLOGICAL MODELING: THE VISUAL CORTEX

Haykin, S. (2008). Principal Component Analysis In *Neural Networks and Learning Machines*, Sections 8.1-8.3. Upper Saddle River, NJ: Prentice-Hall.
(Required)

Miikkulainen, R., Bednar, J. A., Choe, Y., and Sirosh, J. (1998), **A Self-Organizing Neural Network Model of the Primary Visual Cortex**. In *Proceedings of the Fifth International Conference on Neural Information Processing* (ICONIP'98, Kitakyushu, Japan).
(Required)

Miikkulainen, R., Bednar, J. A., Choe, Y., and Sirosh, J. (2005), Computational Maps in the Visual Cortex. New York: Springer.
(Optional).

Lecture: **pdf-overheads**,
LISSOM demos

Oct 22 COMMITTEE MACHINES (Sabarish and Srinivasan)

Simon Haykin (2009). **Neural Networks and Learning Machines, 2nd Edition.**. *Upper Saddle River, NJ: Prentice Hall* 7.2, 7.4, 7.6 , 7.7, 7.9 - 7.13.
(Required)
Note: this is from a different edition of the book, a PDF of the chapter can be found here.

Micheal I.Jordan , Robert A. Jacobs (1994). **Hierarchical Mixtures of Experts and the EM Algorithm**. *Neural Computation* Volume 6, Issue 2:181-214.

(Optional)

David Opitz , Richard Maclin (2011). **Popular Ensemble Methods: An Empirical Study**. *Journal of Artificial Intelligence Research*
(Optional)

Oct 29 FUNCTION APPROXIMATION IN REINFORCEMENT LEARNING (Richard and Ruohan)

Mnih, V., Kavukcuoglu, K., Silver, D., Graves, A., Antonoglou, I., Wierstra, D., and Riedmiller, M. (2013) . **Playing Atari With Deep Reinforcement Learning**. In *NIPS Deep Learning Workshop '2013*
(Required)

Sutton, R. S., and Barto, A. G. (1998). **Generalization and Function Approximation**. In *Introduction to reinforcement learning*, Sections 8.1-8.4. MIT Press.
(Optional)

Tesauro, G. (1995). **Temporal difference learning and TD-Gammon**. In *Communications of the ACM* 38(3), 58-68.
(Optional)

Oct 29 ROBOT CONTROL WITH NEUROEVOLUTION (Chenhan and Lixun)

Floreano, D., & Keller, L. (2010). **Evolution of adaptive behaviour in robots by means of Darwinian selection**. *PLoS biology* 8(1), e1000292.
(Required)

Stanley, K. O., D'Ambrosio, D. B., & Gauci, J. (2009). **A hypercube-based encoding for evolving large-scale neural networks.**. *Artificial life* 15(2), 185-212.
(Optional)

Lee, S., Yosinski, J., Glette, K., Lipson, H., & Clune, J. (2013). **Evolving gaits for physical robots with the hyperneat generative encoding**. *The benefits of simulation* pp. 540-549.
(Optional)

Nov 05 HIGH-LEVEL ROBOT BEHAVIOR (David, Josiah, and Xiaorong)

Ziparo, V. & Iocchi, L. (2006). **Petri Net Plans**. *Fourth International Workshop on Modeling of Objects, Components, and Agents*.
(Required)

Whiteson, S., Kohl, N., Miikulainen, R., & Stone, P. (2005). **Evolving Soccer Keepaway Players through Task Decomposition**. *Machine Learning* 59:5-30.
(Optional)

Li, X., & Miikulainen, R. (2014). **Evolving Multimodal Behavior through Subtask and Switch Neural Networks**. *The Fourteenth International Conference on the Synthesis and Simulation of Living Systems*.
(Optional)

Nov 05 MULTI-AGENT BEHAVIOR (Barry and Jimmy)

Risto Miikkulainen and Eliana Feasley and Leif Johnson and Igor Karpov and Padmini Rajagopalan and Aditya Rawal and Wesley Tansey (2012). **Multiagent Learning through Neuroevolution**. *Advances in Computational Intelligence* LNCS 7311:24-46.
(Required)

Chern Han Yong and Risto Miikkulainen (2010). **Coevolution of Role-Based Cooperation in Multi-Agent Systems**. *IEEE Transactions on Autonomous Mental Development* 1:170-186.
(Optional)

Bobby D. Bryant and Risto Miikkulainen (2003). **Neuroevolution for Adaptive Teams**. *Proceedings of the 2003 Congress on Evolutionary Computation* 1:2194-2201.
(Optional)

Yanli Yang and Polycarpou,M. M. and Minai,A. A. (2002). **Opportunistically cooperative neural learning in mobile agents**. *Proceedings of the 2002 International Joint Conference* 3:2638-2643.
(Optional)

Nov 12 TRANSFER LEARNING (Alex, Elliot, Mark)

Matthew E. Taylor and Peter Stone (2009). **Transfer Learning for Reinforcement Learning: A Survey**. *Journal of Machine Learning Research* 10:1633-1685.
(Sections 1,2,3,8,9 Required; the rest is optional)

Matthew E. Taylor and Shimon Whiteson and Peter Stone (2007). **Transfer via Inter-Task Mappings in Policy Search Reinforcement Learning**. *Proceedings of The Autonomous Agents and Multi-Agent Systems Conference (AAMAS-07)* 6:37-44.
(Optional)

Samarth Swarup and Sylvian R. Ray (2006). **Cross-Domain Knowledge Transfer Using Structured Representations**. *AAAI* 6:506-511.
(Optional)

Nov 12 COMBINING LEARNING AND EVOLUTION (Jacob and Yun)

Shimon Whiteson and Peter Stone (2006). **Sample-Efficient Evolutionary Function Approximation for Reinforcement Learning**. *{P}roceedings of the Twenty-First National Conference on Artificial Intelligence* 518-523.
(Required)

Nolfi, Stefano, Domenico Parisi, and Jeffrey L. Elman (1994). **Learning and evolution in neural networks**. *Adaptive Behavior 3.1* 5-28.
(Optional)

Bryant, Bobby D., and Risto Miikkulainen (2007). **Acquiring visibly intelligent behavior with example-guided neuroevolution**. *Proceedings of the National Conference on Artificial Intelligence. Vol. 22. No. 1.*.
(Optional)

Nov 19 LANGUAGE REPRESENTATIONS (Ankita and Venketaram)

Bengio, Y., Ducharme, R., Vincent, P., & Jauvin, C. (2003). **A Neural Probabilistic Language Model**. *Journal of Machine Learning Research, 3,* 518-523.
(Required)

Mikolov, T., KarafiÃ¡t, M., Burget, L., ÄŒernockÃ½, J., & Khudanpur, S. (2010). **Recurrent Neural Network Based Language Model**. *In Eleventh Annual Conference of the International Speech Communication Association*.
(Optional)

Arisoy, E., Sainath, T. N., Kingsbury, B., & Ramabhadran, B. (2012, June). **Deep Neural Network Language Models**. *Proceedings of the NAACL-HLT 2012 Workshop: Will We Ever Really Replace the N-gram Model? On the Future of Language Modeling for HLT* 20-28.
(Optional)

Nov 19 TIME SERIES ANALYSIS (Joel and Woody)

Adebiyi Ayodele A., Ayo Charles K., Adebiyi Marion O., and Otokiti Sunday O. (2012). **Stock Price Prediction using Neural Network with Hybridized Market Indicators**. *Journal of Emerging Trends in Computing and Information Sciences* Vol. 3, No. 1: 1-9.
(Required)

R.J.Frank, N.Davey, and S.P.Hunt (2001). **Time Series Prediction and Neural Networks**. *Journal of Intelligent and Robotic Systems* Vol. 31: 91-103.
(Optional)

Mansour Sheikhan and Behzad Movaghar (2009). **Exchange Rate Prediction Using an Evolutionary Connectionist Model**. *World Applied Sciences Journal* Vol. 7 (Special Issue of Computer & IT): 8-16.
(Optional)

Seyed Taghi Akhavan Niaki and Saeid Hoseinzade (2013). **Forecasting S&P 500 index using artificial neural networks and design of experiments**. *Journal of Industrial Engineering International* 1-9.
(Optional)

Nov 26 TEXT DOCUMENT PROCESSING (Kaivan and Pulkit)

Samuel Kaski, Timo Honkela, Krista Lagus and Teuvo Kohonen (1998). **WEBSOM â€" Self-organizing maps of document collections**. *Neurocomputing* Volume 21: 101â€"117.
(Required)

Krista Lagus (2002). **Text Retrieval Using Self-Organized Document Maps**. *Neural Processing Letters* Volume 15: 21-29.
(Optional)

Christos Faloutsos and Douglas W. Oard (1995). **A Survey of Information Retrieval and Filtering Methods**. *UM Computer Science Department; CS-TR-3514*
(Optional)

Nov 26 SENTIMENT ANALYSIS (Andrew and Hunter)

Glorot, X., Bordes, A., and Bengio, Y. (2011). **Domain Adaptation for Large-Scale Sentiment Classification: A Deep Learning Approach**. *Proceedings of the 28th International Conference on Machine Learning*
(Required)

Pang, B. and Lee, L. (2008). **Opinion Mining and Sentiment Analysis**. *Foundations and Trends in Information Retrieval* Vol. 2, Nos. 1-2: 1-135
(Optional)

Dos Santos, C.N. and Gatti, M. (2014). **Deep Convolutional Neural Networks for Sentiment Analysis of Short Texts**. *Proceedings of COLING 2014, the 25th International Conference on Computational Linguistics* 69-78.
(Optional)

---

risto@cs.utexas.edu
Sat Oct 18 15:36:21 CDT 2014