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Deep Learning

入门学习

1. 《一天搞懂深度学习》台大 李宏毅 300 页 PPT

   PPT：https://www.slideshare.net/tw_dsconf/ss-62245351

   视频：https://www.youtube.com/watch?v=ZrEsLwCjdxY

   https://pan.baidu.com/s/1i4DhD7R

2. Deep Learning（深度学习）学习笔记整理系列之（1-8）
   http://blog.csdn.net/zouxy09/article/details/8775360
3. 深层学习为何要“Deep”（上，下）
   https://zhuanlan.zhihu.com/p/22888385?refer=YJango
   https://zhuanlan.zhihu.com/p/24245040
4. 《神经网络与深度学习》 作者：邱锡鹏 中文图书 2017
   https://nndl.github.io/
5. 《Neural Networks and Deep Learning》 By Michael Nielsen / Aug 2017
   原文：http://neuralnetworksanddeeplearning.com/index.html
   中文翻译：http://www.liuxiao.org/wp-content/uploads/2016/10/nndl-ebook.pdf
   源码：https://github.com/mnielsen/neural-networks-and-deep-learning

进阶文章

Deep Belief Network(DBN)(Milestone of Deep Learning Eve)

1. Hinton, Geoffrey E., Simon Osindero, and Yee-Whye Teh. "A fast learning algorithm for deep belief nets." Neural computation 18.7 (2006): 1527-1554. http://www.cs.toronto.edu/ (Deep Learning Eve)
2. Hinton, Geoffrey E., and Ruslan R. Salakhutdinov. "Reducing the dimensionality of data with neural networks." Science 313.5786 (2006): 504-507. http://www.cs.toronto.edu/ (Milestone, Show the promise of deep learning)

ImageNet Evolution（Deep Learning broke out from here）

1. Krizhevsky, Alex, Ilya Sutskever, and Geoffrey E. Hinton. "Imagenet classification with deep convolutional neural networks." Advances in neural information processing systems. 2012. http://papers.nips.cc/paper/4824-imagenet-classification-with-deep-convolutional-neural-networks.pdf (AlexNet, Deep Learning Breakthrough)

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2. Simonyan, Karen, and Andrew Zisserman. "Very deep convolutional networks for large-scale image recognition." arXiv preprint arXiv:1409.1556 (2014). https://arxiv.org/pdf/1409.1556.pdf (VGGNet,Neural Networks become very deep!)
3. Szegedy, Christian, et al. "Going deeper with convolutions." Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition. 2015. http://www.cv-foundation.org/openaccess/content*cvpr*2015/papers/Szegedy*Going*Deeper-*With*2015*CVPR*paper.pdf (GoogLeNet)
4. He, Kaiming, et al. "Deep residual learning for image recognition." arXiv preprint arXiv:1512.03385 (2015). https://arxiv.org/pdf/1512.03385.pdf (ResNet,Very very deep networks, CVPR best paper)

1.4 Speech Recognition Evolution

1. Hinton, Geoffrey, et al. "Deep neural networks for acoustic modeling in speech recognition: The shared views of four research groups." IEEE Signal Processing Magazine 29.6 (2012): 82-97. http://cs224d.stanford.edu/papers/maas*paper.pdf* (Breakthrough in speech recognition)
2. Graves, Alex, Abdel-rahman Mohamed, and Geoffrey Hinton. "Speech recognition with deep recurrent neural networks." 2013 IEEE international conference on acoustics, speech and signal processing. IEEE, 2013. http://arxiv.org/pdf/1303.5778.pdf (RNN)
3. Graves, Alex, and Navdeep Jaitly. "Towards End-To-End Speech Recognition with Recurrent Neural Networks." ICML. Vol. 14. 2014. http://www.jmlr.org/proceedings/papers/v32/graves14.pdf
4. Sak, Haşim, et al. "Fast and accurate recurrent neural network acoustic models for speech recognition." arXiv preprint arXiv:1507.06947 (2015). http://arxiv.org/pdf/1507.06947) (Google Speech Recognition System)
5. Amodei, Dario, et al. "Deep speech 2: End-to-end speech recognition in english and mandarin." arXiv preprint arXiv:1512.02595 (2015). https://arxiv.org/pdf/1512.02595.pdf (Baidu Speech Recognition System)

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6. W. Xiong, J. Droppo, X. Huang, F. Seide, M. Seltzer, A. Stolcke, D. Yu, G. Zweig "Achieving Human Parity in Conversational Speech Recognition." arXiv preprint arXiv:1610.05256 (2016). https://arxiv.org/pdf/1610.05256v1) (State-of-the-art in speech recognition, Microsoft)

Model

1. Hinton, Geoffrey E., et al. "Improving neural networks by preventing co-adaptation of feature detectors." arXiv preprint arXiv:1207.0580 (2012). https://arxiv.org/pdf/1207.0580.pdf (Dropout)
2. Srivastava, Nitish, et al. "Dropout: a simple way to prevent neural networks from over-fitting." Journal of Machine Learning Research 15.1 (2014): 1929-1958. http://www.jmlr.org/papers/volume15/srivastava14a.old/source/srivastava14a.pdf
3. Ioffe, Sergey, and Christian Szegedy. "Batch normalization: Accelerating deep network training by reducing internal covariate shift." arXiv preprint arXiv:1502.03167 (2015). http://arxiv.org/pdf/1502.03167) (An outstanding Work in 2015)
4. Ba, Jimmy Lei, Jamie Ryan Kiros, and Geoffrey E. Hinton. "Layer normalization." arXiv preprint arXiv:1607.06450 (2016). https://arxiv.org/pdf/1607.06450.pdf?utmsource=scientist.com&utmmedium=refer&utmcampaign=promote) (Update of Batch Normalization)
5. Courbariaux, Matthieu, et al. "Binarized Neural Networks: Training Neural Networks with Weights and Activations Constrained to+ 1 or−1." https://pdfs.semanticscholar.org/f832/b16cb367802609d91d400085eb87d630212a.pdf (New Model,Fast)
6. Jaderberg, Max, et al. "Decoupled neural interfaces using synthetic gradients." arXiv preprint arXiv:1608.05343 (2016). https://arxiv.org/pdf/1608.05343) (Innovation of Training Method,Amazing Work)
7. Chen, Tianqi, Ian Goodfellow, and Jonathon Shlens. "Net2net: Accelerating learning via knowledge transfer." arXiv preprint arXiv:1511.05641 (2015).

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https://arxiv.org/abs/1511.05641) (Modify previously trained network to reduce training epochs)

8. Wei, Tao, et al. "Network Morphism." arXiv preprint arXiv:1603.01670 (2016). https://arxiv.org/abs/1603.01670) (Modify previously trained network to reduce training epochs)

Optimization

1. Sutskever, Ilya, et al. "On the importance of initialization and momentum in deep learning." ICML (3) 28 (2013): 1139-1147. http://www.jmlr.org/proceedings/papers/v28/sutskever13.pdf (Momentum optimizer)
2. Kingma, Diederik, and Jimmy Ba. "Adam: A method for stochastic optimization." arXiv preprint arXiv:1412.6980 (2014). http://arxiv.org/pdf/1412.6980) (Maybe used most often currently)
3. Andrychowicz, Marcin, et al. "Learning to learn by gradient descent by gradient descent." arXiv preprint arXiv:1606.04474 (2016). https://arxiv.org/pdf/1606.04474) (Neural Optimizer,Amazing Work)
4. Han, Song, Huizi Mao, and William J. Dally. "Deep compression: Compressing deep neural network with pruning, trained quantization and huffman coding." CoRR, abs/1510.00149 2 (2015). https://pdfs.semanticscholar.org/5b6c/9dda1d88095fa4aac1507348e498a1f2e863.pdf (ICLR best paper, new direction to make NN running fast,DeePhi Tech Startup)
5. Iandola, Forrest N., et al. "SqueezeNet: AlexNet-level accuracy with 50x fewer parameters and< 1MB model size." arXiv preprint arXiv:1602.07360 (2016). http://arxiv.org/pdf/1602.07360) (Also a new direction to optimize NN,DeePhi Tech Startup)

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Unsupervised Learning / Deep Generative Model

1. Le, Quoc V. "Building high-level features using large scale unsupervised learning." 2013 IEEE international conference on acoustics, speech and signal processing. IEEE, 2013. http://arxiv.org/pdf/1112.6209.pdf&embed) (Milestone, Andrew Ng, Google Brain Project, Cat)
2. Kingma, Diederik P., and Max Welling. "Auto-encoding variational bayes." arXiv preprint arXiv:1312.6114 (2013). http://arxiv.org/pdf/1312.6114) (VAE)
3. Goodfellow, Ian, et al. "Generative adversarial nets." Advances in Neural Information Processing Systems. 2014. http://papers.nips.cc/paper/5423-generative-adversarial-nets.pdf (GAN,super cool idea)
4. Radford, Alec, Luke Metz, and Soumith Chintala. "Unsupervised representation learning with deep convolutional generative adversarial networks." arXiv preprint arXiv:1511.06434 (2015). http://arxiv.org/pdf/1511.06434) (DCGAN)
5. Gregor, Karol, et al. "DRAW: A recurrent neural network for image generation." arXiv preprint arXiv:1502.04623 (2015). http://jmlr.org/proceedings/papers/v37/gregor15.pdf (VAE with attention, outstanding work)
6. Oord, Aaron van den, Nal Kalchbrenner, and Koray Kavukcuoglu. "Pixel recurrent neural networks." arXiv preprint arXiv:1601.06759 (2016). http://arxiv.org/pdf/1601.06759) (PixelRNN)
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RNN / Sequence-to-Sequence Model

1. Graves, Alex. "Generating sequences with recurrent neural networks." arXiv preprint arXiv:1308.0850 (2013). http://arxiv.org/pdf/1308.0850) (LSTM, very nice generating result, show the power of RNN)

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2. Cho, Kyunghyun, et al. "Learning phrase representations using RNN encoder-decoder for statistical machine translation." arXiv preprint arXiv:1406.1078 (2014). http://arxiv.org/pdf/1406.1078) (First Seq-to-Seq Paper)
3. Sutskever, Ilya, Oriol Vinyals, and Quoc V. Le. "Sequence to sequence learning with neural networks." Advances in neural information processing systems. 2014. https://arxiv.org/pdf/1409.3215.pdf (Outstanding Work)
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Neural Turing Machine

1. Graves, Alex, Greg Wayne, and Ivo Danihelka. "Neural turing machines." arXiv preprint arXiv:1410.5401 (2014). http://arxiv.org/pdf/1410.5401.pdf (Basic Prototype of Future Computer)
2. Zaremba, Wojciech, and Ilya Sutskever. "Reinforcement learning neural Turing machines." arXiv preprint arXiv:1505.00521 362 (2015). https://pdfs.semanticscholar.org/f10e/071292d593fef939e6ef4a59baf0bb3a6c2b.pdf
3. Weston, Jason, Sumit Chopra, and Antoine Bordes. "Memory networks." arXiv preprint arXiv:1410.3916 (2014). http://arxiv.org/pdf/1410.3916)
4. Sukhbaatar, Sainbayar, Jason Weston, and Rob Fergus. "End-to-end memory networks." Advances in neural information processing systems. 2015. http://papers.nips.cc/paper/5846-end-to-end-memory-networks.pdf

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Deep Reinforcement Learning

1. Mnih, Volodymyr, et al. "Playing atari with deep reinforcement learning." arXiv preprint arXiv:1312.5602 (2013). http://arxiv.org/pdf/1312.5602.pdf) (First Paper named deep reinforcement learning)
2. Mnih, Volodymyr, et al. "Human-level control through deep reinforcement learning." Nature 518.7540 (2015): 529-533. https://storage.googleapis.com/deepmind-data/assets/papers/DeepMindNature14236Paper.pdf (Milestone)
3. Wang, Ziyu, Nando de Freitas, and Marc Lanctot. "Dueling network architectures for deep reinforcement learning." arXiv preprint arXiv:1511.06581 (2015). http://arxiv.org/pdf/1511.06581) (ICLR best paper,great idea)
4. Mnih, Volodymyr, et al. "Asynchronous methods for deep reinforcement learning." arXiv preprint arXiv:1602.01783 (2016). http://arxiv.org/pdf/1602.01783) (State-of-the-art method)
5. Lillicrap, Timothy P., et al. "Continuous control with deep reinforcement learning." arXiv preprint arXiv:1509.02971 (2015). http://arxiv.org/pdf/1509.02971) (DDPG)
6. Gu, Shixiang, et al. "Continuous Deep Q-Learning with Model-based Acceleration." arXiv preprint arXiv:1603.00748 (2016). http://arxiv.org/pdf/1603.00748) (NAF)
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8. Silver, David, et al. "Mastering the game of Go with deep neural networks and tree search." Nature 529.7587 (2016): 484-489. http://willamette.edu/ (AlphaGo)

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Deep Transfer Learning / Lifelong Learning / especially for RL

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2. Silver, Daniel L., Qiang Yang, and Lianghao Li. "Lifelong Machine Learning Systems: Beyond Learning Algorithms." AAAI Spring Symposium: Lifelong Machine Learning. 2013. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.696.7800&rep=rep1&type=pdf (A brief discussion about lifelong learning)
3. Hinton, Geoffrey, Oriol Vinyals, and Jeff Dean. "Distilling the knowledge in a neural network." arXiv preprint arXiv:1503.02531 (2015). http://arxiv.org/pdf/1503.02531) (Godfather's Work)
4. Rusu, Andrei A., et al. "Policy distillation." arXiv preprint arXiv:1511.06295 (2015). http://arxiv.org/pdf/1511.06295) (RL domain)
5. Parisotto, Emilio, Jimmy Lei Ba, and Ruslan Salakhutdinov. "Actor-mimic: Deep multitask and transfer reinforcement learning." arXiv preprint arXiv:1511.06342 (2015). http://arxiv.org/pdf/1511.06342) (RL domain)
6. Rusu, Andrei A., et al. "Progressive neural networks." arXiv preprint arXiv:1606.04671 (2016). https://arxiv.org/pdf/1606.04671) (Outstanding Work, A novel idea)

One Shot Deep Learning

1. Lake, Brenden M., Ruslan Salakhutdinov, and Joshua B. Tenenbaum. "Human-level concept learning through probabilistic program induction." Science 350.6266 (2015): 1332-1338. http://clm.utexas.edu/compjclub/wp-content/uploads/2016/02/lake2015.pdf (No Deep Learning,but worth reading)
2. Koch, Gregory, Richard Zemel, and Ruslan Salakhutdinov. "Siamese Neural Networks for One-shot Image Recognition."(2015) http://www.cs.utoronto.ca/

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3. Santoro, Adam, et al. "One-shot Learning with Memory-Augmented Neural Networks." arXiv preprint arXiv:1605.06065 (2016). http://arxiv.org/pdf/1605.06065) (A basic step to one shot learning)
4. Vinyals, Oriol, et al. "Matching Networks for One Shot Learning." arXiv preprint arXiv:1606.04080 (2016). https://arxiv.org/pdf/1606.04080)
5. Hariharan, Bharath, and Ross Girshick. "Low-shot visual object recognition." arXiv preprint arXiv:1606.02819 (2016). http://arxiv.org/pdf/1606.02819) (A step to large data)

NLP(Natural Language Processing)

1. Antoine Bordes, et al. "Joint Learning of Words and Meaning Representations for Open-Text Semantic Parsing." AISTATS(2012) https://www.hds.utc.fr/
2. Mikolov, et al. "Distributed representations of words and phrases and their compositionality." ANIPS(2013): 3111-3119 http://papers.nips.cc/paper/5021-distributed-representations-of-words-and-phrases-and-their-compositionality.pdf (word2vec)
3. Sutskever, et al. ""Sequence to sequence learning with neural networks." ANIPS(2014) http://papers.nips.cc/paper/5346-sequence-to-sequence-learning-with-neural-networks.pdf
4. Ankit Kumar, et al. ""Ask Me Anything: Dynamic Memory Networks for Natural Language Processing." arXiv preprint arXiv:1506.07285(2015) https://arxiv.org/abs/1506.07285)
5. Yoon Kim, et al. "Character-Aware Neural Language Models." NIPS(2015) arXiv preprint arXiv:1508.06615(2015) https://arxiv.org/abs/1508.06615)
6. Jason Weston, et al. "Towards AI-Complete Question Answering: A Set of Prerequisite Toy Tasks." arXiv preprint arXiv:1502.05698(2015) https://arxiv.org/abs/1502.05698) (bAbI tasks)

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8. Alexis Conneau, et al. "Very Deep Convolutional Networks for Natural Language Processing." arXiv preprint arXiv:1606.01781(2016) https://arxiv.org/abs/1606.01781) (state-of-the-art in text classification)
9. Armand Joulin, et al. "Bag of Tricks for Efficient Text Classification." arXiv preprint arXiv:1607.01759(2016) https://arxiv.org/abs/1607.01759) (slightly worse than state-of-the-art, but a lot faster)

Object Detection

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2. Girshick, Ross, et al. "Rich feature hierarchies for accurate object detection and semantic segmentation." Proceedings of the IEEE conference on computer vision and pattern recognition. 2014. http://www.cv-foundation.org/openaccess/content*cvpr*2014/papers/Girshick*Rich*Feature*Hierarchies*2014*CVPR*paper.pdf (RCNN)
3. He, Kaiming, et al. "Spatial pyramid pooling in deep convolutional networks for visual recognition." European Conference on Computer Vision. Springer International Publishing, 2014. http://arxiv.org/pdf/1406.4729) (SPPNet)
4. Girshick, Ross. "Fast r-cnn." Proceedings of the IEEE International Conference on Computer Vision. 2015. https://pdfs.semanticscholar.org/8f67/64a59f0d17081f2a2a9d06f4ed1cdea1a0ad.pdf
5. Ren, Shaoqing, et al. "Faster R-CNN: Towards real-time object detection with region proposal networks." Advances in neural information processing systems. 2015. http://papers.nips.cc/paper/5638-analysis-of-variational-bayesian-latent-dirichlet-allocation-weaker-sparsity-than-map.pdf

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7. Liu, Wei, et al. "SSD: Single Shot MultiBox Detector." arXiv preprint arXiv:1512.02325 (2015). http://arxiv.org/pdf/1512.02325)
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Visual Tracking

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2. Wang, Naiyan, et al. "Transferring rich feature hierarchies for robust visual tracking." arXiv preprint arXiv:1501.04587 (2015). http://arxiv.org/pdf/1501.04587) (SO-DLT)
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5. Bertinetto, Luca, et al. "Fully-Convolutional Siamese Networks for Object Tracking." arXiv preprint arXiv:1606.09549 (2016). https://arxiv.org/pdf/1606.09549) (SiameseFC,New state-of-the-art for real-time object tracking)
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Image Caption

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2. Kulkarni, Girish, et al. "Baby talk: Understanding and generating image descriptions". In Proceedings of the 24th CVPR, 2011. http://tamaraberg.com/papers/generation*cvpr11.pdf*
3. Vinyals, Oriol, et al. "Show and tell: A neural image caption generator". In arXiv preprint arXiv:1411.4555, 2014. https://arxiv.org/pdf/1411.4555.pdf
4. Donahue, Jeff, et al. "Long-term recurrent convolutional networks for visual recognition and description". In arXiv preprint arXiv:1411.4389 ,2014. https://arxiv.org/pdf/1411.4389.pdf
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Machine Translation

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2. Sennrich, et al. "Neural Machine Translation of Rare Words with Subword Units". In arXiv preprint arXiv:1508.07909, 2015. https://arxiv.org/pdf/1508.07909.pdf
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Robotics

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6. Yahya, Ali, et al. "Collective Robot Reinforcement Learning with Distributed Asynchronous Guided Policy Search." arXiv preprint arXiv:1610.00673 (2016). https://arxiv.org/pdf/1610.00673)
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Object Segmentation

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Tutorial

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3. Deep Learning for NLP (without Magic)http://www.socher.org/index.php/DeepLearningTutorial/DeepLearningTutorial
4. A Deep Learning Tutorial: From Perceptrons to Deep Networkshttp://www.toptal.com/machine-learning/an-introduction-to-deep-learning-from-perceptrons-to-deep-networks
5. Deep Learning from the Bottom uphttp://www.metacademy.org/roadmaps/rgrosse/deep*learning*
6. Theano Tutorialhttp://deeplearning.net/tutorial/deeplearning.pdf
7. Neural Networks for Matlabhttp://uk.mathworks.com/help/pdf*doc/nnet/nnet*ug.pdf
8. Using convolutional neural nets to detect facial keypoints tutorialhttp://danielnouri.org/notes/2014/12/17/using-convolutional-neural-nets-to-detect-facial-keypoints-tutorial/
9. Pytorch Tutorials[http://pytorch.org/tutorials/]
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11. VGG Convolutional Neural Networks Practicalhttp://www.robots.ox.ac.uk/
12. TensorFlow tutorialshttps://github.com/nlintz/TensorFlow-Tutorials
13. More TensorFlow tutorialshttps://github.com/pkmital/tensorflow*tutorials*
14. TensorFlow Python Notebookshttps://github.com/aymericdamien/TensorFlow-Examples
15. Keras and Lasagne Deep Learning Tutorialshttps://github.com/Vict0rSch/deep*learning*
16. Classification on raw time series in TensorFlow with a LSTM RNNhttps://github.com/guillaume-chevalier/LSTM-Human-Activity-Recognition
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Geoff Hinton, Yoshua Bengio & Yann LeCun 深度学习三巨头共同主持

http://www.iro.umontreal.ca/~bengioy/talks/DL-Tutorial-NIPS2015.pdf

视频教程

Courses

1. Machine Learning - Stanford https://class.coursera.org/ml-005

   by Andrew Ng in Coursera (2010-2014)
2. Machine Learning - Caltechhttp://work.caltech.edu/lectures.htmlby Yaser Abu-Mostafa (2012-2014)
3. Machine Learning - Carnegie Mellonhttp://www.cs.cmu.edu/by Tom Mitchell (Spring 2011)
4. Neural Networks for Machine Learninghttps://class.coursera.org/neuralnets-2012-001by Geoffrey Hinton in Coursera (2012)
5. Neural networks classhttps://www.youtube.com/playlist?list=PL6Xpj9I5qXYEcOhn7TqghAJ6NAPrNmUBH by Hugo Larochelle from Université de Sherbrooke (2013)
6. Deep Learning Coursehttp://cilvr.cs.nyu.edu/doku.php?id=deeplearning:slides:start by CILVR lab @ NYU (2014)
7. A.I - Berkeleyhttps://courses.edx.org/courses/BerkeleyX/CS188x*1/1T2013/courseware/* by Dan Klein and Pieter Abbeel (2013)
8. A.I - MIThttp://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/ by Patrick Henry Winston (2010)
9. Vision and learning - computers and brainshttp://web.mit.edu/course/other/i2course/www/vision*and*learning-*fall*2013.htmlby Shimon Ullman, Tomaso Poggio, Ethan Meyers @ MIT (2013)

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10. Convolutional Neural Networks for Visual Recognition - Stanfordhttp://vision.stanford.edu/teaching/cs231n/syllabus*winter2015.html* by Fei-Fei Li, Andrej Karpathy (2015)
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12. Deep Learning for Natural Language Processing - Stanfordhttp://cs224d.stanford.edu/
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15. Deep Learning - Nvidiahttps://developer.nvidia.com/deep-learning-courses (2015)
16. Graduate Summer School: Deep Learning, Feature Learninghttps://www.youtube.com/playlist?list=PLHyI3Fbmv0SdzMHAy0aN59oYnLy5vyyTAby Geoffrey Hinton, Yoshua Bengio, Yann LeCun, Andrew Ng, Nando de Freitas and several others @ IPAM, UCLA (2012)
17. Deep Learning - Udacity/Googlehttps://www.udacity.com/course/deep-learning--ud730 by Vincent Vanhoucke and Arpan Chakraborty (2016)
18. Deep Learning - UWaterloohttps://www.youtube.com/playlist?list=PLehuLRPyt1Hyi78UOkMPWCGRxGcA9NVOE by Prof. Ali Ghodsi at University of Waterloo (2015)
19. Statistical Machine Learning - CMUhttps://www.youtube.com/watch?v=azaLcvuqlg&*list=PLjbUi5mgii6BWEUZf7He6nowWvGne*Y8rby Prof. Larry Wasserman
20. Deep Learning Coursehttps://www.college-de-france.fr/site/en-yann-lecun/course-2015-2016.htm by Yann LeCun (2016)
21. Bay area DL schoolhttp://www.bayareadlschool.org/ by Andrew Ng, Yoshua Bengio, Samy Bengio, Andrej Karpathy, Richard Socher, Hugo Larochelle and many others @ Stanford, CA (2016)

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22. Designing, Visualizing and Understanding Deep Neural Networks-UC Berkeleyhttps://www.youtube.com/playlist?list=PLkFD6*40KJIxopmdJF*CLNqG3QuDFH-QUm
23. UVA Deep Learning Coursehttp://uvadlc.github.io MSc in Artificial Intelligence for the University of Amsterdam.
24. MIT 6.S094: Deep Learning for Self-Driving Carshttp://selfdrivingcars.mit.edu/
25. MIT 6.S191: Introduction to Deep Learninghttp://introtodeeplearning.com/
26. Berkeley CS 294: Deep Reinforcement Learninghttp://rll.berkeley.edu/deeprlcourse/
27. Keras in Motion video course[https://www.manning.com/livevideo/keras-in-motion
28. Practical Deep Learning For Codershttp://course.fast.ai/ by Jeremy Howard - Fast.ai

Videos and Lectures

1. How To Create A Mindhttps://www.youtube.com/watch?v=RIkxVci-R4k By Ray Kurzweil
2. Deep Learning, Self-Taught Learning and Unsupervised Feature Learninghttps://www.youtube.com/watch?v=n1ViNeWhC24 By Andrew Ng
3. Recent Developments in Deep Learninghttps://www.youtube.com/watch?v=vShMxxqtDDs&index=3&list=PL78U8qQHXgrhP9aZraxTT5-X1RccTcUYT By Geoff Hinton
4. The Unreasonable Effectiveness of Deep Learninghttps://www.youtube.com/watch?v=sc-KbuZqGkI by Yann LeCun
5. Deep Learning of Representationshttps://www.youtube.com/watch?v=4xsVFLnHC*0* by Yoshua bengio
6. Principles of Hierarchical Temporal Memoryhttps://www.youtube.com/watch?v=6ufPpZDmPKA by Jeff Hawkins
7. Machine Learning Discussion Group - Deep Learning w/ Stanford AI Labhttps://www.youtube.com/watch?v=2QJi0ArLq7s&list=PL78U8qQHXgrhP9aZraxTT5-X1RccTcUYT by Adam Coates

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9. Demystifying Unsupervised Feature Learning https://www.youtube.com/watch?v=wZfVBwOO0-kBy Adam Coates
10. Visual Perception with Deep Learninghttps://www.youtube.com/watch?v=3boKlkPBckABy Yann LeCun
11. The Next Generation of Neural Networkshttps://www.youtube.com/watch?v=AyzOUbkUf3M By Geoffrey Hinton at GoogleTechTalks
12. The wonderful and terrifying implications of computers that can learn-http://www.ted.com/talks/jeremy*howard*the*wonderful*and*terrifying*implication-s*of*computers*that*can*learn* By Jeremy Howard at TEDxBrussels
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14. Natural Language Processinghttp://web.stanford.edu/class/cs224n/handouts/ By Chris Manning in Stanford
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16. Deep Learning: Intelligence from Big Datahttps://www.youtube.com/watch?v=czLI3oLDe8Mby Steve Jurvetson (and panel) at VLAB in Stanford.
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代码

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6. Ccvhttp://libccv.org/doc/doc-convnet/
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10. DeepLearnToolboxhttps://github.com/rasmusbergpalm/DeepLearnToolbox
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19. Knet.jlhttps://github.com/denizyuret/Knet.jl
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21. Neon - Python based Deep Learning Frameworkhttps://github.com/NervanaSys-tems/neon
22. Keras - Theano based Deep Learning Libraryhttp://keras.io
23. Chainer - A flexible framework of neural networks for deep learninghttp://chainer.org/
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29. Brainstorm - Fast, flexible and fun neural networks.https://github.com/IDSIA/brainstorm
30. Tensorflow - Open source software library for numerical computation using data flow graphshttps://github.com/tensorflow/tensorflow
31. DMTK - Microsoft Distributed Machine Learning Tookithttps://github.com/Microsoft/DMTK
32. Scikit Flow - Simplified interface for TensorFlow mimicking Scikit Learn-https://github.com/google/skflow
33. MXnet - Lightweight, Portable, Flexible Distributed/Mobile Deep Learning framework-https://github.com/dmlc/mxnet/
34. Veles - Samsung Distributed machine learning platformhttps://github.com/Samsung/veles
35. Marvin - A Minimalist GPU-only N-Dimensional ConvNets Framework-https://github.com/PrincetonVision/marvin
36. Apache SINGA - A General Distributed Deep Learning Platformhttp://singa.incubator.apache.org/
37. DSSTNE - Amazon's library for building Deep Learning models-https://github.com/amznlabs/amazon-dsstne
38. SyntaxNet - Google's syntactic parser - A TensorFlow dependency library-https://github.com/tensorflow/models/tree/master/syntaxnet
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43. Lasagne - a lightweight library to build and train neural networks in Theanohttps://github.com/Lasagne/Lasagne
44. nolearn - wrappers and abstractions around existing neural network libraries, most notably Lasagnehttps://github.com/dnouri/nolearn
45. Sonnet - a library for constructing neural networks by Google's DeepMindhttps://github.com/deepmind/sonnet
46. PyTorch - Tensors and Dynamic neural networks in Python with strong GPU accelerationhttps://github.com/pytorch/pytorch
47. CNTK - Microsoft Cognitive Toolkithttps://github.com/Microsoft/CNTK

领域专家

Researchers

1. Aaron Courvillehttp://aaroncourville.wordpress.com
2. Abdel-rahman Mohamedhttp://www.cs.toronto.edu/
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5. Alex Krizhevsky http://www.cs.utoronto.ca/
6. Alexander Ilin http://users.ics.aalto.fi/alexilin/
7. Amos Storkey http://homepages.inf.ed.ac.uk/amos/
8. Andrej Karpathy http://cs.stanford.edu/
9. Andrew M. Saxe http://www.stanford.edu/
10. Andrew Ng http://www.cs.stanford.edu/people/ang/
11. Andrew W. Senior http://research.google.com/pubs/author37792.html
12. Andriy Mnih http://www.gatsby.ucl.ac.uk/
13. Ayse Naz Erkan http://www.cs.nyu.edu/

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14. Benjamin Schrauwen http://reslab.elis.ugent.be/benjamin
15. Bernardete Ribeiro https://www.cisuc.uc.pt/people/show/2020
16. Bo David Chen http://vision.caltech.edu/
17. Boureau Y-Lan http://cs.nyu.edu/
18. Brian Kingsbury http://researcher.watson.ibm.com/researcher/view.php?person=us-bedk
19. Christopher Manning http://nlp.stanford.edu/
20. Clement Farabet http://www.clement.farabet.net/
21. Dan Claudiu Cireșan http://www.idsia.ch/
22. David Reichert http://serre-lab.clps.brown.edu/person/david-reichert/
23. Derek Rose http://mil.engr.utk.edu/nmil/member/5.html
24. Dong Yu http://research.microsoft.com/en-us/people/dongyu/default.aspx
25. Drausin Wulsin http://www.seas.upenn.edu/
26. Erik M. Schmidt http://music.ece.drexel.edu/people/eschmidt
27. Eugenio Culurciello https://engineering.purdue.edu/BME/People/viewPersonById?resource*id=71333*
28. Frank Seide http://research.microsoft.com/en-us/people/fseide/
29. Galen Andrew http://homes.cs.washington.edu/
30. Geoffrey Hinton http://www.cs.toronto.edu/
31. George Dahl http://www.cs.toronto.edu/
32. Graham Taylor http://www.uoguelph.ca/
33. Grégoire Montavon http://gregoire.montavon.name/
34. Guido Francisco Montúfar http://personal-homepages.mis.mpg.de/montufar/
35. Guillaume Desjardins http://brainlogging.wordpress.com/
36. Hannes Schulz http://www.ais.uni-bonn.de/
37. Hélène Paugam-Moisy http://www.lri.fr/
38. Honglak Lee http://web.eecs.umich.edu/
39. Hugo Larochelle http://www.dmi.usherb.ca/

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40. Ilya Sutskever http://www.cs.toronto.edu/
41. Itamar Arel http://mil.engr.utk.edu/nmil/member/2.html
42. James Martens http://www.cs.toronto.edu/
43. Jason Morton http://www.jasonmorton.com/
44. Jason Weston http://www.thespermwhale.com/jaseweston/
45. Jeff Dean http://research.google.com/pubs/jeff.html
46. Jiquan Mgiam http://cs.stanford.edu/
47. Joseph Turian http://www-etud.iro.umontreal.ca/
48. Joshua Matthew Susskind http://aclab.ca/users/josh/index.html
49. Jürgen Schmidhuber http://www.idsia.ch/
50. Justin A. Blanco https://sites.google.com/site/blancousna/
51. Koray Kavukcuoglu http://koray.kavukcuoglu.org/
52. KyungHyun Cho http://users.ics.aalto.fi/kcho/
53. Li Deng http://research.microsoft.com/en-us/people/deng/
54. Lucas Theis http://www.kyb.tuebingen.mpg.de/nc/employee/details/lucas.html
55. Ludovic Arnold http://ludovicarnold.altervista.org/home/
56. Marc'Aurelio Ranzato http://www.cs.nyu.edu/
57. Martin Längkvist http://aass.oru.se/
58. Misha Denil http://mdenil.com/
59. Mohammad Norouzi http://www.cs.toronto.edu/
60. Nando de Freitas http://www.cs.ubc.ca/
61. Navdeep Jaitly http://www.cs.utoronto.ca/
62. Nicolas Le Roux http://nicolas.le-roux.name/
63. Nitish Srivastava http://www.cs.toronto.edu/
64. Noel Lopes https://www.cisuc.uc.pt/people/show/2028
65. Oriol Vinyals http://www.cs.berkeley.edu/
66. Pascal Vincent http://www.iro.umontreal.ca/
67. Patrick Nguyen https://sites.google.com/site/drpngx/

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68. Pedro Domingos http://homes.cs.washington.edu/
69. Peggy Series http://homepages.inf.ed.ac.uk/pseries/
70. Pierre Sermanet http://cs.nyu.edu/
71. Piotr Mirowski http://www.cs.nyu.edu/
72. Quoc V. Le http://ai.stanford.edu/
73. Reinhold Scherer http://bci.tugraz.at/scherer/
74. Richard Socher http://www.socher.org/
75. Rob Fergus http://cs.nyu.edu/
76. Robert Coop http://mil.engr.utk.edu/nmil/member/19.html
77. Robert Gens http://homes.cs.washington.edu/
78. Roger Grosse http://people.csail.mit.edu/rgrosse/
79. Ronan Collobert http://ronan.collobert.com/
80. Ruslan Salakhutdinov http://www.utstat.toronto.edu/
81. Sebastian Gerwinn http://www.kyb.tuebingen.mpg.de/nc/employee/details/sgerwinn.html
82. Stéphane Mallat http://www.cmap.polytechnique.fr/
83. Sven Behnke http://www.ais.uni-bonn.de/behnke/
84. Tapani Raiko http://users.ics.aalto.fi/praiko/
85. Tara Sainath https://sites.google.com/site/tsainath/
86. Tijmen Tieleman http://www.cs.toronto.edu/
87. Tom Karnowski http://mil.engr.utk.edu/nmil/member/36.html
88. Tomáš Mikolov https://research.facebook.com/tomas-mikolov
89. Ueli Meier http://www.idsia.ch/
90. Vincent Vanhoucke http://vincent.vanhoucke.com
91. Volodymyr Mnih http://www.cs.toronto.edu/
92. Yann LeCun http://yann.lecun.com/
93. Yichuan Tang http://www.cs.toronto.edu/
94. Yoshua Bengio http://www.iro.umontreal.ca/

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95. Yotaro Kubo http://yota.ro/
96. Youzhi Will Zou http://ai.stanford.edu/
97. Fei-Fei Li http://vision.stanford.edu/feifeili
98. Ian Goodfellow https://research.google.com/pubs/105214.html
99. Robert Laganière http://www.site.uottawa.ca/

重要网站收藏

1. deeplearning.nethttp://deeplearning.net/
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3. nlp.stanford.eduhttp://nlp.stanford.edu/
4. ai-junkie.comhttp://www.ai-junkie.com/ann/evolved/nnt1.html
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24. Deep Learning Newshttp://news.startup.ml/
25. Machine Learning is Fun! Adam Geitgey's Bloghttps://medium.com/@ageitgey/

免费在线图书

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   中文版：https://github.com/exacity/deeplearningbook-chinese
2. Neural Networks and Deep Learninghttp://neuralnetworksanddeeplearning.com/ by Michael Nielsen Dec 2014
3. Deep Learninghttp://research.microsoft.com/pubs/209355/DeepLearning-Now-Publishing-Vol7-SIG-039.pdf by Microsoft Research 2013
4. Deep Learning Tutorialhttp://deeplearning.net/tutorial/deeplearning.pdf by LISA lab, University of Montreal Jan 6 2015
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6. An introduction to genetic algorithmshttps://svn-d1.mpi-inf.mpg.de/AG1/MultiCore-Lab/papers/ebook-fuzzy-mitchell-99.pdf
7. Artificial Intelligence: A Modern Approachhttp://aima.cs.berkeley.edu/
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Datasets

1. MNISThttp://yann.lecun.com/exdb/mnist/ Handwritten digits
2. Google House Numbershttp://ufldl.stanford.edu/housenumbers/ from street view
3. CIFAR-10 and CIFAR-100http://www.cs.toronto.edu/
4. IMAGENEThttp://www.image-net.org/
5. Tiny Imageshttp://groups.csail.mit.edu/vision/TinyImages/ 80 Million tiny images6.
6. Flickr Datahttps://yahooresearch.tumblr.com/post/89783581601/one-hundred-million-creative-commons-flickr-images 100 Million Yahoo dataset
7. Berkeley Segmentation Dataset 500http://www.eecs.berkeley.edu/Research/Projects/CS/vision/bsds/
8. UC Irvine Machine Learning Repositoryhttp://archive.ics.uci.edu/ml/
9. Flickr 8khttp://nlp.cs.illinois.edu/HockenmaierGroup/Framing*Image*Description/KCCA.html
10. Flickr 30khttp://shannon.cs.illinois.edu/DenotationGraph/
11. Microsoft COCOhttp://mscoco.org/home/
12. VQAhttp://www.visualqa.org/
13. Image QAhttp://www.cs.toronto.edu/
14. AT&T Laboratories Cambridge face databasehttp://www.uk.research.att.com/facedatabase.html
15. AVHRR Pathfinderhttp://xtreme.gsfc.nasa.gov
16. Air Freighthttp://www.anc.ed.ac.uk/ - The Air Freight data set is a ray-traced image sequence along with ground truth segmentation based on textural characteristics. 455 images + GT, each 160x120 pixels. Formats: PNG
17. Amsterdam Library of Object Imageshttp://www.science.uva.nl/ - ALOI is a color image collection of one-thousand small objects, recorded for scientific purposes. In order to capture the sensory variation in object recordings, we systematically varied viewing

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angle, illumination angle, and illumination color for each object, and additionally captured wide-baseline stereo images. We recorded over a hundred images of each object, yielding a total of 110,250 images for the collection. Formats: png

18. Annotated face, hand, cardiac & meat imageshttp://www.imm.dtu.dk/ - Most images & annotations are supplemented by various ASM/AAM analyses using the AAM-API. Formats: bmp,asf
19. Image Analysis and Computer Graphicshttp://www.imm.dtu.dk/image/
20. Brown University Stimulihttp://www.cog.brown.edu/ - A variety of datasets including geons, objects, and "greebles". Good for testing recognition algorithms. Formats: pict
21. CAVIAR video sequences of mall and public space behaviorhttp://homepages.inf.ed.ac.uk/rbf/CAVIARDATA1/ - 90K video frames in 90 sequences of various human activities, with XML ground truth of detection and behavior classification Formats: MPEG2 & JPEG
22. Machine Vision Unithttp://www.ipab.inf.ed.ac.uk/mvu/
23. CCITT Fax standard imageshttp://www.cs.waikato.ac.nz/ - 8 images Formats: gif
24. CMU CIL's Stereo Data with Ground Truthcil-ster.html - 3 sets of 11 images, including color tiff images with spectroradiometry Formats: gif, tiff
25. CMU PIE Databasehttp://www.ri.cmu.edu/projects/project*418.html* - A database of 41,368 face images of 68 people captured under 13 poses, 43 illuminations conditions, and with 4 different expressions.
26. CMU VASC Image Databasehttp://www.ius.cs.cmu.edu/idb/ - Images, sequences, stereo pairs thousands of images Formats: Sun Rasterimage
27. Caltech Image Databasehttp://www.vision.caltech.edu/html-files/archive.html - about 20 images - mostly top-down views of small objects and toys. Formats: GIF
28. Columbia-Utrecht Reflectance and Texture Databasehttp://www.cs.columbia.edu/CAVE/curet/ - Texture and reflectance measurements for over 60 samples of 3D texture, observed with over 200 different combinations of viewing and illumination directions. Formats: bmp

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29. Computational Colour Constancy Datahttp://www.cs.sfu.ca/ - A dataset oriented towards computational color constancy, but useful for computer vision in general. It includes synthetic data, camera sensor data, and over 700 images. Formats: tiff
30. Computational Vision Labhttp://www.cs.sfu.ca/
31. Content-based image retrieval databasehttp://www.cs.washington.edu/research/imagedatabase/groundtruth/ - 11 sets of color images for testing algorithms for content-based retrieval. Most sets have a description file with names of objects in each image. Formats: jpg
32. Efficient Content-based Retrieval Grouphttp://www.cs.washington.edu/research/imagedatabase/
33. Densely Sampled View Sphereshttp://ls7-www.cs.uni-dortmund.de/ - Densely sampled view spheres - upper half of the view sphere of two toy objects with 2500 images each. Formats: tiff
34. Computer Science VII Graphical Systemshttp://ls7-www.cs.uni-dortmund.de/
35. Digital Embryoshttps://web-beta.archive.org/web/20011216051535/vision.psych.umn.edu/www/kersten-lab/demos/digitalembryo.html - Digital embryos are novel objects which may be used to develop and test object recognition systems. They have an organic appearance. Formats: various formats are available on request
36. Univerity of Minnesota Vision Labhttp://vision.psych.umn.edu/www/kersten-lab/kersten-lab.html
37. El Salvador Atlas of Gastrointestinal VideoEndoscopyhttp://www.gastrointestinalatlas.com - Images and Videos of his-res of studies taken from Gastrointestinal Video endoscopy. Formats: jpg, mpg, gif
38. FG-NET Facial Aging Databasehttp://sting.cycollege.ac.cy/ - Database contains 1002 face images showing subjects at different ages. Formats: jpg
39. FVC2000 Fingerprint Databaseshttp://bias.csr.unibo.it/fvc2000/ - FVC2000 is the First International Competition for Fingerprint Verification Algorithms. Four fingerprint databases constitute the FVC2000 benchmark 3520 fingerprints in all.

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40. Biometric Systems Labhttp://bias.csr.unibo.it/research/biolab - University of Bologna
41. Face and Gesture images and image sequenceshttp://www.fg-net.org - Several image datasets of faces and gestures that are ground truth annotated for benchmarking
42. German Fingerspelling Databasehttp://www-i6.informatik.rwth-aachen.de/ - The database contains 35 gestures and consists of 1400 image sequences that contain gestures of 20 different persons recorded under non-uniform daylight lighting conditions. Formats: mpg,jpg
43. Language Processing and Pattern Recognitionhttp://www-i6.informatik.rwth-aachen.de/
44. Groningen Natural Image Databasehttp://hlab.phys.rug.nl/archive.html - 4000+ 1536x1024 16 bit calibrated outdoor images Formats: homebrew
45. ICG Testhouse sequencehttp://www.icg.tu-graz.ac.at/ - 2 turntable sequences from iferent viewing heights, 36 images each, resolution 1000x750, color Formats: PPM
46. Institute of Computer Graphics and Visionhttp://www.icg.tu-graz.ac.at
47. IEN Image Libraryhttp://www.ien.it/is/vislib/ - 1000+ images, mostly outdoor sequences Formats: raw, ppm
48. INRIA's Syntim images databasehttp://www-rocq.inria.fr/ - 15 color image of simple objects Formats: gif
49. INRIAhttp://www.inria.fr/
50. INRIA's Syntim stereo databaseshttp://www-rocq.inria.fr/ - 34 calibrated color stereo pairs Formats: gif
51. Image Analysis Laboratoryhttp://www.ece.ncsu.edu/imaging/Archives/ImageDataBase/index.html - Images obtained from a variety of imaging modalities -- raw CFA images, range images and a host of "medical images". Formats: homebrew
52. Image Analysis Laboratoryhttp://www.ece.ncsu.edu/imaging
53. Image Databasehttp://www.prip.tuwien.ac.at/prip/image.html - An image database including some textures

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54. JAFFE Facial Expression Image Databasehttp://www.mis.atr.co.jp/ - The JAFFE database consists of 213 images of Japanese female subjects posing 6 basic facial expressions as well as a neutral pose. Ratings on emotion adjectives are also available, free of charge, for research purposes. Formats: TIFF Grayscale images.
55. ATR Research, Kyoto, Japanhttp://www.mic.atr.co.jp/
56. JISCT Stereo Evaluationftp://ftp.vislist.com/IMAGERY/JISCT/ - 44 image pairs. These data have been used in an evaluation of stereo analysis, as described in the April 1993 ARPA Image Understanding Workshop paper The JISCT Stereo Evaluation" by R.C.Bolles, H.H.Baker, and M.J.Hannah, 263--274 Formats: SSI
57. MIT Vision Texturehttp://www-white.media.mit.edu/vismod/imagery/VisionTexture/vistex.html - Image archive 100+ images Formats: ppm
58. MIT face images and moreftp://whitechapel.media.mit.edu/pub/images - hundreds of images Formats: homebrew
59. Machine Visionhttp://vision.cse.psu.edu/book/testbed/images/ - Images from the textbook by Jain, Kasturi, Schunck 20+ images Formats: GIF TIFF
60. Mammography Image Databaseshttp://marathon.csee.usf.edu/Mammography/Database.html - 100 or more images of mammograms with ground truth. Additional images available by request, and links to several other mammography databases are provided. Formats: homebrew
61. ftp://ftp.cps.msu.edu/pub/pripftp://ftp.cps.msu.edu/pub/prip - many images Formats: unknown
62. Middlebury Stereo Data Sets with Ground Truthhttp://www.middlebury.edu/stereo/data.html - Six multi-frame stereo data sets of scenes containing planar regions. Each data set contains 9 color images and subpixel-accuracy ground-truth data. Formats: ppm
63. Middlebury Stereo Vision Research Pagehttp://www.middlebury.edu/stereo - Middlebury College

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64. Modis Airborne simulator, Gallery and data sethttp://ltpwww.gsfc.nasa.gov/MODIS/MAS/ - High Altitude Imagery from around the world for environmental modeling in support of NASA EOS program Formats: JPG and HDF
65. NIST Fingerprint and handwritingftp://sequoyah.ncsl.nist.gov/pub/databases/data - datasets - thousands of images Formats: unknown
66. NIST Fingerprint dataftp://ftp.cs.columbia.edu/jpeg/other/uuencoded - compressed multipart uuencoded tar file
67. NLM HyperDoc Visible Human Projecthttp://www.nlm.nih.gov/research/visible/visiblehuman.html - Color, CAT and MRI image samples - over 30 images Formats: jpeg
68. National Design Repositoryhttp://www.designrepository.org - Over 55,000 3D CAD and solid models of mostly mechanical/machined engineerign designs. Formats: gif,vrml,wrl,stp,sat
69. Geometric & Intelligent Computing Laboratoryhttp://gicl.mcs.drexel.edu
70. OSU MSU 3D Object Model Databasehttp://eewww.eng.ohio-state.edu/ - several sets of 3D object models collected over several years to use in object recognition research Formats: homebrew, vrml
71. OSU MSU/WSU Range Image Databasehttp://eewww.eng.ohio-state.edu/ - Hundreds of real and synthetic images Formats: gif, homebrew
72. OSU/SAMPL Database: Range Images, 3D Models, Stills, Motion Sequenceshttp://sampl.eng.ohio-state.edu/ - Over 1000 range images, 3D object models, still images and motion sequences Formats: gif, ppm, vrml, homebrew
73. Signal Analysis and Machine Perception Laboratoryhttp://sampl.eng.ohio-state.edu
74. Otago Optical Flow Evaluation Sequenceshttp://www.cs.otago.ac.nz/research/vision/Research/OpticalFlow/opticalflow.html - Synthetic and real sequences with machine-readable ground truth optical flow fields, plus tools to generate ground truth for new sequences. Formats: ppm,tif,homebrew
75. Vision Research Grouphttp://www.cs.otago.ac.nz/research/vision/index.html

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76. ftp://ftp.limsi.fr/pub/quenot/opflow/testdata/piv/ftp://ftp.limsi.fr/pub/quenot/opflow/testdata/piv/ - Real and synthetic image sequences used for testing a Particle Image Velocimetry application. These images may be used for the test of optical flow and image matching algorithms. Formats: pgm [raw]
77. LIMSI-CNRS/CHM/IMM/visionhttp://www.limsi.fr/Recherche/IMM/PageIMM.html
78. LIMSI-CNRShttp://www.limsi.fr/
79. Photometric 3D Surface Texture Databasehttp://www.taurusstudio.net/research/pmtexdb/index.htm - This is the first 3D texture database which provides both full real surface rotations and registered photometric stereo data 30 textures, 1680 images. Formats: TIFF
80. SEQUENCES FOR OPTICAL FLOW ANALYSIS SOFAhttp://www.cee.hw.ac.uk/ - 9 synthetic sequences designed for testing motion analysis applications, including full ground truth of motion and camera parameters. Formats: gif
81. Computer Vision Grouphttp://www.cee.hw.ac.uk/
82. Sequences for Flow Based Reconstructionhttp://www.nada.kth.se/ - synthetic sequence for testing structure from motion algorithms Formats: pgm
83. Stereo Images with Ground Truth Disparity and Occlusionhttp://www-dbv.cs.uni-bonn.de/stereo*data*/ - a small set of synthetic images of a hallway with varying amounts of noise added. Use these images to benchmark your stereo algorithm. Formats: raw, viff [khoros, or tiff]
84. Stuttgart Range Image Databasehttp://range.informatik.uni-stuttgart.de - A collection of synthetic range images taken from high-resolution polygonal models available on the web Formats: homebrew
85. Department Image Understandinghttp://www.informatik.uni-stuttgart.de/ipvr/bv/bv*home*engl.html
86. The AR Face Databasehttp://www2.ece.ohio-state.edu/ - Contains over 4,000 color images corresponding to 126 people's faces 70 men and 56 women. Frontal views with

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variations in facial expressions, illumination, and occlusions. Formats: RAW [RGB 24-bit]

87. Purdue Robot Vision Labhttp://rvl.www.ecn.purdue.edu/RVL/
88. The MIT-CSAIL Database of Objects and Sceneshttp://web.mit.edu/torralba/www/database.html - Database for testing multiclass object detection and scene recognition algorithms. Over 72,000 images with 2873 annotated frames. More than 50 annotated object classes. Formats: jpg
89. The RVL SPEC-DB SPECularity DataBasehttp://rvl1.ecn.purdue.edu/RVL/specularitydatabase/ - A collection of over 300 real images of 100 objects taken under three different illuminaiton conditions Diffuse/Ambient/Directed. -- Use these images to test algorithms for detecting and compensating specular highlights in color images. Formats: TIFF
90. Robot Vision Laboratoryhttp://rvl1.ecn.purdue.edu/RVL/
91. The Xm2vts databasehttp://xm2vtsdb.ee.surrey.ac.uk - The XM2VTSDB contains four digital recordings of 295 people taken over a period of four months. This database contains both image and video data of faces.
92. Centre for Vision, Speech and Signal Processinghttp://www.ee.surrey.ac.uk/Research/CVSSP
93. Traffic Image Sequences and 'Marbled Block' Sequencehttp://i21www.ira.uka.de/imagesequences - thousands of frames of digitized traffic image sequences as well as the 'Marbled Block' sequence grayscale images Formats: GIF
94. IAKS/KOGShttp://i21www.ira.uka.de
95. U Bern Face imagesftp://ftp.iam.unibe.ch/pub/Images/FaceImages - hundreds of images Formats: Sun rasterfile
96. U Michigan texturesftp://freebie.engin.umich.edu/pub/misc/textures Formats: compressed raw
97. U Oulu wood and knots databasehttp://www.ee.oulu.fi/ - Includes classifications - 1000+ color images Formats: ppm

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98. UCID - an Uncompressed Colour Image Databasehttp://vision.doc.ntu.ac.uk/datasets/UCID/ucid.html - a benchmark database for image retrieval with predefined ground truth. Formats: tiff
99. UMass Vision Image Archivehttp://vis-www.cs.umass.edu/ - Large image database with aerial, space, stereo, medical images and more. Formats: homebrew
100. UNC's 3D image databaseftp://sunsite.unc.edu/pub/academic/computer-science/virtual-reality/3d - many images Formats: GIF
101. USF Range Image Data with Segmentation Ground Truthhttp://marathon.csee.usf.edu/range/seg-comp/SegComp.html - 80 image sets Formats: Sun raster-image
102. University of Oulu Physics-based Face Databasehttp://www.ee.oulu.fi/research/imag/color/pbfd.html - contains color images of faces under different illuminants and camera calibration conditions as well as skin spectral reflectance measurements of each person.
103. Machine Vision and Media Processing Unithttp://www.ee.oulu.fi/mvmp/
104. University of Oulu Texture Databasehttp://www.outex.oulu.fi - Database of 320 surface textures, each captured under three illuminants, six spatial resolutions and nine rotation angles. A set of test suites is also provided so that texture segmentation, classification, and retrieval algorithms can be tested in a standard manner. Formats: bmp, ras, xv
105. Machine Vision Grouphttp://www.ee.oulu.fi/mvg
106. Usenix face databaseftp://ftp.uu.net/published/usenix/faces - Thousands of face images from many different sites circa 994
107. View Sphere Databasehttp://www-prima.inrialpes.fr/Prima/hall/view*sphere.html* - Images of 8 objects seen from many different view points. The view sphere is sampled using a geodesic with 172 images/sphere. Two sets for training and testing are available. Formats: ppm
108. PRIMA, GRAVIRhttp://www-prima.inrialpes.fr/Prima/

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109. Vision-list Imagery Archiveftp://ftp.vislist.com/IMAGERY/ - Many images, many formats

110. Wiry Object Recognition Databasehttp://www.cs.cmu.edu/ - Thousands of images of a cart, ladder, stool, bicycle, chairs, and cluttered scenes with ground truth labelings of edges and regions. Formats: jpg

111. 3D Vision Grouphttp://www.cs.cmu.edu/0.000000E+003dvision/

112. Yale Face Databasehttp://cvc.yale.edu/projects/yalefaces/yalefaces.html - 165 images 15 individuals with different lighting, expression, and occlusion configurations.

113. Yale Face Database Bhttp://cvc.yale.edu/projects/yalefacesB/yalefacesB.html - 5760 single light source images of 10 subjects each seen under 576 viewing conditions 9 poses x 64 illumination conditions. Formats: PGM

114. Center for Computational Vision and Controlhttp://cvc.yale.edu/

115. DeepMind QA Corpushttps://github.com/deepmind/rc-data - Textual QA corpus from CNN and DailyMail. More than 300K documents in total. Paperhttp://arxiv.org/abs/1506.03340 for reference.

116. YouTube-8M Datasethttps://research.google.com/youtube8m/ - YouTube-8M is a large-scale labeled video dataset that consists of 8 million YouTube video IDs and associated labels from a diverse vocabulary of 4800 visual entities.

117. Open Images datasethttps://github.com/openimages/dataset - Open Images is a dataset of

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