

- Some papers or topics are followed by tutorials to facilitate understanding. The tutorials are not valid choices for the critic review report required in Assignment 1.
- Based on **personal experience**, some papers are marked with "+" symbols, from + to ++++ indicating easy to hard implementation. Theoretical papers or papers outside my expertise lack the ranking. The ranking may be helpful for you to choose a "technical path", which you may follow in doing Assignment 2 and 3. But they have NO effect in assessing your Assignment 1.

[Undergoing construction ...]

Probabilistic models

- [Probabilistic PCA \(http://www.robots.ox.ac.uk/~cvrg/hilary2006/ppca.pdf\)](http://www.robots.ox.ac.uk/~cvrg/hilary2006/ppca.pdf)(++)
 - [Bayesian PCA \(https://papers.nips.cc/paper/1549-bayesian-pca.pdf\)](https://papers.nips.cc/paper/1549-bayesian-pca.pdf)(++)
- [Linear Discriminant Analysis \(http://www.face-rec.org/algorithms/LDA/discriminant-analysis-for-recognition.pdf\)](http://www.face-rec.org/algorithms/LDA/discriminant-analysis-for-recognition.pdf)
- [Latent Dirichlet Process-based Model \(http://www.jmlr.org/papers/volume3/blei03a/blei03a.pdf\)](http://www.jmlr.org/papers/volume3/blei03a/blei03a.pdf)(+++), [nested \(https://cocosci.berkeley.edu/tom/papers/ncrp.pdf\)](https://cocosci.berkeley.edu/tom/papers/ncrp.pdf)(+++), [tutorial \(https://www.cs.cmu.edu/~epxing/Class/10708-15/notes/10708_scribe_lecture18.pdf\)](https://www.cs.cmu.edu/~epxing/Class/10708-15/notes/10708_scribe_lecture18.pdf)

Non-parametric and kernel methods

- [Good old nearest neighbour \(https://www.nowpublishers.com/article/Details/MAL-064\)](https://www.nowpublishers.com/article/Details/MAL-064)
- [Kernel PCA \(http://pca.narod.ru/scholkopf_kernel.pdf\)](http://pca.narod.ru/scholkopf_kernel.pdf)(++)
 - [KPCA application \(https://alex.smola.org/papers/1999/MikSchSmoMuletal99.pdf\)](https://alex.smola.org/papers/1999/MikSchSmoMuletal99.pdf)

Ensemble

- [Adaboost \(http://web.eecs.utk.edu/~leparker/Courses/CS425-528-fall10/Handouts/AdaBoost.M1.pdf\)](http://web.eecs.utk.edu/~leparker/Courses/CS425-528-fall10/Handouts/AdaBoost.M1.pdf)(++)
 - [Adaboost-Multiclass \(https://web.stanford.edu/~hastie/Papers/samme.pdf\)](https://web.stanford.edu/~hastie/Papers/samme.pdf)
 - [Fast Object Detection \(https://www.cs.cmu.edu/~efros/courses/LBMV07/Papers/viola-cvpr-01.pdf\)](https://www.cs.cmu.edu/~efros/courses/LBMV07/Papers/viola-cvpr-01.pdf)
 - Gradient Boost ([paper-1 \(https://statweb.stanford.edu/~jhf/ftp/stobst.pdf\)](https://statweb.stanford.edu/~jhf/ftp/stobst.pdf), [paper-2 \(http://maths.dur.ac.uk/~dma6kp/pdf/face_recognition/Boosting/Mason99AnyboostLo](http://maths.dur.ac.uk/~dma6kp/pdf/face_recognition/Boosting/Mason99AnyboostLo)
[paper-3 \(http://maths.dur.ac.uk/~dma6kp/pdf/face_recognition/Boosting/Mason99AnyboostLo](http://maths.dur.ac.uk/~dma6kp/pdf/face_recognition/Boosting/Mason99AnyboostLo)
[tutorial-1 \(https://www.frontiersin.org/articles/10.3389/fnbot.2013.00021/full\)](https://www.frontiersin.org/articles/10.3389/fnbot.2013.00021/full),
[tutorial-2 \(https://machinelearningmastery.com/gentle-introduction-gradient-boosting-algorithm-machine-learning/\)](https://machinelearningmastery.com/gentle-introduction-gradient-boosting-algorithm-machine-learning/))
- [Random Forest \(https://link.springer.com/article/10.1023/A:1010933404324\)](https://link.springer.com/article/10.1023/A:1010933404324)(++)
- [Comparative Study \(http://www.jmlr.org/papers/volume15/delgado14a/delgado14a.pdf\)](http://www.jmlr.org/papers/volume15/delgado14a/delgado14a.pdf)

Generative Models and Data Representation

- [Generative Adversarial Nets \(https://arxiv.org/abs/1406.2661\)](https://arxiv.org/abs/1406.2661)(+)
 - [Wasserstein GAN \(https://arxiv.org/abs/1701.07875\)](https://arxiv.org/abs/1701.07875)(++)

- [For Image Data \(https://arxiv.org/abs/1511.06434\)](https://arxiv.org/abs/1511.06434)(++)
- [Sparse Encoding \(https://www.semanticscholar.org/paper/Learning-Overcomplete-Representations-Lewicki-Sejnowski/0ee7cacbf988c7b3f24b2bc6dd43d9fce1b25bdc\)](https://www.semanticscholar.org/paper/Learning-Overcomplete-Representations-Lewicki-Sejnowski/0ee7cacbf988c7b3f24b2bc6dd43d9fce1b25bdc)(+++)
- [Efficient Sparse Encoding Algorithms \(https://papers.nips.cc/paper/2979-efficient-sparse-coding-algorithms.pdf\)](https://papers.nips.cc/paper/2979-efficient-sparse-coding-algorithms.pdf)(+++)
- [Metric Learning \(https://ai.stanford.edu/~ang/papers/nips02-metric.pdf\)](https://ai.stanford.edu/~ang/papers/nips02-metric.pdf)(++)
- [Auto Encoder \(http://www.cs.toronto.edu/~larocneh/publications/icml-2008-denoising-autoencoders.pdf\)](http://www.cs.toronto.edu/~larocneh/publications/icml-2008-denoising-autoencoders.pdf)(+)
- [Sparse AutoEncoder \(https://web.stanford.edu/class/cs294a/sparseAutoencoder.pdf\)](https://web.stanford.edu/class/cs294a/sparseAutoencoder.pdf)(++)
- [Variational AutoEncoder \(Auto-encoding variational Bayes\)\(++\)](https://arxiv.org/abs/1606.05908) [tutorial \(https://arxiv.org/abs/1606.05908\)](#)
- [Deep Learning and AI \(https://www.nowpublishers.com/article/Details/MAL-006\)](https://www.nowpublishers.com/article/Details/MAL-006)

Training Techniques, Regularisation

- [Large Margin and SVM, ?]
- [Early Stopping, ?]
- [Dropout \(http://jmlr.org/papers/volume15/srivastava14a.old/srivastava14a.pdf\)](http://jmlr.org/papers/volume15/srivastava14a.old/srivastava14a.pdf)
- [Long Short-term Memory \(http://www.bioinf.jku.at/publications/older/2604.pdf\)](http://www.bioinf.jku.at/publications/older/2604.pdf)
 - [Recurrent sequence translation, GRU \(https://arxiv.org/pdf/1409.1259.pdf\)](https://arxiv.org/pdf/1409.1259.pdf)
 - [Recurrent Unit Comparison \(https://arxiv.org/pdf/1412.3555v1.pdf\)](https://arxiv.org/pdf/1412.3555v1.pdf)
- [Batch Normalisation \(https://arxiv.org/abs/1502.03167\)](https://arxiv.org/abs/1502.03167)(+, Inception-v2)

Deep Architecture

- [AlexNet \(https://www.nvidia.com/content/tesla/pdf/machine-learning/imagenet-classification-with-deep-convolutional-nn.pdf\)](https://www.nvidia.com/content/tesla/pdf/machine-learning/imagenet-classification-with-deep-convolutional-nn.pdf)
- [Very-deep \(at its time\) VGG \(https://arxiv.org/abs/1409.1556\)](https://arxiv.org/abs/1409.1556)
- Inception Net [v1 \(https://arxiv.org/pdf/1409.4842.pdf\)](https://arxiv.org/pdf/1409.4842.pdf), [v2\(see above\)](#), [v3 \(https://arxiv.org/abs/1512.00567\)](https://arxiv.org/abs/1512.00567), [v4 \(https://arxiv.org/pdf/1602.07261.pdf\)](https://arxiv.org/pdf/1602.07261.pdf)(with ResNet)
- [ResNet \(https://arxiv.org/abs/1512.03385\)](https://arxiv.org/abs/1512.03385)
 - [ResNet connects to boosting \(https://arxiv.org/abs/1605.06431\)](https://arxiv.org/abs/1605.06431), [Using Boosting to Train ResNet \(https://arxiv.org/abs/1706.04964\)](https://arxiv.org/abs/1706.04964)

Reinforcement

- [Regret Bounding, ?]
- [Temporal Difference, ?]
- [Q-Learning, ?]
- [Policy-Gradient, ?]
- [Monte Carlo Tree Search \(https://hal.inria.fr/inria-00116992/document\)](https://hal.inria.fr/inria-00116992/document)(++)
 - [AlphaGo Zero \(https://deepmind.com/documents/119/agz_unformatted_nature.pdf\)](https://deepmind.com/documents/119/agz_unformatted_nature.pdf)(++++)

Dynamic Models

- [HMM, ?]
- [Kalman Filter, ?]

Monte Carlo Methods (for MCTS, see above)

- [RANSAC \(https://dl.acm.org/citation.cfm?id=358692\)](https://dl.acm.org/citation.cfm?id=358692)(+, behind pay-wall, use our library to download)
- [Inference methods, ?]

Application / Practical Tasks

Cavet: Papers in this section represent trend as of 2018, but may not be time-tested.

- Attack and Defense
 - [Attack Deep NN Image Recognisers by Slightly Noisy Images \(https://arxiv.org/pdf/1312.6199.pdf\)](https://arxiv.org/pdf/1312.6199.pdf)(+)
 - [Single Pixel Attack \(https://arxiv.org/pdf/1710.08864.pdf\)](https://arxiv.org/pdf/1710.08864.pdf)(++)
 - [Mass Destruction Attack \(https://arxiv.org/pdf/1802.08195.pdf\)](https://arxiv.org/pdf/1802.08195.pdf)(++): attack on non-specific image processing systems, even slightly touched biological ones!
- Object Detection (papers in this section are of difficulty +++ if implemented from scratch, but existing implementations are widely available)
 - [Regional CNN \(https://arxiv.org/pdf/1311.2524.pdf\)](https://arxiv.org/pdf/1311.2524.pdf), [fast \(https://arxiv.org/abs/1504.08083\)](https://arxiv.org/abs/1504.08083), [faster \(https://arxiv.org/pdf/1506.01497.pdf\)](https://arxiv.org/pdf/1506.01497.pdf)
 - [tutorial-1 \(https://blog.athelas.com/a-brief-history-of-cnns-in-image-segmentation-from-r-cnn-to-mask-r-cnn-34ea83205de4\)](https://blog.athelas.com/a-brief-history-of-cnns-in-image-segmentation-from-r-cnn-to-mask-r-cnn-34ea83205de4), [tutorial-2 \(https://towardsdatascience.com/r-cnn-fast-r-cnn-faster-r-cnn-yolo-object-detection-algorithms-36d53571365e\)](https://towardsdatascience.com/r-cnn-fast-r-cnn-faster-r-cnn-yolo-object-detection-algorithms-36d53571365e)
 - [Yolo \(https://arxiv.org/pdf/1506.02640v5.pdf\)](https://arxiv.org/pdf/1506.02640v5.pdf)
 - [Single Shot Detector \(https://arxiv.org/abs/1512.02325\)](https://arxiv.org/abs/1512.02325)
- Sequence to sequence translation (<https://arxiv.org/pdf/1409.3215.pdf>)(+)
 - [Align and translation together \(https://arxiv.org/abs/1409.0473\)](https://arxiv.org/abs/1409.0473)(+)
 - [Attention-based \(http://papers.nips.cc/paper/7181-attention-is-all-you-need\)](http://papers.nips.cc/paper/7181-attention-is-all-you-need)
- Game Playing and Control
 - [Q-Learning \(https://deepmind-data.storage.googleapis.com/assets/papers/DeepMindNature14236Paper.pdf\)](https://deepmind-data.storage.googleapis.com/assets/papers/DeepMindNature14236Paper.pdf)(++, the pioneer work), [Double-Q, ?], [Rainbow-Q, ?], [Q from Demo, ?]
 - [Deterministic Policy Gradient, ?], [DDPG, ?], [A3C, ?], [A2C, ?]
- Recommendation systems
 - [Reduction-based \(http://files.grouplens.org/papers/webKDD00.pdf\)](http://files.grouplens.org/papers/webKDD00.pdf)(+)
 - [Matrix Factorisation \(http://www.cs.rochester.edu/twiki/pub/Main/HarpSeminar/Factorization_Meets_the_N_a_Multifaceted_Collaborative_Filtering_Model.pdf\)](http://www.cs.rochester.edu/twiki/pub/Main/HarpSeminar/Factorization_Meets_the_N_a_Multifaceted_Collaborative_Filtering_Model.pdf)
- Text Content Analysis and Generation
 - [Sentient Analysis \(http://www.cs.columbia.edu/~julia/papers/Agarwaletal11.pdf\)](http://www.cs.columbia.edu/~julia/papers/Agarwaletal11.pdf)(++)
 - [Dialogue Bots \(https://arxiv.org/abs/1507.04808\)](https://arxiv.org/abs/1507.04808)

