A Blog From a Human-engineer-being

Eren Golge's Blog

A Large set of Machine Learning Resources for Beginners to Mavens

Search my Blog Gently

April 29, 2014

By Eren

Machine Learning, Research

links machine learning resource tools

5 Comments

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Best way to qualify your machine learning model.

Note : I regularly update this list.

Machine Learning 101:

I. Introduction to Machine Learning

- http://homepages.inf.ed.ac.uk/rbf/IAPR/researchers/MLPAGES/mltut.htm
- http://jeremykun.com/2012/08/04/machine-learning-introduction/
- http://www.omidrouhani.com/research/machinelearning/html/machinelearning.htm
- http://www.youtube.com/playlist?list=PLD63A284B7615313A (cal tech class)

II. Linear Regression

- http://en.wikipedia.org/wiki/Linear_regression
- http://www.youtube.com/watch?v=ExVhaN36jBs
- http://en.wikipedia.org/wiki/Simple_linear_regression
- http://www.youtube.com/watch?v=ocGEhiLwDVc

III) Linear Algebra

- http://ocw.mit.edu/courses/mathematics/18-06sc-linear-

algebra-fall-2011/Syllabus/

- https://www.khanacademy.org/math/linear-algebra
- online text
- http://joshua.smcvt.edu/linearalgebra/book.pdf
- - see http://joshua.smcvt.edu/linearalgebra/ for usage rights

V) Linear Regression with Multiple Variables

- Gradient Descent

- http://en.wikipedia.org/wiki/Gradient_descent
- http://www.youtube.com/watch?v=umAeJ7LMCfU (discusses above wiki article)
- http://www.youtube.com/watch?v=Dgn1ssi2p40

- Optimization

- http://www.stanford.edu/class/ee364a/videos/video01.html

IV) Octave Tutorial

- http://en.wikibooks.org/wiki/Octave_Programming_Tutorial

VI) Logistic Regression (LR)

- http://en.wikipedia.org/wiki/Logistic_regression
- http://alias-i.com/lingpipe/demos/tutorial/logistic-regression/read-me.html
- http://www.ats.ucla.edu/stat/sas/library/logistic.pdf
- http://www.youtube.com/watch?v=-Z2a_mzl9LM&feature=c4-overview&playnext=1&list=TLIxwITi7ngG0 (refers to LR as a classifier)

VII) Regularization

- http://en.wikipedia.org/wiki/Regularization_(mathematics)
- http://solon.cma.univie.ac.at/regul.html
- http://www.di.ens.fr/~fbach/ecml2010tutorial/ecml_tutorial_part1.pdf

overview using advanced math

- http://solon.cma.univie.ac.at/ms/regtutorial.pdf

VIII and IX) Neural Networks

- http://www.youtube.com/watch?v=KuPai0ogiHk
- http://www.youtube.com/watch?v=Ih5Mr93E-2c&list=PLD63A284B7615313A&index=10

- backpropagation

- http://www.youtube.com/watch?v=aVId8KMsdUU
- http://www.speech.sri.com/people/anand/771/html/node37.html
- http://blog.zabarauskas.com/backpropagation-tutorial/

XI) Machine Learning System Design

- http://people.cs.pitt.edu/~milos/courses/cs2750-Spring03/lectures/class2.pdf

Precision, recall, accuracy, …

- http://en.wikipedia.org/wiki/Precision_and_recall
- https://en.wikipedia.org/wiki/Accuracy_and_precision
- http://stats.stackexchange.com/questions/34193/how-to-choose-an-error-metric-when-evaluating-a-class…
- http://www.cs.cornell.edu/courses/cs578/2003fa/performance_measures.pdf

XII) Support Vector Machines

- http://www.cs.ucf.edu/courses/cap6412/fall2009/papers/Berwick2003.pdf
- http://www.cs.columbia.edu/~kathy/cs4701/documents/jason_svm_tutorial.pdf
- http://www.youtube.com/watch?v=eHsErlPJWUU
- http://web.mit.edu/zoya/www/SVM.pdf

XIII) Clustering

- http://en.wikipedia.org/wiki/Cluster_analysis
- http://en.wikipedia.org/wiki/K-means_clustering
- http://www.youtube.com/watch?v=0MQEt10e4NM&feature=c4-overview&playnext=1&list=TLT3EED0Azl4Y

XIV) Dimensionality Reduction

- http://en.wikipedia.org/wiki/Dimensionality_reduction
- http://research.cs.tamu.edu/prism/lectures/iss/iss_l10.pdf
- http://www.math.uwaterloo.ca/~aghodsib/courses/f06stat890/readings/tutorial_stat890.pdf
- http://www.youtube.com/watch?v=EHIZ7Pk1XVY
- http://www.youtube.com/watch?v=mz618Tesra4

XV) Anomaly Detection

- www.siam.org/meetings/sdm08/TS2.ppt
- http://en.wikipedia.org/wiki/Anomaly_detection

- Google Analytics http://www.google.com/analytics/
- anomaly detection with Google Analytics (example)

- http://www.youtube.com/watch?v=PulNjqfToAo

Must purchase this article (I did not purchase but appears to be good) http://www.sciencedirect.com/science/article/pii/S138912860700062X

- Gaussian distribution

- http://www.youtube.com/watch?v=4uiJoYVPmMw (no math)
- https://en.wikipedia.org/wiki/Normal_distribution
- http://www.r-tutor.com/elementary-statistics/probability-distributions/normal-distribution
- https://en.wikipedia.org/wiki/Multivariate_normal_distribution

XVI) Recommender Systems

- http://pages.cs.wisc.edu/~beechung/icml11-tutorial/
- http://ijcai-11.iiia.csic.es/files/proceedings/Tutorial%20IJCAI%202011%20Gesamt.pdf
- http://muricoca.github.io/crab/tutorial.html (using Python)

- Collaborative Filtering

- www.cs.cmu.edu/~wcohen/collab-filtering-tutorial.ppt

XVII) Large Scale Machine Learning

- http://i.stanford.edu/~ullman/pub/ch12.pdf
- http://www.sanjivk.com/EECS6898/ (introduction to class)
- (lectures) http://www.sanjivk.com/EECS6898/lectures.html
- http://techtalks.tv/talks/introduction-5/57923/

- stochastic gradient descent

- http://en.wikipedia.org/wiki/Stochastic_gradient_descent
- http://www.youtube.com/watch?v=HvLJUsEc6dw (visualization)
- http://work.caltech.edu/library/101.html
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-832-underactuated-robotics-… http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-832-underactuated-robotics-…

- parallelized stochastic gradient descent

- http://www.research.rutgers.edu/~lihong/pub/Zinkevich11Parallelized.pdf

- recursive partitioning:

- http://cran.r-project.org/web/packages/rpart/vignettes/longintro.pdf

Machine Learning 201:

- Advanced Machine Learning Course (CMU)
- Lecture 1: Machine Learning With Scikit-Learn
- Lecture 2: Machine Learning With Scikit-Learn
- Lecture 3: Machine Learning from the Boston Python User Group
- Andrew Ng’s Standford ML Class
- An Introduction to Machine Learning
- Andrew Ng’s Coursera Class Wiki
- Koller's PGM course on Coursera (requires solid prob. background)
- The Machine Learning Library
- JMLR
- CMU Google Slides
- NN Course
- Statistical Machine Learning Course by Ryan

Tibshirani & Larry Wasserman (NEW)

Deep Learning:

- Deep Learning - Very wide grasp resource about everything
- Juergen Schmidhuber's home page - Different perspectives of NNs with theoretical view as well
- Home Page of Geoffrey Hinton - And the Father of DL
- Neural Network FAQ, part 1 of 7: Introduction - General sense NN FAQ
- Page on lear.inrialpes.fr - INRIA Deep Learning Notes tutorial
- Page on nyu.edu:21991 - very detailed examples on real datasets
- Hinton's NN lectures at Coursera

Sparse Coding (new):

- ECCV10 tutorials
- CVPR10 tutorials

Some good articles on working with the command line:

- command line nuggets for data science (article focuses on unix but all will work in linux bash)
- intro to the command line
- 7 Command Line Tools for Data Scientists

Jacobian Iteration for Singular Value Decomposition:

- Basic Explanation
- Stream Algorithm for SVD

Fortran:

- Fortran for Beginners
- Fortran 77 Stanford Tutorial

- Professional Programmer's Guide to Fortran 77
- BLAS
- Fortran 77 Intrinsic Functions

Mathematics, Statistical Theory and Probability Theory:

- Introduction to Probability
- Rice
- Chang Stochastic Processes
- Durrett Probability

Methods of Optimization:

- Gradient Descent
- Basic Steepest Decent
- Newton's Method in Optimization
- CRAN Optimization and Mathematical Programming Task View
- MIT OCW Optimization Methods
- Boyd Optimization
- Boyd Solutions Manual
- Convex Optimization in R

Theoretical Computer Science:

- Foundations of Computer Science
- Complexity Theory a Modern Approach

Some Really Random Stuff:

- A Little Stats Cheat Sheet. Pretty basic stuff but it is a nice quick reference.
- Proof wiki list of symbols with LaTex code!!
- LaTex greeks, very useful.
- LaTeX fonts

R:

- R One pagers

- R Time Series
- R Statistical And Machine Learning Task View

Python:

- Pylearn2 Deeplearning Library
- IPython Notebooks on Various Topics

Credits goes to Resources
I added some of my places to that list as well.

Related posts:

1. **Some Useful Machine Learning Libraries.**
2. **Kohonen Learning Procedure K-Means vs Lloyd's K-means**

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Steven Taylor • 15 days ago

Great list although I'm having trouble with the youtube links.

• Reply • Share ›

erogol Mod ➚ Steven Taylor • 14 days ago

Thanks :)

I checked some of the links but no problem. Would you point he broken one in your case?

• Reply • Share ›

Steven Taylor ➚ erogol • 9 days ago

The links are working for me now. I'm not sure what the issue was then.

Thank you, I'm going to bookmark this site.

• Reply • Share ›

Rehan • 16 days ago

Awesome collection :D

• Reply • Share ›

Amar Prabhu • 16 days ago

Just wanted to say thanks!

• Reply • Share ›