02462 SIGNALS AND DATA

Background reading is drawn from the open resources:
"Deep Learning", I. Goodfellow, Y. Bengio and A. Courville, https://www.deeplearningbook.org/
"The Scientist and Engineer's Guide to Digital Signal Processing", S.W. Smith, http://www.dspguide.com/

Plan and readings February-May 2019 (subject to change)

PROBABILITY AND STATISTICS OF SIGNALS

05/02 Probability and density functions
Reading: Deep Ch. 3.1-3.12.
12/02 Signal detection and Bayesian decision theory
Reading: Deep Ch. 3.1-3.12.
19/02 Multivariate densities and covariance.
Reading: Deep Ch. 3.1-3.12.

INFERENCE AND SIGNAL REPRESENTATIONS

26/02 Inference, likelihoods, priors and posteriors. Linear models
Reading: Deep Ch. 5.5,5.6.
05/03 Inference, univariate and multivariate normal distribution. Principal components, change of basis.
Reading: Deep Ch. 2.1-2.7, 3.1-3.12,5.5,5.6,5.8.
12/03 Sampling - periodic bases for time series. Noise and random periodic signals. Nyquist and aliasing.
Reading: http://www.dspguide.com/ch3/2.htm (figure 3.3).

SIGNAL MODELS

19/03 Sound and speech signals. Filters and 1D Convolutions
Reading: Deep Ch. 9,12.3.
26/03 Images data. Filters and image convolutions
Reading: Deep Ch. 9,12.2.
02/04 Text data. Bag of words, latent semantics, word representations, Glove.
Reading: Deep Ch. 9,12.4.

TRANSFER LEARNING PROJECT

09/04 Inference in feed forward networks, backprop, stochastic gradient. Inference with a softmax layer.
Reading: Deep Ch. 5.9,6.2,6.5.
23/04 Transfer learning - planning project
Reading: Deep Ch. 15.2

30/04 Transfer learning - executing project.

07/05 Transfer learning - reporting and presentations.

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