

9.641 Neural Networks

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<http://hebb.mit.edu/courses/9.641>

Prerequisites

- Linear systems theory
 - vectors, matrices
 - convolution, correlation
- Basic differential equations
- Probability theory
- MATLAB

Required work

- 4 problem sets
- presentation of a journal paper?
- project
 - oral presentation
 - computer demo
 - written paper

Project types

- Train a network
- Design a network
- Analyze a network

Neural networks as models of early vision

Biological systems

Computer systems

Basics

- 9/7 spikes and rates
- 9/12 MATLAB and linear algebra
- 9/14 LT neurons and perceptrons
- 9/19 vision and convolutional neural networks
- 9/21 delta rule
- 9/26 backpropagation
- 9/28 objectives and optimization
- 10/3 contrastive Hebbian learning
- 10/5 Markov random fields

Identifying a project

- 10/12 project discussion
- 10/17 edge detection and contour integration
- 10/19 nonlinear diffusion
- 10/24 active contours/snakes
- 10/26 steerable filters

Project development

- 10/31 TBA
- 11/2 TBA
- 11/7 TBA
- 11/9 TBA
- 11/14 TBA
- 11/16 TBA
- 11/21 TBA
- 11/23 TBA
- 11/28 TBA
- 12/5 TBA

Grand finale

- 12/7 oral presentations