Pattern Recognition Technology

YAMANE, Ken

1. Course Description
The main topics are as follows: linear models for regression, linear models for classification, neural networks.

2. Course Objectives
The aim of the course is to learn fundamental methods and techniques of pattern recognition.

3. Grading Policy
Students are evaluated with reports in each lecture (30%), a mid-term exam (30%), and a term exam (40%).

4. Textbook and Reference
Textbook
No textbook is used.

5. Requirements(Assignments)

6. Note

7. Schedule
[1]   Introduction
[2]   Template matching, prototype, nearest-neighbor method
[3]   Least squares method
[4]   Linear discriminant, linear regression, logistic regression
[5]   Bayesian inference, maximum likelihood
[6]   Clustering: k-means clustering, Gaussian mixture model (GMM), expectation-maximization algorithm (EM algorithm)
[7]   Time series pattern recognition: matching algorithm based on dynamic programming (DP matching), hidden Markov model (HMM)
[8]   Summary, mid-term exam
[9]   Radial basis function network (RBFN)
[10]   Support vector machine (SVM), support vector regression (SVR)
[11]   Neural networks I: recurrent neural network, Hopfield model
[12]   Neural networks II: perceptron, leaning rules
[13]   Neural networks III: Multi-layer neural network (Multilayer perceptron, MLP), backpropagation algorithm, deep neural network (DNN)
[14]   State-of-the-art technology: Deep learning (CNN, R-CNN, fast R-CNN, faster R-CNN, mask R-CNN, etc.)
[15]   Summary, term exam