

NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Electronics and Communication Engineering - Pattern Recognition

Subject Co-ordinator - Prof. P.S. Sastry

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction to Statistical Pattern Recognition
- Lecture 2 - Overview of Pattern Classifiers
- Lecture 3 - The Bayes Classifier for minimizing Risk
- Lecture 4 - Estimating Bayes Error; Minimax and Neymann-Pearson classifiers
- Lecture 5 - Implementing Bayes Classifier; Estimation of Class Conditional Densities
- Lecture 6 - Maximum Likelihood estimation of different densities
- Lecture 7 - Bayesian estimation of parameters of density functions, MAP estimates
- Lecture 8 - Bayesian Estimation examples; the exponential family of densities and ML estimates
- Lecture 9 - Sufficient Statistics; Recursive formulation of ML and Bayesian estimates
- Lecture 10 - Mixture Densities, ML estimation and EM algorithm
- Lecture 11 - Convergence of EM algorithm; overview of Nonparametric density estimation
- Lecture 12 - Convergence of EM algorithm, Overview of Nonparametric density estimation
- Lecture 13 - Nonparametric estimation, Parzen Windows, nearest neighbour methods
- Lecture 14 - Linear Discriminant Functions; Perceptron -- Learning Algorithm and convergence proof
- Lecture 15 - Linear Least Squares Regression; LMS algorithm
- Lecture 16 - AdaLine and LMS algorithm; General nonlinear least-squares regression
- Lecture 17 - Logistic Regression; Statistics of least squares method; Regularized Least Squares
- Lecture 18 - Fisher Linear Discriminant
- Lecture 19 - Linear Discriminant functions for multi-class case; multi-class logistic regression
- Lecture 20 - Learning and Generalization; PAC learning framework
- Lecture 21 - Overview of Statistical Learning Theory; Empirical Risk Minimization
- Lecture 22 - Consistency of Empirical Risk Minimization
- Lecture 23 - Consistency of Empirical Risk Minimization; VC-Dimension
- Lecture 24 - Complexity of Learning problems and VC-Dimension
- Lecture 25 - VC-Dimension Examples; VC-Dimension of hyperplanes
- Lecture 26 - Overview of Artificial Neural Networks
- Lecture 27 - Multilayer Feedforward Neural networks with Sigmoidal activation functions;
- Lecture 28 - Backpropagation Algorithm; Representational abilities of feedforward networks
- Lecture 29 - Feedforward networks for Classification and Regression; Backpropagation in Practice

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- Lecture 30 - Radial Basis Function Networks; Gaussian RBF networks
- Lecture 31 - Learning Weights in RBF networks; K-means clustering algorithm
- Lecture 32 - Support Vector Machines -- Introduction, obtaining the optimal hyperplane
- Lecture 33 - SVM formulation with slack variables; nonlinear SVM classifiers
- Lecture 34 - Kernel Functions for nonlinear SVMs; Mercer and positive definite Kernels
- Lecture 35 - Support Vector Regression and ϵ -insensitive Loss function, examples of SVM learning
- Lecture 36 - Overview of SMO and other algorithms for SVM; ϵ -SVM and ϵ -SVR; SVM as a risk minimizer
- Lecture 37 - Positive Definite Kernels; RKHS; Representer Theorem
- Lecture 38 - Feature Selection and Dimensionality Reduction; Principal Component Analysis
- Lecture 39 - No Free Lunch Theorem; Model selection and model estimation; Bias-variance trade-off
- Lecture 40 - Assessing Learnt classifiers; Cross Validation;
- Lecture 41 - Bootstrap, Bagging and Boosting; Classifier Ensembles; AdaBoost
- Lecture 42 - Risk minimization view of AdaBoost