POLITECNICO DI MILANO — COMO CAMPUS

PATTERN ANALYSIS AND MACHINE INTELLIGENCE 2015-2016
prof. Matteo Matteucci

Course Summary

Project Repository

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Team Members

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Contents

1 Statistical learning

- Bias, Variance, irreducible error, expected prediction error
- Flexibility, complexity
- Bias-variance trade-off (the relations among MSE (test & trainig), Expected prediction error) (regr)
- minimum avg. test error rate (class)
- Plots
- LDA, decision boundaries
- inference vs prediction, # of observations vs # of predictors
- non-linear functions
- Bayes classifier and bayes error rate
- Example of a solution for LDA

2 Linear regression

- MSE
- Manual computations for linear model ($\hat{}$,$\bar{}$, β, etc)
- training & test RSS
- convenience intervals
- null hypothesis

3 Classification

- Discriminative methods
- Generative methods
- KNN
- Euclidean distance
- LDA, logistic regression
- Manual computations (discriminants, boundary equations, drawings)
- QDA (parameters)
- the curse of dimensionality
- estimation of probabilities

4 Clustering

- SSE, accuracy (internal/external),
- K-Means
- Hierarchical (agglomerative)
- Mixture of Gaussians
- DBSCAN
- K-medoids
- Fuzzy C-means
- Jarvis-Patrick
- linkage techniques
- metrics for the distance between clusters