SVM: a brief introduction

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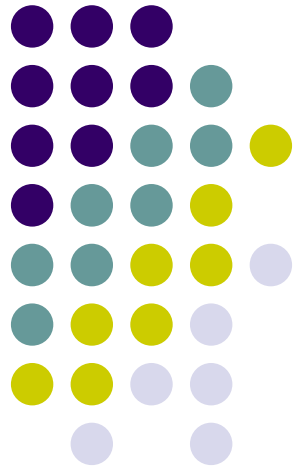
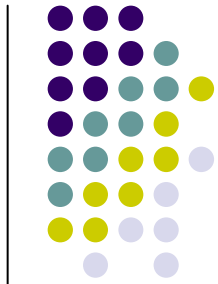


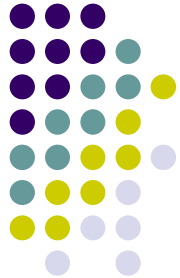
Support Vector Machines



- A most recently developed learning system (in early 90's, by Vapnik and his coworkers)
  - Can be applied in classification and regression

- Advantages:
  - Better generalization
  - Global optimum

What it SVM?

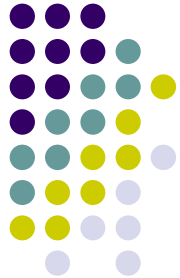


- http://www.csie.ntu.edu.tw/~piaip/svm/svm_cjlin_dm.pdf

SVM applications

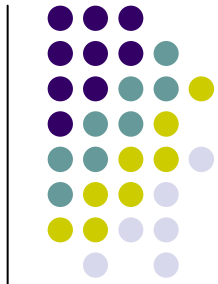
- SVMs were originally proposed by Boser, Guyon and Vapnik in 1992 and gained increasing popularity in late 1990s.
- SVMs are currently among the best performers for a number of classification tasks ranging from text to genomic data.
- SVMs can be applied to complex data types beyond feature vectors (e.g. graphs, sequences, relational data) by designing kernel functions for such data.
- SVM techniques have been extended to a number of tasks such as regression [Vapnik *et al.* '97], principal component analysis [Schölkopf *et al.* '99], etc.
- Most popular optimization algorithms for SVMs use *decomposition* to hill-climb over a subset of α_i's at a time, e.g. SMO [Platt '99] and [Joachims '99]
- Tuning SVMs remains a black art: selecting a specific kernel and parameters is usually done in a try-and-see manner.

Useful tools



- SVM-Light
  - http://svmlight.joachims.org/
- LibSVM
  - http://www.csie.ntu.edu.tw/~cjlin/libsvm/

Tutorial



- http://www1.cs.columbia.edu/~rkuang/candidacy/Burges98.pdf

Beyond SVM

- Kernel methods
  - Kernel methods for pattern analysis
  - http://www.kernel-methods.net/