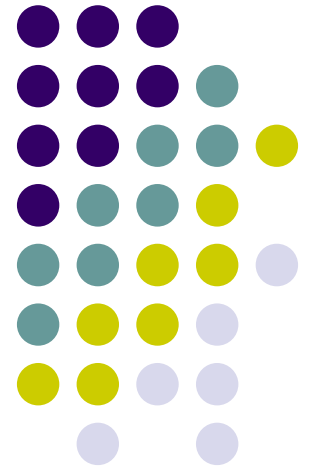


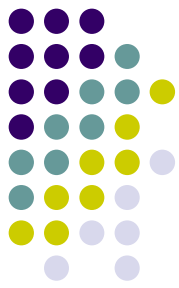
SVM: a brief introduction

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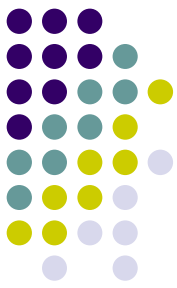
State Key Lab of CAD&CG, ZJU
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Support Vector Machines



- 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



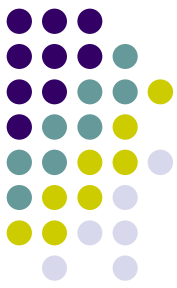
What is SVM?

- 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/>

