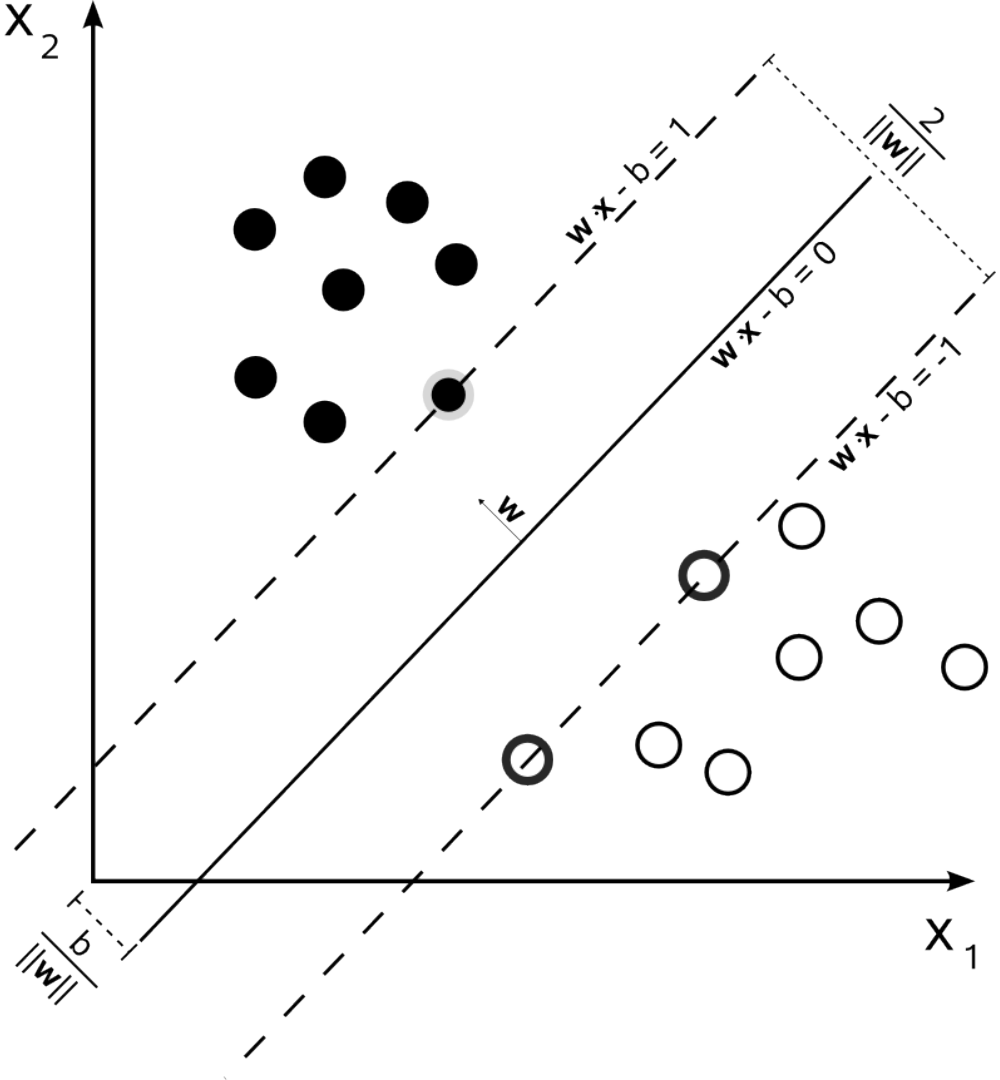
Support Vector Machines

Key Ideas Behind SVM

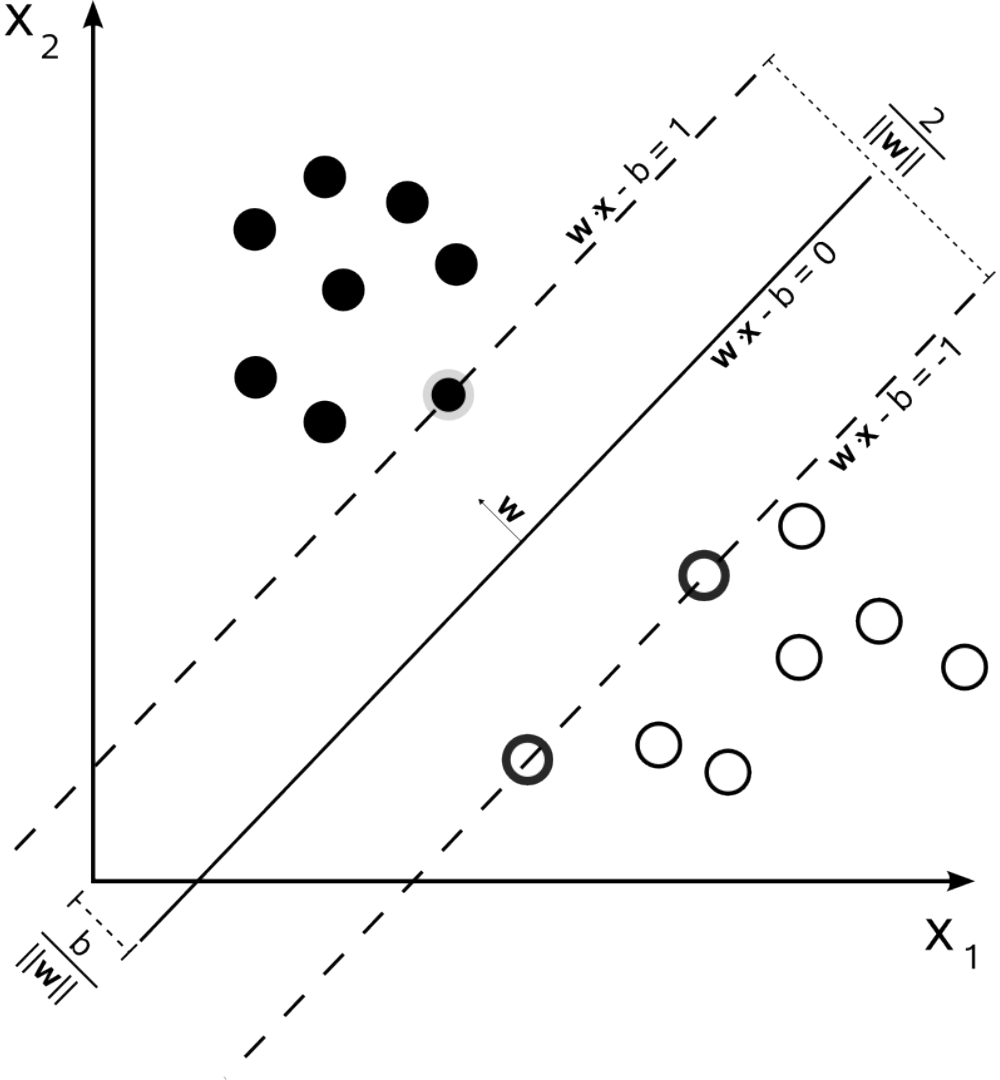
- Maximum margin
- Support Vectors
- Soft Margin
- Kernel Trick

Max Margin:
How to draw the best line.

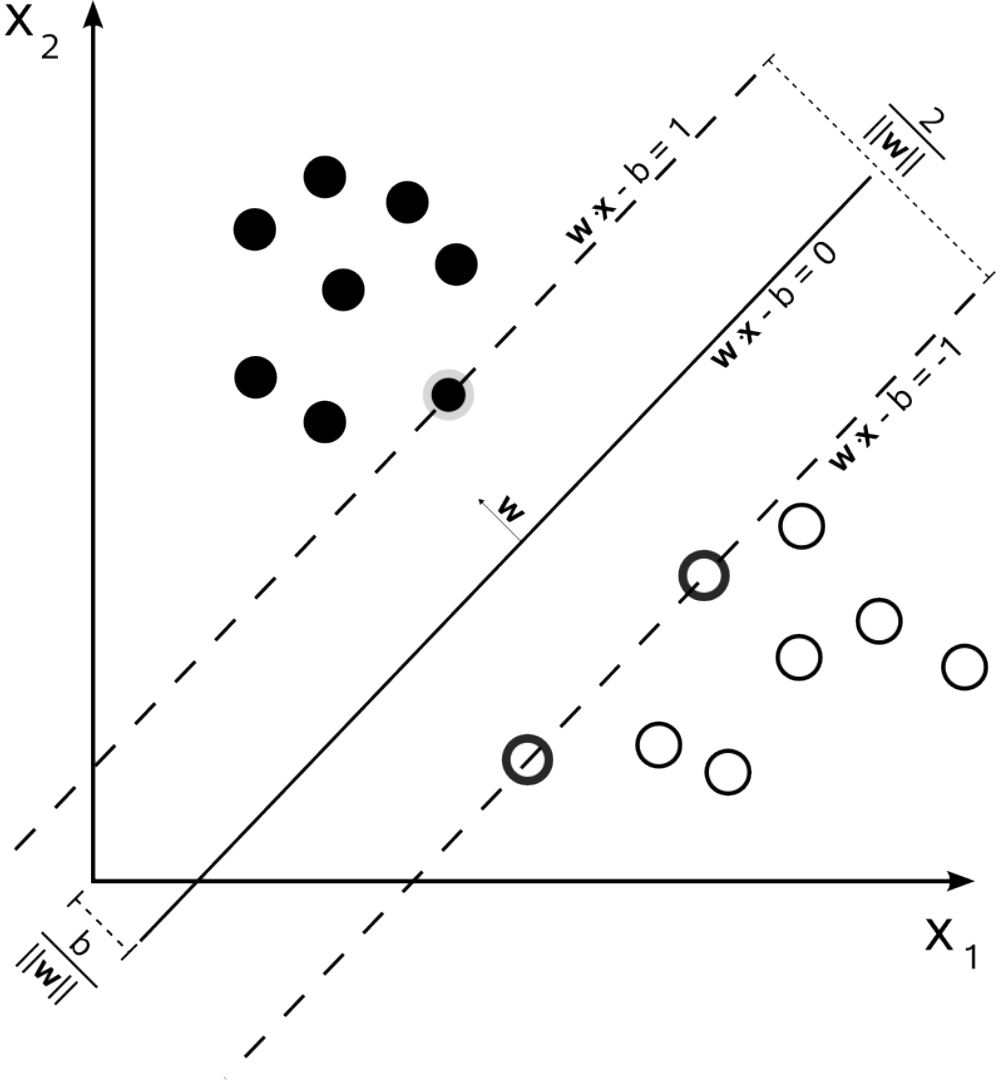


Max Margin:
How to draw the best line.

SVMs say you should draw the line so you separate the classes the most.

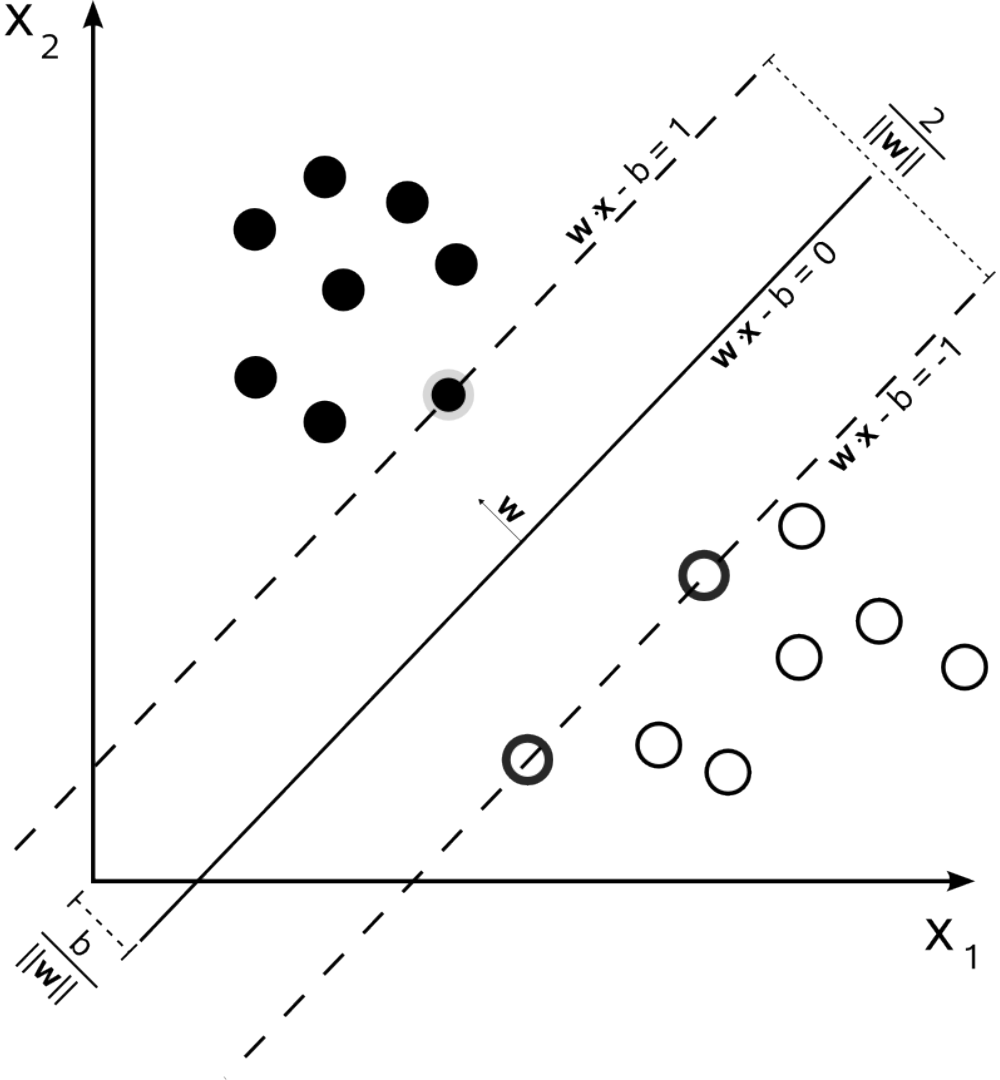


Support Vectors:
Only stuff on the margin matters

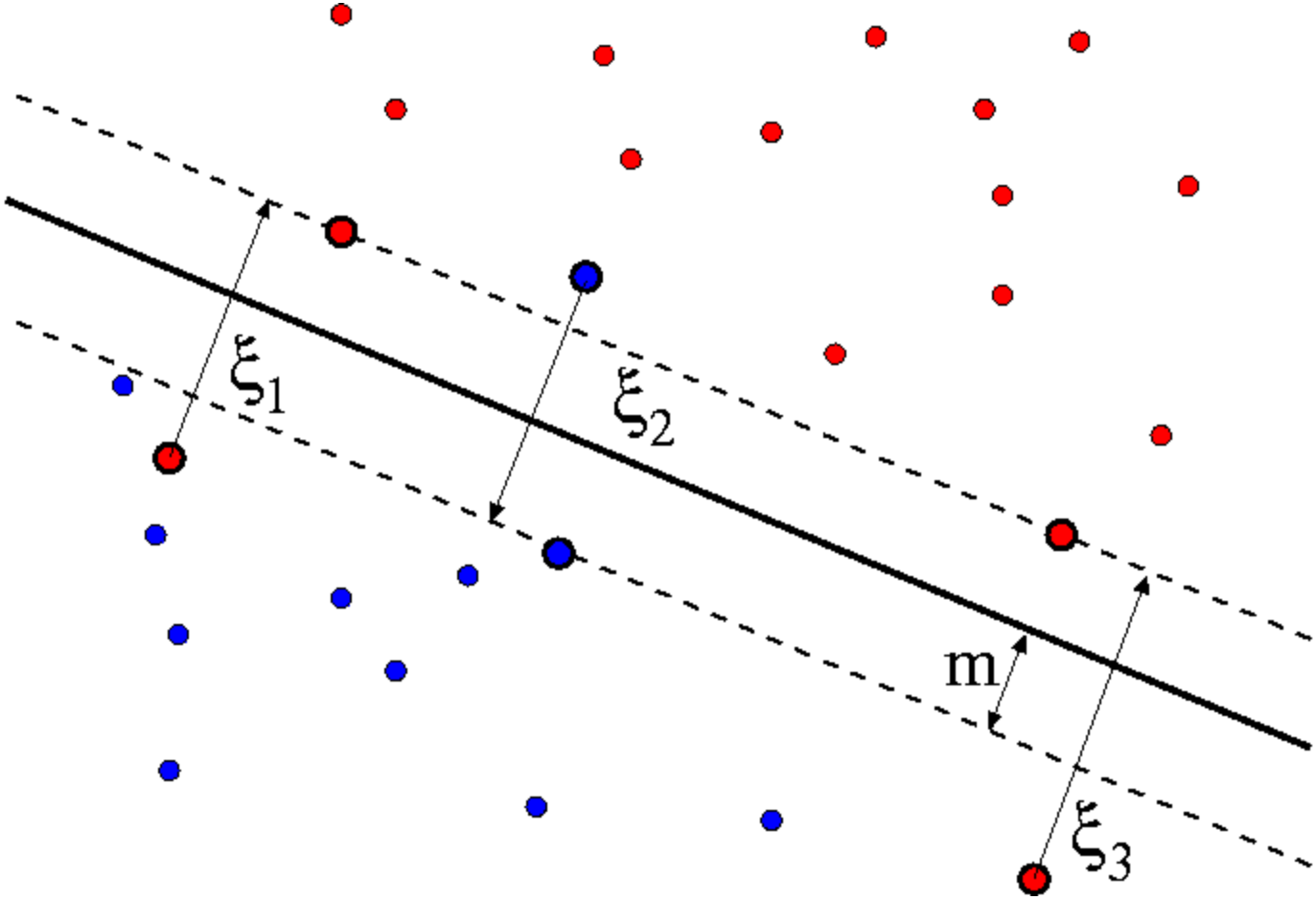


Support Vectors: Only stuff on the margin matters

The math of SVMs shows you only need to keep track of points nearest the boundary.

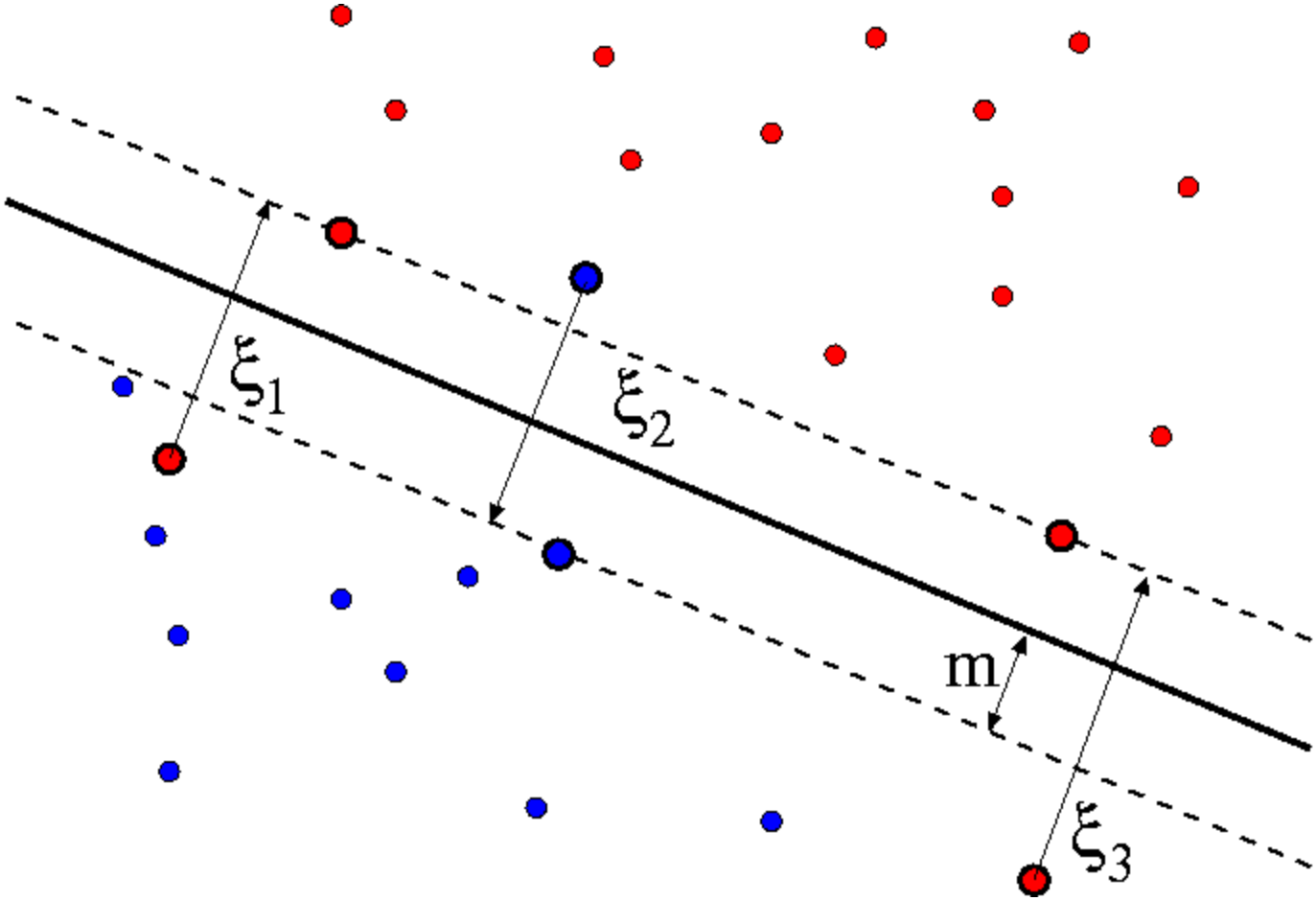


Soft Margin:
Allowing errors

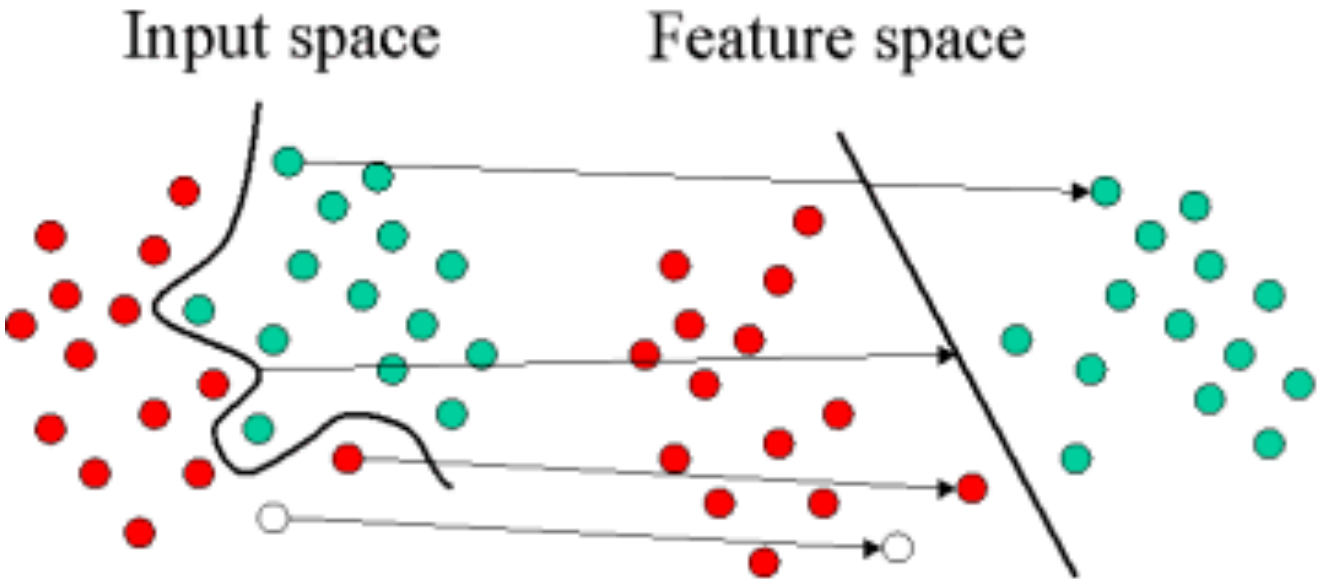


Soft Margin:
Allowing errors

Soft margin allow you to draw a line in any situation: you now care about the support vectors, and those with “slack”

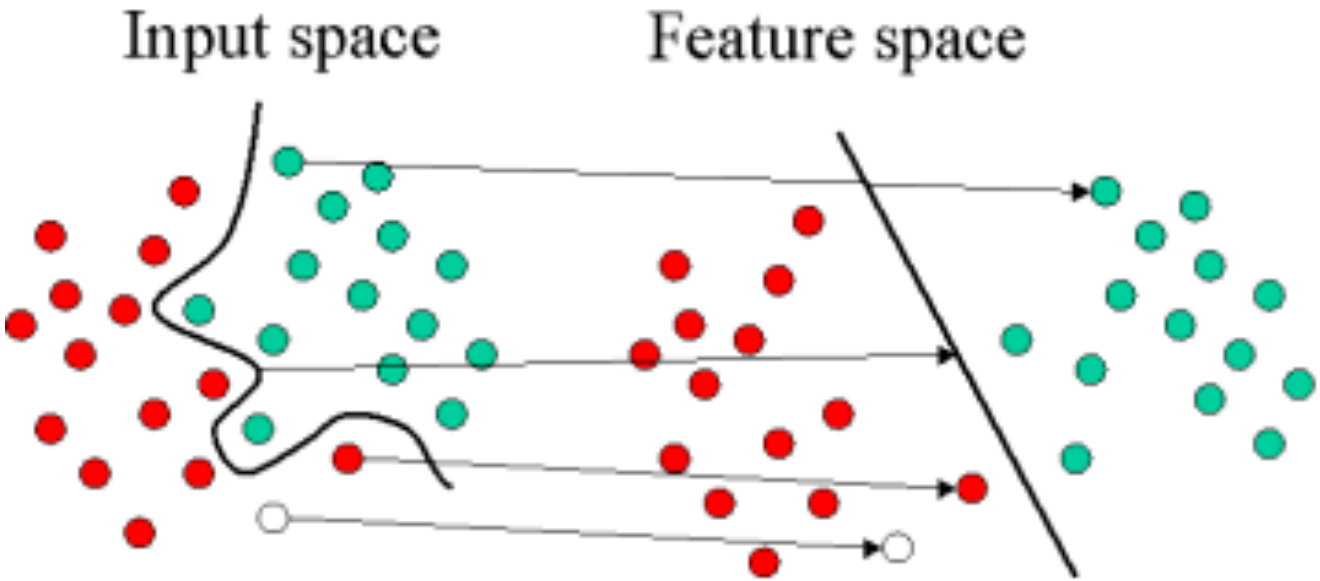


Kernel Trick: Allowing for nonlinearity



Kernel Trick: Allowing for nonlinearity

The math of SVMs shows you care about inner products between points. You can replace one inner product with another, and get a new geometry. In the original geometry, this looks like a nonlinear classifier.



Key Ideas Behind SVM

- Maximum margin
- Support Vectors
- Soft Margin
- Kernel Trick