Support Vector Machines algorithm

Motivations
Hyperplanes
Maximal Marging classifier
Kernel trick
Other topics
Summary

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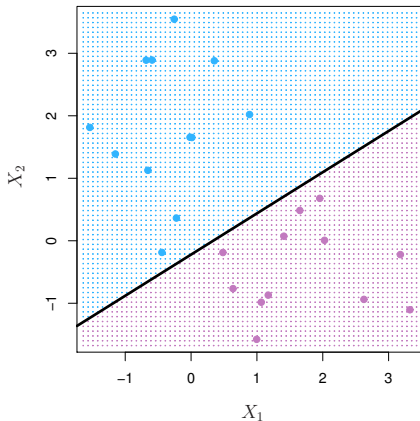
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In the classification context, try to separate a two-class population by a plane or an hyperplane ($p > 2$)

- Maximal Margin classifier, which is translated in a convex optimization problem ;
- When the frontier is clearly non linear, we can use the kernel trick : convert the problem in another (bigger) space where the frontier will be more regular.
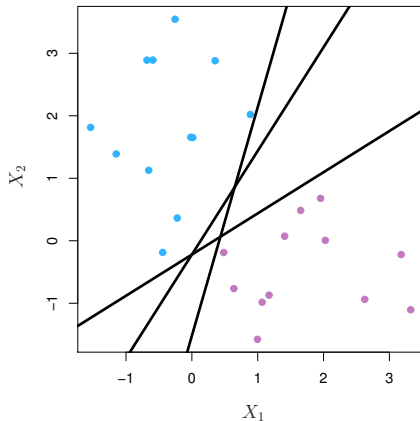- History, one of most successful approach at the end of 90's (V.Vapnik)

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- On the left, three separating hyperplanes
- On the right, a separating hyperplane with the associated regions

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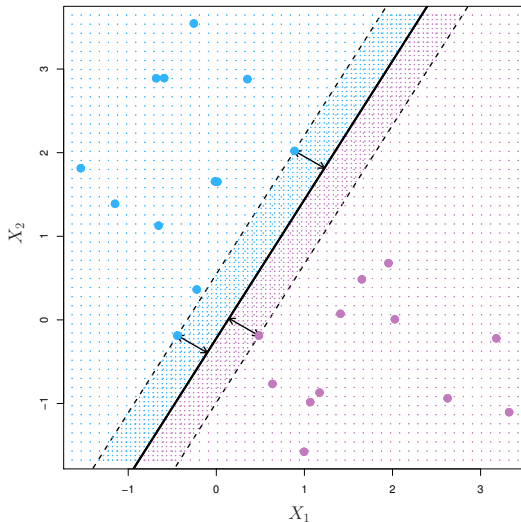
- Maximal Margin classifier : optimization problem translation

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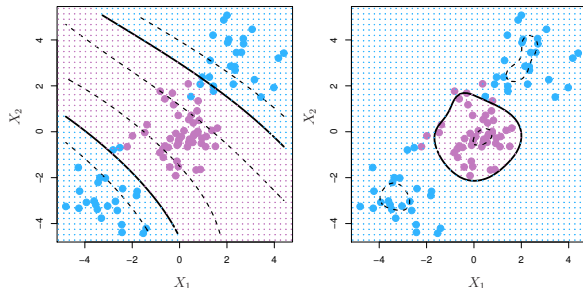   - Kernel trick
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- Taking in account non-linearities :
  1. Polynomial expansion (left)
  2. New space, new variables (right)

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- Compare Logistic Regression and SVM
- Compare SVM and NN
- More than two classes classification : OVA (One versus All), OVO (One versus One)

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TBD