



# 6: Técnicas Independientes del Algoritmo

Some Figures in these slides were taken from  
*Pattern Classification (2nd ed)* by R. O. Duda, P. E. Hart and D. G. Stork, John Wiley & Sons, 2000  
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## 6 Branch and Bound in Feature Selection



- Reducing dimension  $d$ : Choosing a subset from the features set.
- If we choose  $d_r$  as the new dimension, the goal is to find a subset of features that optimizes a given criterion function from all the possible subsets:

**BRANCH and BOUND** (Backtracking): Top-Down;

$$q(d, d_r) = \binom{d}{d_r} = \frac{d!}{d_r!(d-d_r)!}$$

- Choose a performance measure  $J$  monotonically decreasing with  $d$ .
- In each level  $n=d-1:d_r$ ,  $J$  is evaluated for  $n$  ( $n-1$ ) feature space dimension.
- Branches whose performance measure  $J$  is bounded by a threshold are skipped.

**Suboptimal Selection:** ;

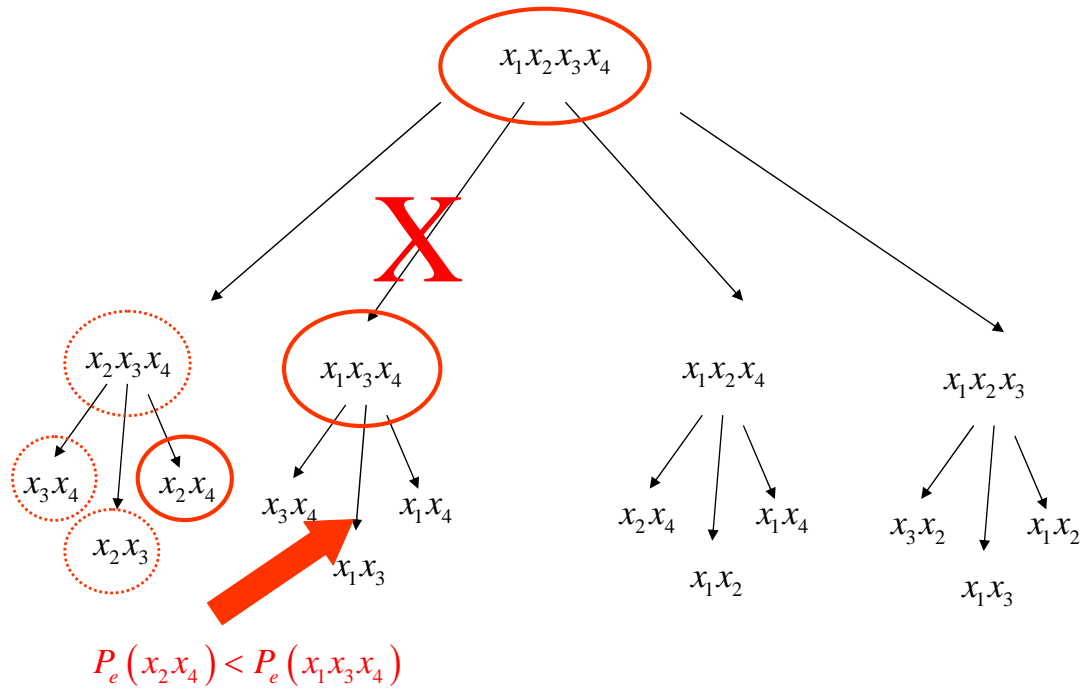
- Sequential Forward Selection (It begins with features individually and increases gradually the number of features).
- Backward Selection (It begins with the complete set of features and decreases gradually the number of features without backtracking).

Help featselm (Matlab PrTools) apply to zipcode data base

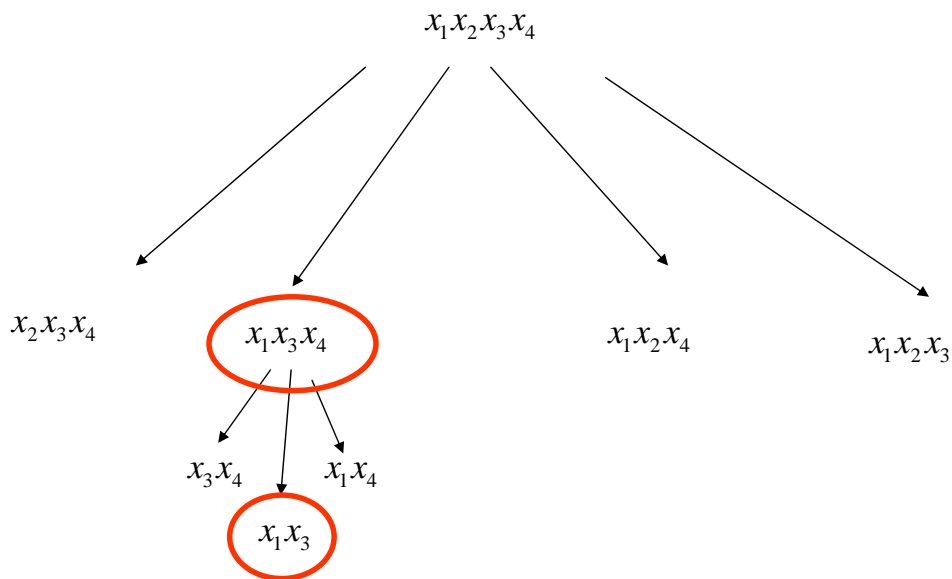
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# 6 Branch and Bound in Feature Selection



# 6 Sequential Backward in Feature Selection (Suboptimal)





# 6 Sequential Forward Feature Selection (Suboptimal)

