Adaboost
one of combining models

Explained on white board in class

Boosting

- Definition of Boosting:

  Boosting refers to a general method of producing a very accurate prediction rule by combining rough and moderately inaccurate rules-of-thumb.

- Intuition:

  1) No learner is always the best;

  2) Construct a set of base-learners which when combined achieves higher accuracy

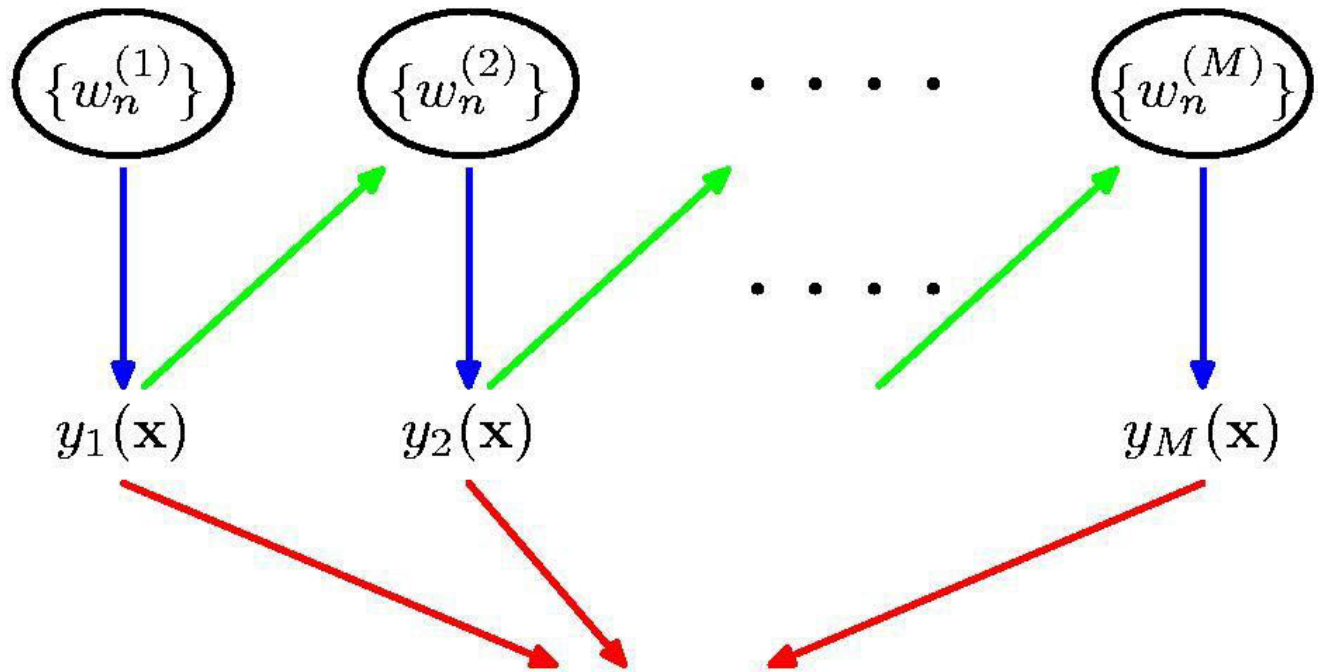
Boosting(cont’d)

- 3) Different learners may:

  --- Be trained by different algorithms

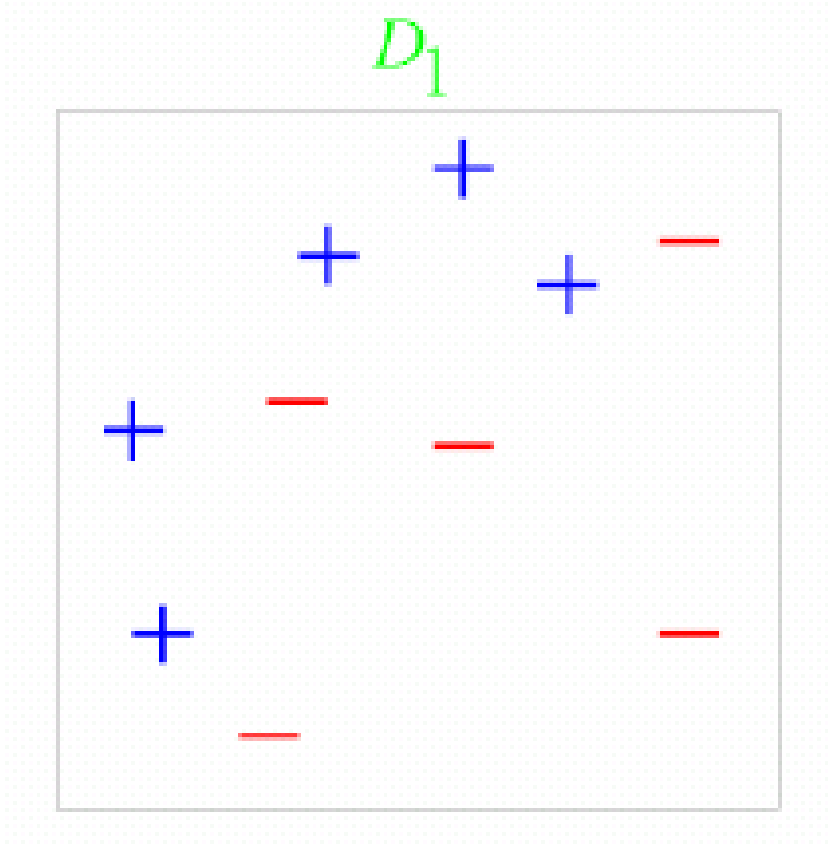
- 4) A week learner is “rough and moderately inaccurate” predictor but one that can predict better than chance.

Schematic illustration of the boosting Classifier



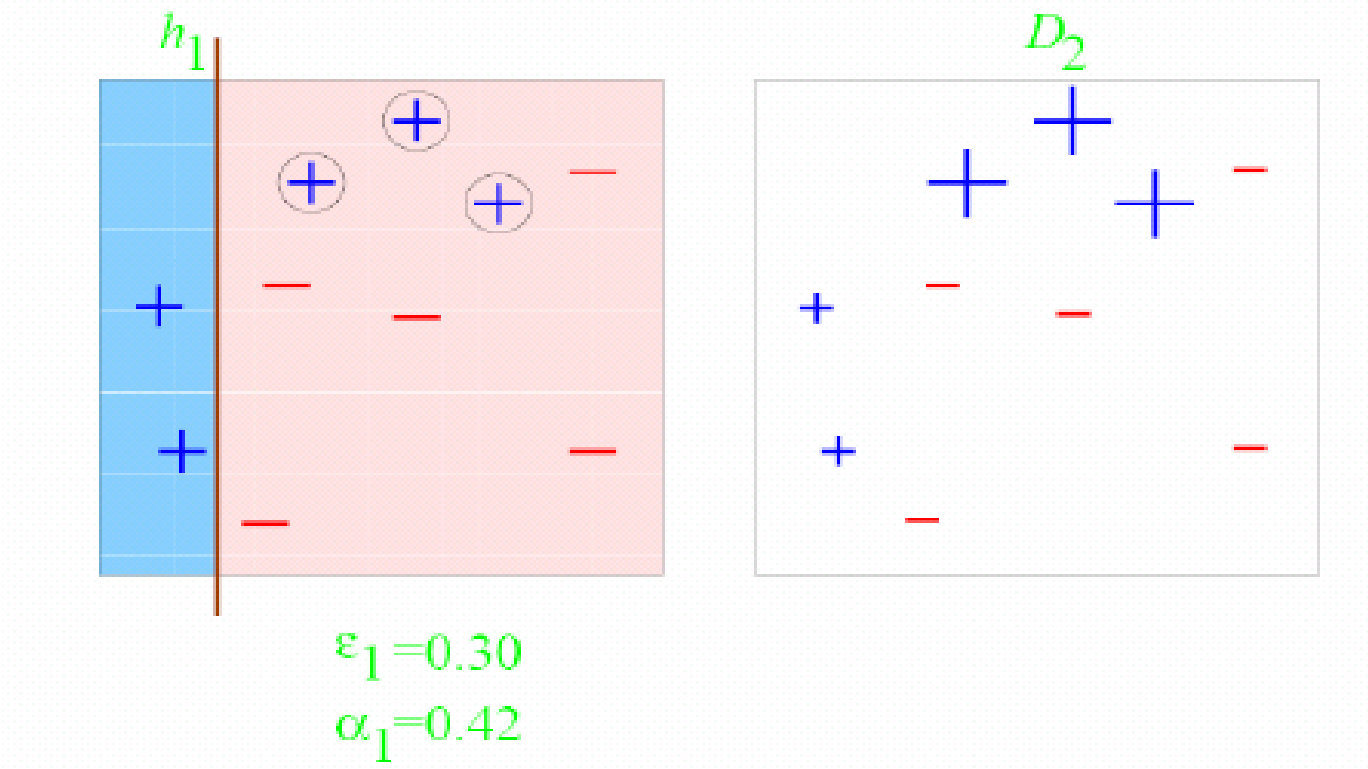
$$Y_M(\mathbf{x}) = \text{sign}\left(\sum_m^M \alpha_m y_m(\mathbf{x})\right)$$

A toy example (Adaboost)



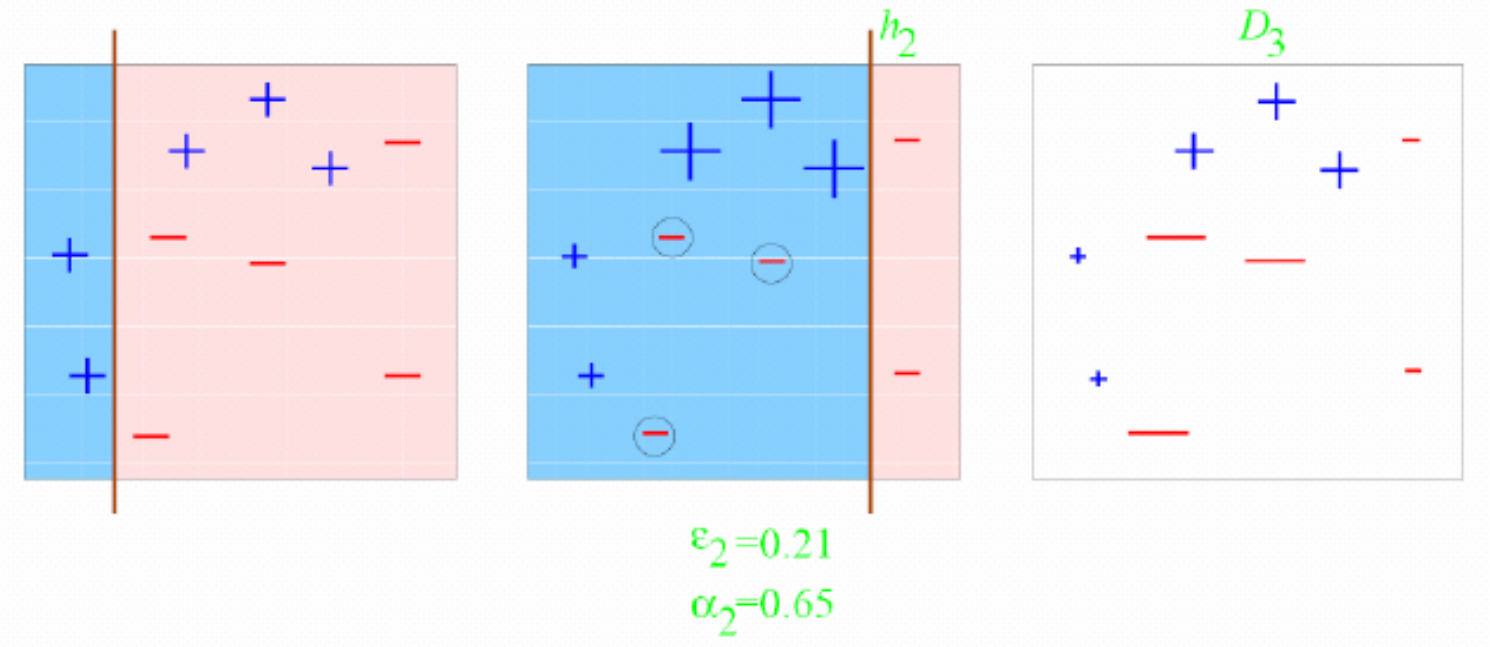
Training set: 10 points
(represented by plus or minus)
Original Status: Equal Weights
for all training samples

A toy example(cont'd)



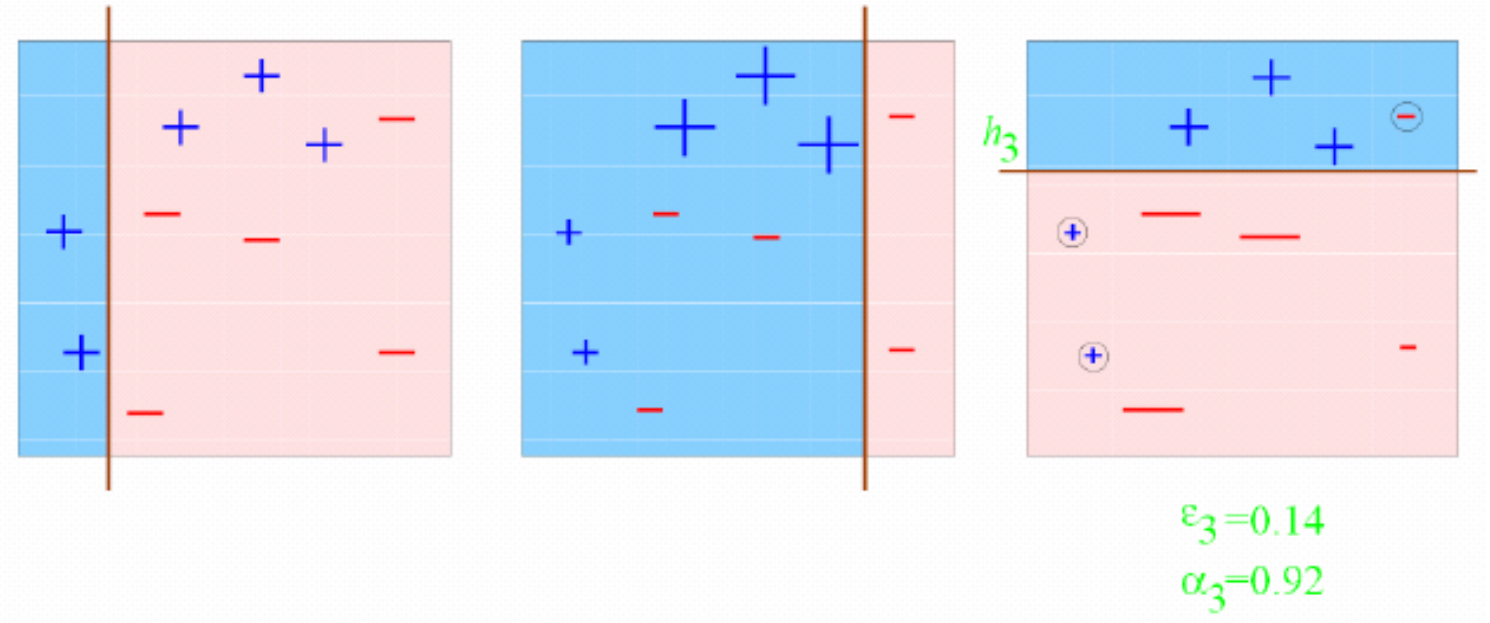
Round 1: Three "plus" points are not correctly classified;
They are given higher weights.

A toy example(cont'd)



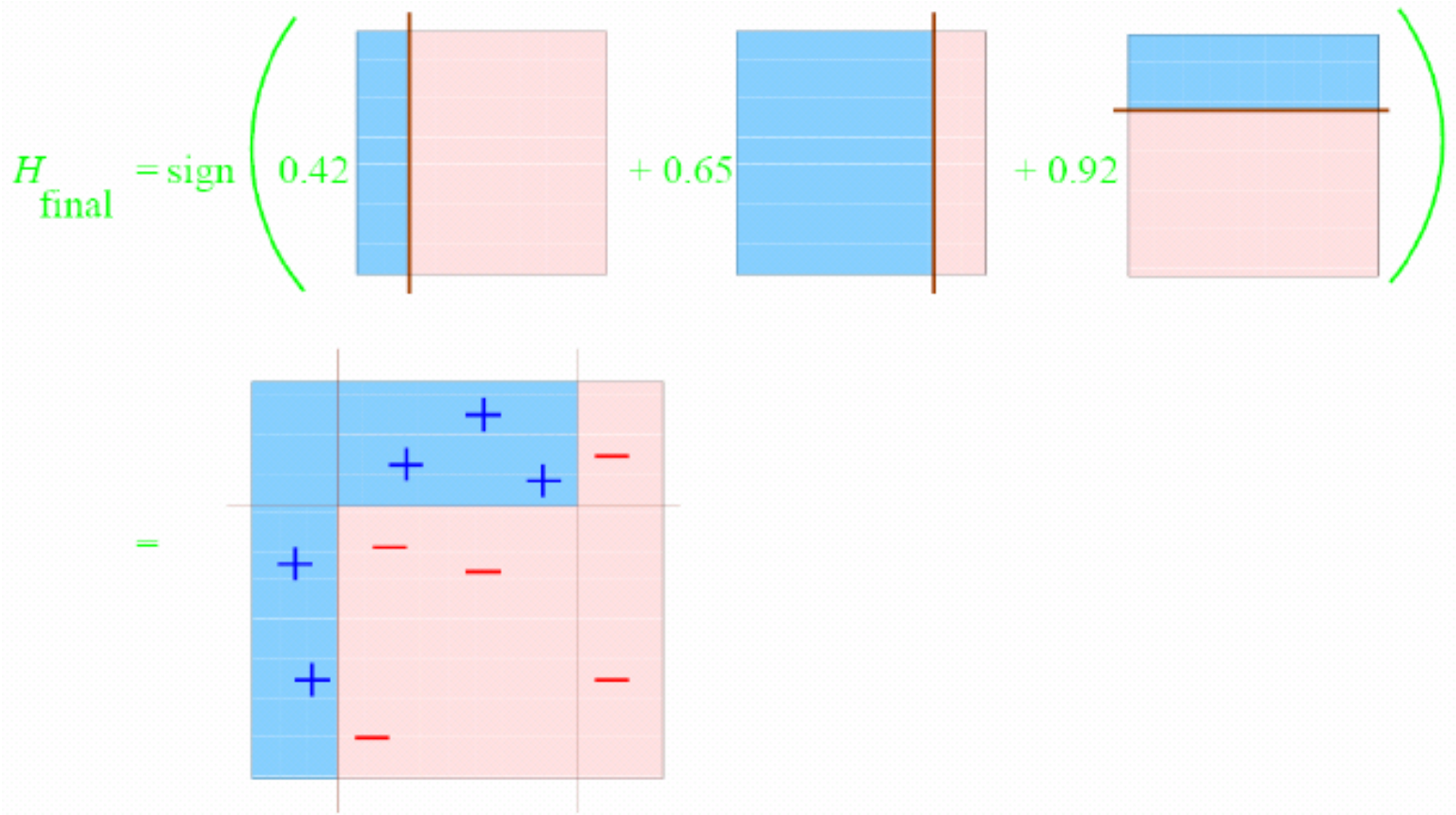
Round 2: Three "minuse" points are not correctly classified;
They are given higher weights.

A toy example(cont'd)



Round 3: One "minuse" and two "plus" points are not correctly classified; They are given higher weights.

A toy example(cont'd)



Final Classifier: integrate the three "weak" classifiers and obtain a final strong classifier.