Review on Boosting Algorithm

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Outline

1. Experiment
   - Binary Classification Boosting Algorithm
   - Multi-class Classification Boosting Algorithm

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   - Binary Classification Boosting Algorithm
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Experiment 1

- Goal: Compare binary classification boosting algorithms:
  - Least-Square TreeBoost
  - LAD TreeBoost
  - M-TreeBoost
  - Gentle AdaBoost
  - Logit Boost
  - L2-TreeBoost
- Simulated dataset:
  - 500 samples: 2-dimensional explanatory vectors
  - Label $= \{-1, 1\}$
  - Number of iteration for learning each algorithm: 100
  - Number of Monte Carlo iterations: 100

Result

Figure: Comparison of Boosting Algorithms with Binary Classification

Result

Figure: Comparison of Boosting Algorithms with Binary Classification with 5% Noise

Result

Figure: Comparison of Boosting Algorithms with Binary Classification with 10% Noise

Experiment 2

- Goal: Compare binary classification boosting algorithms:
  - Least-Square TreeBoost
  - LAD TreeBoost
  - M-TreeBoost
  - Gentle AdaBoost
  - Logit Boost
  - L2-TreeBoost
- Real dataset: UCI Wisconsin Breast Cancer Dataset
  - 683 samples: 9-dimensional explanatory vectors
  - Label $= \{2, 4\}$
  - 5 fold cross validation

Result

Figure: Comparison of Boosting Algorithms with UCI Wisconsin Breast Cancer Dataset

Experiment

- Goal: Compare multi-class classification boosting algorithms:
  - AdaBoost MH
  - Logit Boost for J class
  - Multiclass TreeBoost
- Real dataset: UCI Wine quality
  - 1599 samples: 11-dimensional explanatory vectors
  - Label = 0:10
  - 5 fold cross validation

Result

Figure: Comparison of Multi-class Boosting Algorithms with UCI Wine Quality Dataset

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