Demo: Gradient Boosting

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Objectives

- Discuss Gradient Boosting in SAS Enterprise Miner.
- Demonstrtaion of SVGradient BoostingM using SAS EM

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Main Features of Gradient Boosting in SAS EM

- Data set re-sampled several times
- The results is a weighted average of re-sampled data
- A *series* of base learner models are created
  - In Gradient Boosting, the base learner is a Tree
- The *series* of base learners forms a single predictive model

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Gradient Boosting Algorithm

- First, the initial base learner is formed
- The next base learner is fit to the pseudo-residuals of previous base learners
  - The pseudo-residual are expressed with the derivative of the loss function (such as square error), more precisely as the gradient of the loss function to be minimized
  - Residual = observed target – predicted target
- An additive model is built using a series of base learners

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Two Important Concepts

- Two Loss functions:
- The square error loss function
- The Huber-M regression loss function
- Shrinkage Parameter
- This is the learning rate of the algorithm, controlled by a shrinkage parameter, υ (between 0 and 1)
- The default value of shrinkage is 0.1

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Stochastic Gradient Boosting

- At each iteration, a subsample is randomly selected form the training data
  - Drawn without replacement
- For each iteration, a separate subsample from the training data is used.
- Advantages of incorporating randomness:
  - Improve accuracy
  - Robustness to overfitting

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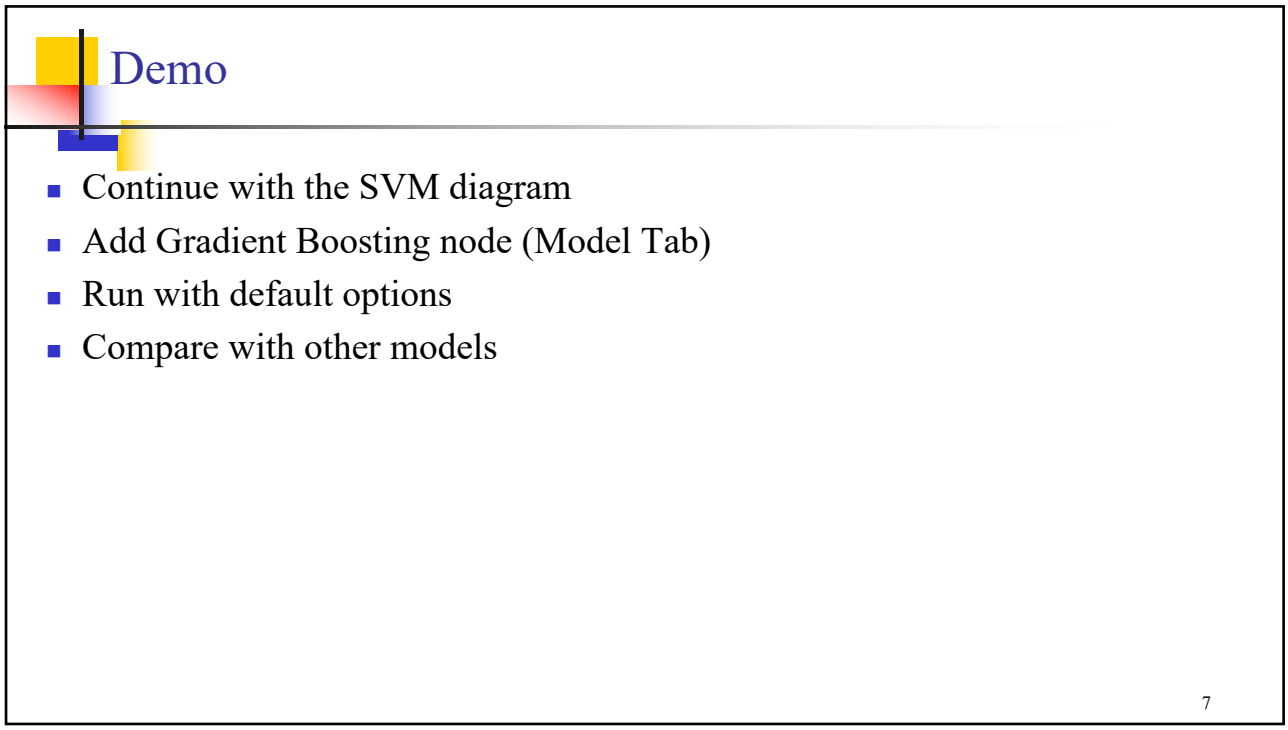
Demo
Continue with the SVM diagram
Add Gradient Boosting node (Model Tab)
Run with default options
Compare with other models
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