## Standard GBM

Stochastic Gradient Boosting

14718 samples

53 predictor

5 classes: 'A', 'B', 'C', 'D', 'E'

No pre-processing

Resampling: Cross-Validated (10 fold)

Summary of sample sizes: 13246, 13245, 13248, 13246, 13247, 13247, ...

Resampling results across tuning parameters:

interaction.depth n.trees Accuracy Kappa Accuracy SD Kappa SD

2 100 0.9092270 0.8851330 0.005966073 0.007542928

2 200 0.9478189 0.9339733 0.004198312 0.005299449

2 500 0.9812470 0.9762780 0.003224092 0.004080115

5 100 0.9712597 0.9636384 0.002719773 0.003444003

5 200 0.9862074 0.9825538 0.002680970 0.003391578

5 500 0.9933410 0.9915769 0.002638823 0.003338232

10 100 0.9875662 0.9842726 0.003202808 0.004051507

10 200 0.9932733 0.9914912 0.003162053 0.003999785

10 500 0.9951075 0.9938113 0.002695908 0.003410208

Tuning parameter 'shrinkage' was held constant at a value of 0.1

Tuning parameter 'n.minobsinnode' was

held constant at a value of 10

Accuracy was used to select the optimal model using the largest value.

The final values used for the model were n.trees = 500, interaction.depth = 10, shrinkage = 0.1

and n.minobsinnode = 10.

## Random Forest

14718 samples

53 predictor

5 classes: 'A', 'B', 'C', 'D', 'E'

No pre-processing

Resampling: Cross-Validated (10 fold)

Summary of sample sizes: 13244, 13246, 13247, 13246, 13246, 13248, ...

Resampling results across tuning parameters:

mtry Accuracy Kappa Accuracy SD Kappa SD

2 0.9923898 0.9903720 0.002678915 0.003390687

10 0.9949714 0.9936389 0.002568619 0.003249747

25 0.9928651 0.9909743 0.002204551 0.002789319

50 0.9899438 0.9872779 0.003592631 0.004545721

Accuracy was used to select the optimal model using the largest value.

The final value used for the model was mtry = 10.

rf variable importance

only 20 most important variables shown (out of 53)

Overall

roll\_belt 100.00

yaw\_belt 69.03

pitch\_forearm 61.31

magnet\_dumbbell\_z 55.49

pitch\_belt 53.52

magnet\_dumbbell\_y 49.35

roll\_forearm 44.69

magnet\_dumbbell\_x 32.06

accel\_dumbbell\_y 28.53

magnet\_belt\_y 26.40

roll\_dumbbell 25.78

accel\_belt\_z 24.95

magnet\_belt\_z 23.57

accel\_dumbbell\_z 20.29

accel\_forearm\_x 20.02

roll\_arm 18.74

gyros\_belt\_z 18.53

magnet\_forearm\_z 16.64

total\_accel\_dumbbell 16.40

magnet\_arm\_x 15.56

## Random Forest with PCA

14718 samples

19 predictor

5 classes: 'A', 'B', 'C', 'D', 'E'

No pre-processing

Resampling: Cross-Validated (10 fold)

Summary of sample sizes: 13247, 13247, 13245, 13246, 13247, 13246, ...

Resampling results across tuning parameters:

mtry Accuracy Kappa Accuracy SD Kappa SD

2 0.9758115 0.9694008 0.002110213 0.002666821

10 0.9705798 0.9627858 0.003527004 0.004455655

25 0.9575342 0.9462809 0.004683183 0.005919925

50 0.9565146 0.9449927 0.005349033 0.006753978

Accuracy was used to select the optimal model using the largest value.

The final value used for the model was mtry = 2.

## Penalized Multinomial Regression

14718 samples

53 predictor

5 classes: 'A', 'B', 'C', 'D', 'E'

No pre-processing

Resampling: Cross-Validated (10 fold)

Summary of sample sizes: 13246, 13245, 13246, 13245, 13247, 13247, ...

Resampling results across tuning parameters:

decay Accuracy Kappa Accuracy SD Kappa SD

1e-05 0.6611601 0.5701704 0.01516604 0.01862954

1e-04 0.6611601 0.5701704 0.01516604 0.01862954

1e-03 0.6611601 0.5701704 0.01516604 0.01862954

1e-02 0.6611601 0.5701704 0.01516604 0.01862954

Accuracy was used to select the optimal model using the largest value.

The final value used for the model was decay = 0.01.

## Penalized Multinomial Regression with PCA

14718 samples

19 predictor

5 classes: 'A', 'B', 'C', 'D', 'E'

No pre-processing

Resampling: Cross-Validated (10 fold)

Summary of sample sizes: 13248, 13247, 13248, 13245, 13246, 13246, ...

Resampling results across tuning parameters:

decay Accuracy Kappa Accuracy SD Kappa SD

1e-05 0.5042154 0.3680803 0.01567716 0.02001564

1e-04 0.5042154 0.3680803 0.01567716 0.02001564

1e-03 0.5042154 0.3680803 0.01567716 0.02001564

1e-02 0.5042154 0.3680803 0.01567716 0.02001564

Accuracy was used to select the optimal model using the largest value.

The final value used for the model was decay = 0.01.