> print(fit\_gbm, digits=4)

Stochastic Gradient Boosting

14718 samples

12 predictor

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

No pre-processing

Resampling: Bootstrapped (25 reps)

Summary of sample sizes: 14718, 14718, 14718, 14718, 14718, 14718, ...

Resampling results across tuning parameters:

interaction.depth n.trees Accuracy Kappa

1 50 0.5044 0.3613

1 100 0.5528 0.4285

1 150 0.5727 0.4554

2 50 0.5885 0.4752

2 100 0.6418 0.5449

2 150 0.6742 0.5865

3 50 0.6374 0.5391

3 100 0.6964 0.6148

3 150 0.7340 0.6626

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 = 150, interaction.depth =

3, shrinkage = 0.1 and n.minobsinnode = 10.

> predict\_gbm<-predict(fit\_gbm,valid\_pca)

> (conf\_gbm<-confusionMatrix(valid\_pca$classe, predict\_gbm))

Confusion Matrix and Statistics

Reference

Prediction A B C D E

A 1132 60 74 112 17

B 108 632 108 48 53

C 101 69 637 19 29

D 90 36 81 583 14

E 62 85 80 65 609

Overall Statistics

Accuracy : 0.7327

95% CI : (0.72, 0.745)

No Information Rate : 0.3044

P-Value [Acc > NIR] : < 2.2e-16

Kappa : 0.6612

Mcnemar's Test P-Value : < 2.2e-16

Statistics by Class:

Class: A Class: B Class: C Class: D Class: E

Sensitivity 0.7582 0.7166 0.6500 0.7050 0.8435

Specificity 0.9229 0.9212 0.9444 0.9458 0.9302

Pos Pred Value 0.8115 0.6660 0.7450 0.7251 0.6759

Neg Pred Value 0.8971 0.9368 0.9153 0.9405 0.9718

Prevalence 0.3044 0.1799 0.1998 0.1686 0.1472

Detection Rate 0.2308 0.1289 0.1299 0.1189 0.1242

Detection Prevalence 0.2845 0.1935 0.1743 0.1639 0.1837

Balanced Accuracy 0.8406 0.8189 0.7972 0.8254 0.8868

> (accuracy\_gbm<-conf\_gbm$overall['Accuracy'])

Accuracy

0.7326672