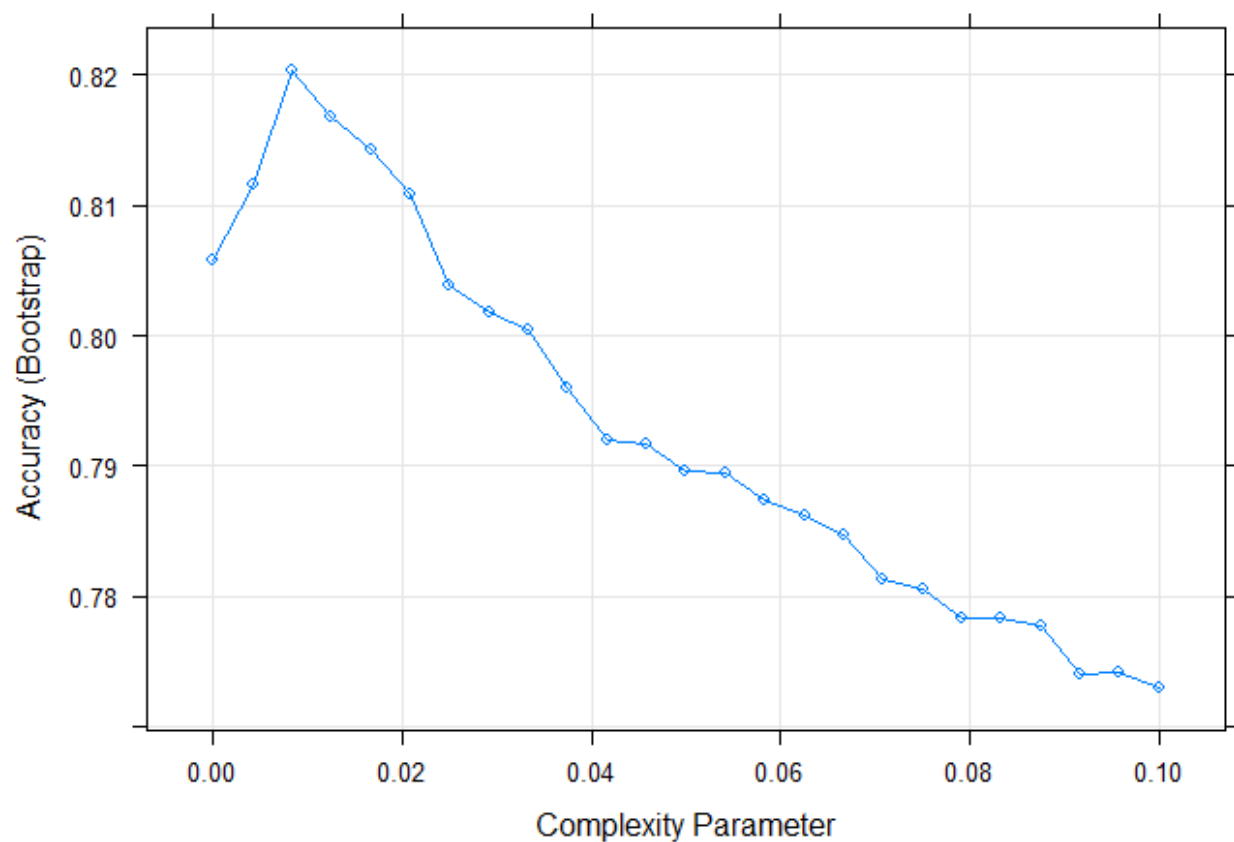# MNIST

MNIST prediction with Classification trees

Load the data

```
data("mnist_27")
train_rpart <- train(y~., method="rpart", tuneGrid=data.frame(cp=seq(0.0, 0.1, len=25
                     data=mnist_27$train)
```
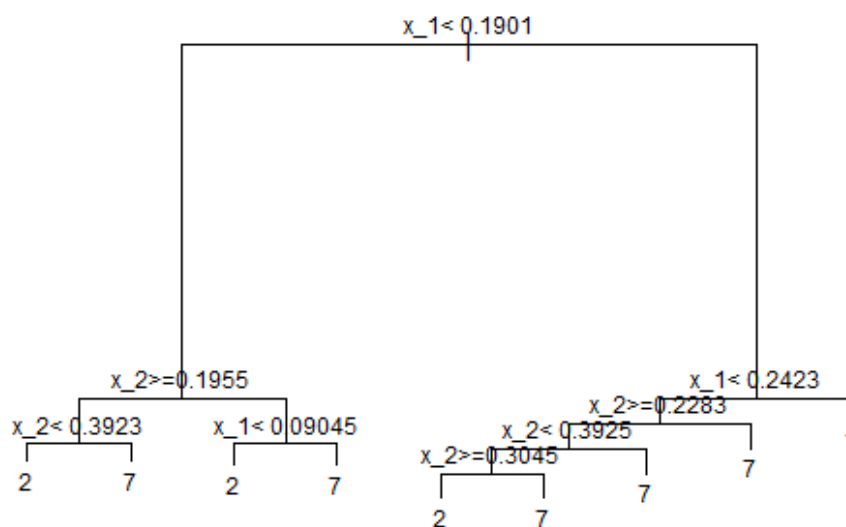
Plot accuracy and complexity parameter

```
plot(train_rpart)
```


Plot the decision tree

```
plot(train_rpart$finalModel, margin = 0.1)
text(train_rpart$finalModel, cex = 0.75)
```


Confusion Matrix

```
confusionMatrix(train_rpart)
```

```
## Bootstrapped (25 reps) Confusion Matrix
##
## (entries are percentual average cell counts across resamples)
##
##           Reference
## Prediction    2    7
##          2 38.7  9.2
##          7  8.8 43.3
##
##  Accuracy (average) : 0.8201
```

Confusion matrix

```
confusionMatrix(predict(train_rpart, mnist_27$test), mnist_27$test$y)
```

```
## Confusion Matrix and Statistics
##
##           Reference
## Prediction  2  7
##          2 92 22
##          7 14 72
##
##                Accuracy : 0.82
##                  95% CI : (0.7596, 0.8706)
##     No Information Rate : 0.53
##     P-Value [Acc > NIR] : <2e-16
##
##                   Kappa : 0.637
##  Mcnemar's Test P-Value : 0.2433
##
##             Sensitivity : 0.8679
##             Specificity : 0.7660
##          Pos Pred Value : 0.8070
##          Neg Pred Value : 0.8372
##              Prevalence : 0.5300
##          Detection Rate : 0.4600
##    Detection Prevalence : 0.5700
##       Balanced Accuracy : 0.8169
##
##        'Positive' Class : 2
##
```