bc_lab.R

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```
library(e1071)
library(caret)
```

```
## Warning: package 'caret' was built under R version 3.4.4
```

```
## Loading required package: lattice
```

```
## Loading required package: ggplot2
```

```
## Warning in as.POSIXlt.POSIXct(Sys.time()): unknown timezone 'zone/tz/2018c.
## 1.0/zoneinfo/America/Chicago'
```

```
data <- read.csv(file='balance.csv', head=FALSE, sep=",")

t1 = sample(1:625, 500)
t2 = setdiff(1:625, t1)

cl = data[t2,]$V1

train = subset(data[t1,])
test = subset(data[t2,],select=- V1)

model <- naiveBayes(V1 ~., data=train)

pred <- predict(model, test)

confusionMatrix(pred, cl)
```

```
## Confusion Matrix and Statistics
##
##           Reference
## Prediction  B  L  R
##          B  0  0  0
##          L  2 62  1
##          R 11  0 49
##
## Overall Statistics
##
##                Accuracy : 0.888
##                  95% CI : (0.8192, 0.9374)
##     No Information Rate : 0.496
##     P-Value [Acc > NIR] : < 2.2e-16
##
##                   Kappa : 0.7964
##  Mcnemar's Test P-Value : 0.002905
##
## Statistics by Class:
##
##                      Class: B Class: L Class: R
## Sensitivity             0.000   1.0000   0.9800
## Specificity             1.000   0.9524   0.8533
## Pos Pred Value            NaN   0.9538   0.8167
## Neg Pred Value          0.896   1.0000   0.9846
## Prevalence              0.104   0.4960   0.4000
## Detection Rate          0.000   0.4960   0.3920
## Detection Prevalence    0.000   0.5200   0.4800
## Balanced Accuracy       0.500   0.9762   0.9167
```

```
pred <- predict(model, test, type="raw")
pred
```

```
##                 B           L          R
##   [1,] 0.12245476 0.045148326 0.83239692
##   [2,] 0.20136613 0.564521612 0.23411225
##   [3,] 0.16072881 0.159738230 0.67953296
##   [4,] 0.03578191 0.017436306 0.94678179
##   [5,] 0.02789918 0.009787116 0.96231370
##   [6,] 0.14708989 0.095264813 0.75764530
##   [7,] 0.07799871 0.041690673 0.88031062
##   [8,] 0.05984520 0.069848049 0.87030676
##   [9,] 0.06713754 0.070631065 0.86223140
##  [10,] 0.16867707 0.177702646 0.65362028
##  [11,] 0.11734420 0.806002643 0.07665316
##  [12,] 0.12334057 0.551325244 0.32533419
##  [13,] 0.11825797 0.398273212 0.48346882
##  [14,] 0.15820515 0.567234098 0.27456076
##  [15,] 0.12883920 0.381233910 0.48992689
##  [16,] 0.07289295 0.075273654 0.85183340
##  [17,] 0.12000135 0.405794432 0.47420421
##  [18,] 0.12583926 0.519345843 0.35481490
##  [19,] 0.07539372 0.133082807 0.79152348
##  [20,] 0.16240188 0.551548735 0.28604938
##  [21,] 0.13051121 0.365798944 0.50368985
##  [22,] 0.06035427 0.072351732 0.86729400
##  [23,] 0.09004657 0.129694524 0.78025891
##  [24,] 0.07772790 0.091387495 0.83088460
##  [25,] 0.17481360 0.429467345 0.39571906
##  [26,] 0.08518472 0.136189532 0.77862574
##  [27,] 0.04917587 0.042643715 0.90818042
##  [28,] 0.09938167 0.142605632 0.75801270
##  [29,] 0.08055103 0.078497458 0.84095151
##  [30,] 0.02482046 0.010345243 0.96483429
##  [31,] 0.08956175 0.184976303 0.72546195
##  [32,] 0.14222981 0.613803399 0.24396679
##  [33,] 0.07219600 0.152766324 0.77503767
##  [34,] 0.10752377 0.271030776 0.62144545
##  [35,] 0.07332132 0.145736939 0.78094174
##  [36,] 0.04237636 0.045686094 0.91193755
##  [37,] 0.14959451 0.310300217 0.54010528
##  [38,] 0.09413712 0.161149570 0.74471331
##  [39,] 0.09794503 0.606656819 0.29539815
##  [40,] 0.10394185 0.602169867 0.29388829
##  [41,] 0.07060570 0.155032025 0.77436227
##  [42,] 0.07947916 0.741492011 0.17902883
##  [43,] 0.06356180 0.167894817 0.76854338
##  [44,] 0.06177513 0.153934731 0.78429014
##  [45,] 0.06785834 0.825888481 0.10625318
##  [46,] 0.07416898 0.711812742 0.21401827
##  [47,] 0.08308616 0.432506977 0.48440687
##  [48,] 0.08176861 0.555397229 0.36283416
##  [49,] 0.11328066 0.431853341 0.45486600
##  [50,] 0.06786979 0.153720241 0.77840997
##  [51,] 0.12744182 0.595333936 0.27722424
##  [52,] 0.11504350 0.423775704 0.46118079
```

```
##  [53,] 0.14513737 0.605925640 0.24893699
##  [54,] 0.04244225 0.044264980 0.91329277
##  [55,] 0.08534818 0.092108245 0.82254357
##  [56,] 0.02677653 0.012359611 0.96086386
##  [57,] 0.12211525 0.633822053 0.24406270
##  [58,] 0.13772980 0.485489101 0.37678110
##  [59,] 0.07240725 0.762127876 0.16546488
##  [60,] 0.07867080 0.610734712 0.31059448
##  [61,] 0.07582859 0.319295640 0.60487577
##  [62,] 0.09135480 0.771288693 0.13735651
##  [63,] 0.08879323 0.618681663 0.29252511
##  [64,] 0.09764381 0.462047069 0.44030912
##  [65,] 0.13804673 0.515822657 0.34613061
##  [66,] 0.04538943 0.912573443 0.04203713
##  [67,] 0.05737609 0.850819073 0.09180484
##  [68,] 0.06393122 0.747557427 0.18851136
##  [69,] 0.07011023 0.437154942 0.49273483
##  [70,] 0.11763567 0.662073039 0.22029129
##  [71,] 0.03363742 0.943263031 0.02309955
##  [72,] 0.11089933 0.425863695 0.46323698
##  [73,] 0.09241787 0.245875774 0.66170636
##  [74,] 0.07091206 0.142144039 0.78694390
##  [75,] 0.07083409 0.083404761 0.84576115
##  [76,] 0.06551549 0.901350266 0.03313424
##  [77,] 0.08318863 0.844124945 0.07268643
##  [78,] 0.08983463 0.593217060 0.31694831
##  [79,] 0.08738451 0.434763480 0.47785201
##  [80,] 0.09009831 0.421075669 0.48882602
##  [81,] 0.06898004 0.174859005 0.75616095
##  [82,] 0.11043861 0.444522026 0.44503937
##  [83,] 0.06710717 0.160477943 0.77241488
##  [84,] 0.15578635 0.495147439 0.34906621
##  [85,] 0.08253552 0.170715562 0.74674892
##  [86,] 0.06966765 0.764442363 0.16588998
##  [87,] 0.07571875 0.612787912 0.31149334
##  [88,] 0.09692787 0.768966459 0.13410567
##  [89,] 0.11160513 0.476188849 0.41220602
##  [90,] 0.08951799 0.301183147 0.60929887
##  [91,] 0.02857800 0.963301260 0.00812074
##  [92,] 0.06571842 0.781925694 0.15235589
##  [93,] 0.05218856 0.844356611 0.10345483
##  [94,] 0.06149168 0.749576063 0.18893226
##  [95,] 0.07256508 0.636794407 0.29064052
##  [96,] 0.06967643 0.601116862 0.32920670
##  [97,] 0.05199958 0.830464477 0.11753594
##  [98,] 0.05425096 0.904181659 0.04156738
##  [99,] 0.06085127 0.836988873 0.10215986
## [100,] 0.06693439 0.725980023 0.20708559
## [101,] 0.07613812 0.447917980 0.47594390
## [102,] 0.08447679 0.597100330 0.31842288
## [103,] 0.11771180 0.375584577 0.50670362
## [104,] 0.15007622 0.691190015 0.15873376
## [105,] 0.12094805 0.362502910 0.51654904
## [106,] 0.07669738 0.076653263 0.84664935
```

```
## [107,] 0.11195722 0.612495068 0.27554771
## [108,] 0.10017211 0.397367126 0.50246076
## [109,] 0.09469954 0.255121530 0.65017893
## [110,] 0.14527433 0.429287900 0.42543777
## [111,] 0.05457637 0.895410664 0.05001297
## [112,] 0.07586194 0.823916431 0.10022163
## [113,] 0.09853586 0.573103306 0.32836084
## [114,] 0.03057134 0.958074711 0.01135395
## [115,] 0.04835609 0.900347399 0.05129651
## [116,] 0.06334425 0.849060072 0.08759568
## [117,] 0.04039458 0.933686795 0.02591863
## [118,] 0.06036720 0.828997413 0.11063539
## [119,] 0.08568498 0.599518766 0.31479625
## [120,] 0.08727424 0.576057756 0.33666800
## [121,] 0.09502306 0.833619139 0.07135781
## [122,] 0.09781644 0.302899538 0.59928403
## [123,] 0.02779725 0.958096010 0.01410674
## [124,] 0.06007648 0.814380379 0.12554314
## [125,] 0.07653176 0.704561104 0.21890713
```