August 6, 2023

The results below are generated from an R script.

```r
# Assignment: ASSIGNMENT 9_2
# Name: Reppeto, Brian
# Date: 2023-07-31

## Set the working directory to the root of your DSC 520 directory
setwd("~/DSC520/Week 9")

library(readr)
library(caret)

## Load the `data`
data <- read.csv("binary-classifier-data.csv")

set.seed(42)  # For reproducibility
train_index <- createDataPartition(data$label, p = 0.8, list = FALSE)
train_data <- data[train_index, ]
test_data <- data[-train_index, ]

model <- glm(label ~ x + y, data = train_data, family = binomial)

summary(model)

##
## Call:
## glm(formula = label ~ x + y, family = binomial, data = train_data)
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  0.460877   0.130570   3.530 0.000416 ***
## x           -0.003124   0.002047  -1.526 0.126960
## y           -0.007875   0.002068  -3.808 0.000140 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 1661.9  on 1198  degrees of freedom
## Residual deviance: 1641.7  on 1196  degrees of freedom
## AIC: 1647.7
##
## Number of Fisher Scoring iterations: 4

predictions <- predict(model, newdata = test_data, type = "response")
```

```
print(predictions)
```

```
##         4         5         9        20        23        29        31        34        44
## 0.4048469 0.3963584 0.3789795 0.3858841 0.3937299 0.4064059 0.4005530 0.3989758 0.3970116
##        45        59        64        66        68        75        81        86        93
## 0.3902614 0.4912433 0.4895130 0.4927954 0.5105171 0.4914386 0.5052435 0.4894538 0.4949648
##        96       104       113       114       117       122       123       124       128
## 0.4952474 0.4349856 0.4352794 0.4382040 0.4385620 0.4332609 0.4332466 0.4333228 0.4353101
##       129       134       136       139       144       152       154       160       174
## 0.4348778 0.4293875 0.4348100 0.4312895 0.4390672 0.4348680 0.4329375 0.4351788 0.4252932
##       177       183       186       194       196       199       200       205       209
## 0.4262217 0.4114478 0.4280357 0.4019428 0.4084266 0.4897186 0.4839768 0.4907929 0.4933128
##       214       217       220       221       231       245       251       258       260
## 0.4838753 0.4866891 0.4849638 0.4829257 0.3873681 0.3907505 0.3879897 0.3877217 0.5349380
##       270       278       279       286       287       290       301       305       310
## 0.5317538 0.5361680 0.5433535 0.5387093 0.5429486 0.5395656 0.5444645 0.5377039 0.5399323
##       313       319       326       329       336       338       340       342       343
## 0.5450823 0.5008187 0.5018512 0.4933912 0.4952490 0.4967977 0.5049788 0.5066976 0.5036812
##       347       351       352       359       364       367       368       373       380
## 0.5042475 0.4932112 0.5047179 0.4985164 0.5010874 0.5061767 0.5107832 0.5260540 0.5182766
##       383       386       395       400       401       405       409       413       419
## 0.5345097 0.5378169 0.5180122 0.5211844 0.5247113 0.5203461 0.5232296 0.5262791 0.5316744
##       423       431       435       436       439       441       446       447       452
## 0.5325890 0.5429018 0.5349905 0.5420308 0.5451788 0.5326337 0.5390994 0.5400997 0.5415740
##       456       465       466       468       470       484       494       495       515
## 0.5301261 0.5366030 0.5379332 0.5318592 0.5296202 0.6058309 0.6104535 0.6166963 0.6076502
##       518       519       525       534       535       538       541       549       551
## 0.6098502 0.6111415 0.6100516 0.4028794 0.4010491 0.3907881 0.4048762 0.4103108 0.4032439
##       552       553       556       575       576       587       588       591       597
## 0.4017009 0.4024125 0.3948095 0.4030217 0.5401973 0.5436430 0.5406647 0.5434188 0.5406168
##       599       608       609       612       628       632       635       639       641
## 0.5450107 0.5594199 0.5523968 0.5384868 0.5535787 0.5574713 0.5684541 0.5633256 0.5593648
##       642       643       648       655       656       657       658       665       693
## 0.5527910 0.5539353 0.5647708 0.5497030 0.5574080 0.5523396 0.5567961 0.5474543 0.5041145
##       704       713       714       716       718       723       728       734       736
## 0.4990655 0.4989570 0.3685882 0.3643515 0.3695009 0.3700784 0.3663279 0.3604555 0.3651941
##       745       748       759       763       766       775       777       782       787
## 0.3704403 0.3695366 0.3661003 0.3714134 0.3669010 0.4632503 0.4630463 0.4649184 0.4681036
##       795       801       804       806       807       810       812       814       825
## 0.4568643 0.4726063 0.4566534 0.4512534 0.4582433 0.4571213 0.4712813 0.4715620 0.5047096
##       842       848       855       856       857       867       876       877       878
## 0.5122521 0.5196999 0.5149958 0.5098188 0.5057732 0.5235484 0.5190588 0.5085192 0.5181539
##       881       889       890       891       892       910       916       920       940
## 0.5171138 0.5210554 0.5167940 0.5191336 0.5171379 0.5163542 0.5221615 0.5219566 0.4316760
##       942       948       949       952       953       957       959       962       965
## 0.4320192 0.4381571 0.4322574 0.4348580 0.4364300 0.4280239 0.4277476 0.4393581 0.4309392
##       970       972       973       975       976       986       994      1003      1004
## 0.4321056 0.4261940 0.4387456 0.4348985 0.4338531 0.4356529 0.5368518 0.5261309 0.5320128
##      1008      1010      1012      1016      1019      1022      1028      1030      1031
## 0.4992513 0.5201869 0.5201184 0.5366243 0.5383631 0.5203700 0.5248956 0.5147527 0.5120258
##      1037      1040      1048      1059      1066      1080      1086      1088      1089
## 0.5182426 0.4454133 0.4452501 0.4501085 0.4504436 0.4445024 0.4465533 0.4485562 0.4472533
##      1095      1097      1099      1106      1115      1127      1131      1133      1139
## 0.4440121 0.5064534 0.5098135 0.5091205 0.5135906 0.5013144 0.5139128 0.5087114 0.5687760
```

```
##      1147      1153      1158      1161      1164      1166      1169      1175      1179
## 0.5721920 0.5806708 0.5811489 0.5684049 0.5774636 0.5598749 0.5560831 0.5458520 0.5588177
##      1191      1194      1203      1220      1227      1230      1247      1253      1255
## 0.5570438 0.5600346 0.5564487 0.5542140 0.5445378 0.5546050 0.5532934 0.5465872 0.5447842
##      1256      1259      1260      1261      1264      1270      1273      1274      1284
## 0.5460822 0.5458005 0.5490261 0.5416401 0.5491875 0.5530726 0.4538392 0.4515331 0.4406284
##      1291      1296      1299      1305      1308      1312      1314      1319      1334
## 0.4384443 0.4473023 0.4389325 0.4467838 0.4439730 0.4320967 0.4418670 0.4568220 0.4461078
##      1342      1343      1351      1355      1361      1374      1388      1392      1395
## 0.4551667 0.4464504 0.5171259 0.5077329 0.5129415 0.5129634 0.5101147 0.5089372 0.5146739
##      1398      1400      1405      1412      1414      1415      1424      1428      1434
## 0.5163131 0.5107736 0.5795533 0.5981800 0.5923009 0.5844120 0.5900947 0.5957915 0.5808095
##      1436      1443      1451      1470      1473      1475      1482      1483      1484
## 0.5955367 0.5954479 0.5926567 0.3964789 0.4105542 0.3959278 0.4160845 0.4021016 0.4017718
##      1490      1492
## 0.3868344 0.3981562

predicted_labels <- ifelse(predictions > 0.5, 1, 0)
accuracy <- mean(predicted_labels == test_data$label)

print(accuracy)

## [1] 0.5384615
```

The R session information (including the OS info, R version and all packages used):

```
sessionInfo()

## R version 4.3.0 (2023-04-21)
## Platform: aarch64-apple-darwin20 (64-bit)
## Running under: macOS Ventura 13.4.1
##
## Matrix products: default
## BLAS:   /System/Library/Frameworks/Accelerate.framework/Versions/A/Frameworks/vecLib.framework/Versio
## LAPACK: /Library/Frameworks/R.framework/Versions/4.3-arm64/Resources/lib/libRlapack.dylib;  LAPACK ve
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## time zone: America/New_York
## tzcode source: internal
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] foreign_0.8-84  lm.beta_1.7-2   lubridate_1.9.2 forcats_1.0.0   stringr_1.5.0
##  [6] dplyr_1.1.2     purrr_1.0.1     tidyr_1.3.0     tibble_3.2.1    tidyverse_2.0.0
## [11] readxl_1.4.3    caret_6.0-94    lattice_0.21-8  ggplot2_3.4.2   readr_2.1.4
##
## loaded via a namespace (and not attached):
##  [1] tidyselect_1.2.0     timeDate_4022.108    farver_2.1.1         fastmap_1.1.1
##  [5] pROC_1.18.4          digest_0.6.33        rpart_4.1.19         timechange_0.2.0
##  [9] lifecycle_1.0.3      survival_3.5-5       magrittr_2.0.3       compiler_4.3.0
## [13] rlang_1.1.1          tools_4.3.0          utf8_1.2.3           yaml_2.3.7
```

```
## [17] data.table_1.14.8    knitr_1.43           labeling_0.4.2       bit_4.0.5
## [21] plyr_1.8.8           withr_2.5.0          nnet_7.3-19          grid_4.3.0
## [25] stats4_4.3.0         fansi_1.0.4          xtable_1.8-4         colorspace_2.1-0
## [29] future_1.33.0        globals_0.16.2       scales_1.2.1         iterators_1.0.14
## [33] MASS_7.3-60          tinytex_0.45         cli_3.6.1            rmarkdown_2.23
## [37] crayon_1.5.2         generics_0.1.3       rstudioapi_0.15.0    future.apply_1.11.0
## [41] reshape2_1.4.4       tzdb_0.4.0           splines_4.3.0        parallel_4.3.0
## [45] cellranger_1.1.0     vctrs_0.6.3          hardhat_1.3.0        Matrix_1.6-0
## [49] hms_1.1.3            bit64_4.0.5          listenv_0.9.0        foreach_1.5.2
## [53] gower_1.0.1          recipes_1.0.6        glue_1.6.2           parallelly_1.36.0
## [57] codetools_0.2-19     stringi_1.7.12       gtable_0.3.3         munsell_0.5.0
## [61] pillar_1.9.0         htmltools_0.5.5      ipred_0.9-14         lava_1.7.2.1
## [65] R6_2.5.1             vroom_1.6.3          evaluate_0.21        highr_0.10
## [69] class_7.3-22         Rcpp_1.0.11          nlme_3.1-162         prodlim_2023.03.31
## [73] xfun_0.39            ModelMetrics_1.2.2.2 pkgconfig_2.0.3
```

```
Sys.time()
```

```
## [1] "2023-08-06 21:38:20 EDT"
```