|  |  |  |  |
| --- | --- | --- | --- |
|  | LR | LR+Lasso | NN |
| Origin dataset | $AUC  [1] 0.9249787  $threshold  [1] 0.41  $total\_accuracy  [1] 0.9134394  $confusion\_matrix  actual\_response  pred\_class 0 1  0 7088 473  1 240 436  $positive\_precision  [1] 0.6449704  $positive\_recall  [1] 0.479648  $negative\_precision  [1] 0.9374421  $negative\_recall  [1] 0.9672489 | $AUC  [1] 0.925106  $threshold  [1] 0.03  $total\_accuracy  [1] 0.9111327  $confusion\_matrix  actual\_response  pred\_class 0 1  0 7161 565  1 167 344  $positive\_precision  [1] 0.6731898  $positive\_recall  [1] 0.3784378  $negative\_precision  [1] 0.9268703  $negative\_recall  [1] 0.9772107 | Test AUC: 0.9379  Test Accuracy:  threshold 0.510000  accuracy 0.916474  accuracy\_check 0.916474  positive\_precision 0.519252  positive\_recall 0.652835  negative\_precision 0.965748  negative\_recall 0.941842 |
|  | Call:  glm(formula = y ~ ., family = "binomial", data = full\_train\_bccp)  Deviance Residuals:  Min 1Q Median 3Q Max  -5.9036 -0.3290 -0.1967 -0.1417 3.3040  Coefficients: (1 not defined because of singularities)  Estimate Std. Error z value Pr(>|z|)  (Intercept) -3.338880 0.148093 -22.546 < 2e-16 \*\*\*  jobentrepreneur -0.141085 0.133287 -1.059 0.289823  jobhousemaid 0.135082 0.157316 0.859 0.390525  jobmanagement -0.055452 0.092834 -0.597 0.550292  jobretired 0.463713 0.113165 4.098 4.17e-05 \*\*\*  jobself.employed -0.075421 0.130231 -0.579 0.562498  jobservices 0.002575 0.088177 0.029 0.976702  jobstudent 0.452538 0.119725 3.780 0.000157 \*\*\*  jobtechnician 0.149176 0.072499 2.058 0.039626 \*  jobunemployed 0.143216 0.137031 1.045 0.295959  jobunknown 0.200656 0.257623 0.779 0.436052  maritalmarried 0.008157 0.075180 0.109 0.913596  maritalsingle 0.102266 0.085710 1.193 0.232805  maritalunknown -0.111660 0.461173 -0.242 0.808686  educationbasic.6y 0.025368 0.131846 0.192 0.847424  educationbasic.9y -0.081533 0.103902 -0.785 0.432622  educationhigh.school 0.072666 0.095145 0.764 0.445020  educationilliterate 0.959618 1.019522 0.941 0.346580  educationprofessional.course 0.168434 0.107780 1.563 0.118110  educationuniversity.degree 0.345672 0.091723 3.769 0.000164 \*\*\*  educationunknown 0.166480 0.130350 1.277 0.201540  defaultunknown -0.418613 0.074174 -5.644 1.66e-08 \*\*\*  defaultyes -7.221093 139.129448 -0.052 0.958607  housingunknown -0.110378 0.153478 -0.719 0.472030  housingyes -0.007147 0.045451 -0.157 0.875057  loanunknown NA NA NA NA  loanyes -0.034646 0.063139 -0.549 0.583197  contacttelephone -0.893036 0.067400 -13.250 < 2e-16 \*\*\*  poutcomenonexistent 0.539427 0.104257 5.174 2.29e-07 \*\*\*  poutcomesuccess 0.839071 0.235215 3.567 0.000361 \*\*\*  age 0.017887 0.027918 0.641 0.521720  duration 1.175000 0.020813 56.454 < 2e-16 \*\*\*  campaign -0.091665 0.034473 -2.659 0.007837 \*\*  pdays -0.205432 0.045110 -4.554 5.26e-06 \*\*\*  previous -0.007138 0.032525 -0.219 0.826291  emp.var.rate -1.422511 0.036811 -38.643 < 2e-16 \*\*\*  cons.price.idx 0.767954 0.033985 22.597 < 2e-16 \*\*\*  cons.conf.idx 0.244791 0.019960 12.264 < 2e-16 \*\*\*  ---  Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1  (Dispersion parameter for binomial family taken to be 1)  Null deviance: 23277 on 32950 degrees of freedom  Residual deviance: 14170 on 32914 degrees of freedom  AIC: 14244  Number of Fisher Scoring iterations: 10 | $opt\_lambda\_lasso  [1] 0.0004023168  $opt\_lasso\_coefficients  38 x 1 sparse Matrix of class "dgCMatrix"  s0  (Intercept) -3.240085766  jobentrepreneur -0.101759551  jobhousemaid 0.068790534  jobmanagement -0.024443403  jobretired 0.454686692  jobself.employed -0.034214446  jobservices .  jobstudent 0.433259487  jobtechnician 0.139490293  jobunemployed 0.106934733  jobunknown 0.125840293  maritalmarried .  maritalsingle 0.085591888  maritalunknown -0.004234320  educationbasic.6y -0.012405746  educationbasic.9y -0.132058899  educationhigh.school .  educationilliterate 0.599202544  educationprofessional.course 0.090555664  educationuniversity.degree 0.263813436  educationunknown 0.085553613  defaultunknown -0.405447497  defaultyes .  housingunknown -0.052778568  housingyes .  loanunknown -0.007608956  loanyes -0.014321283  contacttelephone -0.856569815  poutcomenonexistent 0.510027798  poutcomesuccess 0.834466317  age 0.007057162  duration 1.162522308  campaign -0.077666398  pdays -0.200885129  previous .  emp.var.rate -1.395424537  cons.price.idx 0.738130891  cons.conf.idx 0.239016972 |  |
|  |  |  |  |
| Balanced dataset | $AUC  [1] 0.9293573  $threshold  [1] 0.36  $total\_accuracy  [1] 0.8592077  $confusion\_matrix  actual\_response  pred\_class 0 1  0 752 75  1 188 853  $positive\_precision  [1] 0.8194044  $positive\_recall  [1] 0.919181  $negative\_precision  [1] 0.9093108  $negative\_recall  [1] 0.8 | $AUC  [1] 0.9289177  $threshold  [1] 0.01  $total\_accuracy  [1] 0.8543897  $confusion\_matrix  actual\_response  pred\_class 0 1  0 803 135  1 137 793  $positive\_precision  [1] 0.8526882  $positive\_recall  [1] 0.8545259  $negative\_precision  [1] 0.8560768  $negative\_recall  [1] 0.8542553 | Test AUC: 0.9310  Test Accuracy:  threshold 0.790000  accuracy 0.860278  accuracy\_check 0.860278  positive\_precision 0.934267  positive\_recall 0.812559  negative\_precision 0.787234  negative\_recall 0.923845 |
|  | Call:  glm(formula = y ~ ., family = "binomial", data = full\_train\_bccp)  Deviance Residuals:  Min 1Q Median 3Q Max  -6.8752 -0.4458 -0.1277 0.5131 2.7552  Coefficients: (1 not defined because of singularities)  Estimate Std. Error z value Pr(>|z|)  (Intercept) -0.17538 0.23607 -0.743 0.457536  jobentrepreneur -0.39157 0.19858 -1.972 0.048632 \*  jobhousemaid 0.18316 0.24455 0.749 0.453867  jobmanagement -0.10380 0.14555 -0.713 0.475742  jobretired 0.64833 0.18548 3.495 0.000473 \*\*\*  jobself.employed -0.28134 0.20239 -1.390 0.164503  jobservices -0.06247 0.13485 -0.463 0.643180  jobstudent 0.75815 0.20250 3.744 0.000181 \*\*\*  jobtechnician 0.06757 0.11449 0.590 0.555046  jobunemployed 0.41322 0.21308 1.939 0.052474 .  jobunknown 0.47174 0.38912 1.212 0.225383  maritalmarried -0.02954 0.11780 -0.251 0.801960  maritalsingle 0.06276 0.13306 0.472 0.637184  maritalunknown -0.44135 0.68199 -0.647 0.517530  educationbasic.6y -0.26317 0.21054 -1.250 0.211315  educationbasic.9y -0.21769 0.16384 -1.329 0.183947  educationhigh.school -0.10896 0.15484 -0.704 0.481639  educationilliterate 0.27144 1.23402 0.220 0.825900  educationprofessional.course 0.05143 0.17474 0.294 0.768522  educationuniversity.degree 0.43965 0.14991 2.933 0.003359 \*\*  educationunknown 0.05622 0.21172 0.266 0.790592  defaultunknown -0.51112 0.11380 -4.491 7.07e-06 \*\*\*  housingunknown -0.01354 0.24238 -0.056 0.955439  housingyes 0.04075 0.07135 0.571 0.567887  loanunknown NA NA NA NA  loanyes -0.14344 0.09881 -1.452 0.146572  contacttelephone -0.72783 0.10035 -7.253 4.08e-13 \*\*\*  poutcomenonexistent 0.46234 0.17932 2.578 0.009928 \*\*  poutcomesuccess 0.97433 0.45326 2.150 0.031585 \*  age 0.04560 0.04974 0.917 0.359284  duration 2.34788 0.06332 37.081 < 2e-16 \*\*\*  campaign -0.14020 0.04343 -3.228 0.001246 \*\*  pdays -0.33381 0.14300 -2.334 0.019577 \*  previous -0.08312 0.08640 -0.962 0.336024  emp.var.rate -1.76088 0.06559 -26.848 < 2e-16 \*\*\*  cons.price.idx 0.74841 0.06169 12.132 < 2e-16 \*\*\*  cons.conf.idx 0.28328 0.03686 7.686 1.52e-14 \*\*\*  ---  Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1  (Dispersion parameter for binomial family taken to be 1)  Null deviance: 10360.8 on 7473 degrees of freedom  Residual deviance: 5276.4 on 7438 degrees of freedom  AIC: 5348.4  Number of Fisher Scoring iterations: 6 | $opt\_lambda\_lasso  [1] 0.004632514  $opt\_lasso\_coefficients  37 x 1 sparse Matrix of class "dgCMatrix"  s0  (Intercept) -0.067331652  jobentrepreneur -0.197161296  jobhousemaid .  jobmanagement .  jobretired 0.571581476  jobself.employed -0.011048088  jobservices -0.010062958  jobstudent 0.533445121  jobtechnician .  jobunemployed 0.164930969  jobunknown 0.005647422  maritalmarried .  maritalsingle 0.020126688  maritalunknown .  educationbasic.6y -0.121088274  educationbasic.9y -0.156574395  educationhigh.school -0.050947411  educationilliterate .  educationprofessional.course .  educationuniversity.degree 0.327212118  educationunknown .  defaultunknown -0.401166734  housingunknown .  housingyes .  loanunknown .  loanyes -0.010780495  contacttelephone -0.512798760  poutcomenonexistent 0.243256196  poutcomesuccess 0.901413653  age .  duration 2.137849593  campaign -0.086350607  pdays -0.245739352  previous .  emp.var.rate -1.506759145  cons.price.idx 0.513634200  cons.conf.idx 0.221030902 |  |