**Assignment No. 17.1**

|  |  |
| --- | --- |
| **Weight Lifting Exercises monitored with Inertial Measurement Units Data Set**  *Download*: [Data Folder](https://archive.ics.uci.edu/ml/machine-learning-databases/00273/), [Data Set Description](https://archive.ics.uci.edu/ml/datasets/Weight+Lifting+Exercises+monitored+with+Inertial+Measurement+Units)  **Abstract**: Six young health subjects were asked to perform 5 variations of the biceps curl weight lifting exercise. One of the variations is the one predicted by the health professional. |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Set Characteristics:** | Multivariate | **Number of Instances:** | 39242 | **Area:** | Physical |
| **Attribute Characteristics:** | Real | **Number of Attributes:** | 152 | **Date Donated** | 2013-11-24 |
| **Associated Tasks:** | Classification | **Missing Values?** | Yes | **Number of Web Hits:** | 31151 |

<http://groupware.les.inf.puc-rio.br/har#dataset>

**5. Problem Statement**

1. Use the below given data set

Data Set

2. Perform the below given activities:

a. Create classification model using logistic regression model

> bicepfitcomp <- multinom(classe~.,data = compbicepsdata)

# weights: 260 (204 variable)

initial value 6476.378160

iter 10 value 2705.232017

iter 20 value 1505.079428

iter 30 value 1200.663807

iter 40 value 1077.016253

iter 50 value 1041.946052

iter 60 value 1012.673881

iter 70 value 994.620772

iter 80 value 981.990370

iter 90 value 975.324537

iter 100 value 967.878856

final value 967.878856

stopped after 100 iterations

> summary(bicepfitcomp)

Call:

multinom(formula = classe ~ ., data = compbicepsdata)

Coefficients:

(Intercept) roll\_belt pitch\_belt yaw\_belt total\_accel\_belt gyros\_belt\_y

B -0.0002372731 0.01175230 -0.02249378 -0.025549965 -0.21028458 -0.0005144366

C 0.0005853607 0.03450716 0.09677406 -0.003970619 -0.02268163 -0.0005289241

D -0.0010659263 0.12447666 0.19419055 -0.010605141 -0.17195345 -0.0029090536

E 0.0038049666 -0.07350191 -0.08458064 -0.007425632 0.24096957 0.0026106300

gyros\_belt\_z accel\_belt\_x accel\_belt\_y accel\_belt\_z magnet\_belt\_x magnet\_belt\_y

B 0.0005451308 0.0432776835 0.042139353 0.005286005 0.001459398 0.021592001

C 0.0015753524 0.0235642477 0.026900534 -0.015843231 0.016394403 0.004260078

D -0.0399020278 0.0008120461 0.036109852 0.040857912 0.014269283 0.001896438

E 0.0385820881 0.0296842785 0.006335348 -0.002456551 0.003498586 0.022572418

magnet\_belt\_z roll\_arm pitch\_arm yaw\_arm total\_accel\_arm

B 0.002996217 -0.0013338003 -0.03084709 -0.0071705203 -0.054668844

C 0.016426148 0.0004760502 0.02584941 0.0055671292 -0.016307121

D 0.009514537 -0.0062698188 -0.03199977 -0.0021545966 -0.002521171

E -0.005411867 0.0020123272 -0.03356504 -0.0009613611 -0.018757410

var\_yaw\_arm gyros\_arm\_x gyros\_arm\_y gyros\_arm\_z accel\_arm\_x accel\_arm\_y

B 0.0002674587 -0.17519343 0.154399058 -0.01304219 -0.0176590473 0.01899797

C -0.0001553531 0.18596529 -0.116225552 0.01208778 0.0051583452 0.00831638

D 0.0003035653 0.01380912 0.002043667 0.01790310 0.0002675234 0.03058092

E 0.0003312353 0.06586303 -0.048676604 -0.04853682 -0.0188811424 0.02075397

accel\_arm\_z magnet\_arm\_x magnet\_arm\_y magnet\_arm\_z roll\_dumbbell pitch\_dumbbell

B 0.0094660433 -0.0001809815 0.007734291 -0.021120196 -0.003172449 -0.037998924

C 0.0004205292 -0.0026455414 -0.024688611 0.009828972 -0.009628103 -0.008003234

D 0.0113405226 -0.0046200612 -0.008322441 -0.007576511 0.015086122 -0.032395644

E 0.0082740748 -0.0029346877 -0.008651967 -0.011365802 -0.011939614 -0.037850449

yaw\_dumbbell gyros\_dumbbell\_x gyros\_dumbbell\_y gyros\_dumbbell\_z accel\_dumbbell\_x

B -0.005323319 -0.0503817354 0.01664894 0.03323885 0.014573368

C -0.013073134 0.0262165489 -0.03054899 -0.00941461 -0.033554473

D 0.001621521 -0.0253330764 0.05383329 -0.02873176 0.006047909

E -0.007329583 0.0004576297 0.00319873 0.06901222 0.006837573

accel\_dumbbell\_y accel\_dumbbell\_z magnet\_dumbbell\_x magnet\_dumbbell\_y

B 0.005720934 0.02608163 0.0037635028 -0.002384624

C -0.010867989 0.03542123 -0.0005536248 0.011255899

D -0.019190641 -0.00614260 -0.0009816717 0.013166484

E 0.011766711 0.01937076 0.0026157065 -0.004148734

magnet\_dumbbell\_z roll\_forearm pitch\_forearm yaw\_forearm gyros\_forearm\_x

B -0.009582912 0.005727105 0.02983237 0.002040554 0.07208931

C -0.016924288 0.014682638 -0.02436004 0.002570271 -0.03142696

D -0.005646247 0.003944888 0.04849315 0.001720817 -0.01674027

E -0.002275761 0.005422465 0.03246909 0.002858337 -0.01817254

gyros\_forearm\_y gyros\_forearm\_z accel\_forearm\_x accel\_forearm\_y accel\_forearm\_z

B -0.268153484 -0.063296376 -0.0003332101 0.002295670 0.03009503

C 0.162956820 0.045584009 0.0181337622 0.003630156 0.01603708

D -0.000860937 0.010477496 -0.0008252225 0.008443925 0.01648809

E 0.043811652 0.007162214 0.0077226658 0.004725790 0.03059804

magnet\_forearm\_x magnet\_forearm\_y magnet\_forearm\_z

B 0.005235069 -0.005693512 0.002801811

C -0.001895448 -0.007925721 0.002147247

D 0.006529693 -0.008295289 0.005841748

E 0.001707951 -0.004572496 -0.004863730

Std. Errors:

(Intercept) roll\_belt pitch\_belt yaw\_belt total\_accel\_belt gyros\_belt\_y

B 0.0002060375 0.03303294 0.03827279 0.008338866 0.016755932 0.0001520783

C 0.0001139925 0.04160232 0.03865763 0.011638087 0.006799105 0.0001343443

D 0.0002367491 0.03262314 0.04414344 0.008162590 0.025473833 0.0001327943

E 0.0001840835 0.02834678 0.03571589 0.007676338 0.042287833 0.0002786222

gyros\_belt\_z accel\_belt\_x accel\_belt\_y accel\_belt\_z magnet\_belt\_x magnet\_belt\_y

B 0.0008947565 0.01759439 0.02206990 0.01662742 0.005128151 0.003533092

C 0.0014919180 0.02574402 0.02677123 0.02510770 0.008487274 0.004436176

D 0.0012396566 0.01856098 0.02070264 0.01737144 0.005105117 0.004060889

E 0.0011856899 0.01540356 0.01748604 0.01479877 0.004248129 0.003150906

magnet\_belt\_z roll\_arm pitch\_arm yaw\_arm total\_accel\_arm var\_yaw\_arm

B 0.004260996 0.001064472 0.003618316 0.001056532 0.01300283 2.672809e-05

C 0.006993094 0.001387666 0.005547831 0.002390738 0.02303444 6.170073e-05

D 0.004804969 0.002369703 0.007704793 0.002279384 0.01817832 3.198828e-05

E 0.004015773 0.002131556 0.006942213 0.001673882 0.01548855 3.005427e-05

gyros\_arm\_x gyros\_arm\_y gyros\_arm\_z accel\_arm\_x accel\_arm\_y accel\_arm\_z

B 0.03531536 0.01701746 0.002968646 0.002262810 0.006895352 0.003818676

C 0.03746585 0.01696352 0.004286688 0.003820480 0.010142318 0.005618606

D 0.03711213 0.01604330 0.002912440 0.004170109 0.010145629 0.005325612

E 0.03138471 0.01313876 0.002831900 0.002676451 0.008005717 0.004281775

magnet\_arm\_x magnet\_arm\_y magnet\_arm\_z roll\_dumbbell pitch\_dumbbell yaw\_dumbbell

B 0.0007353163 0.002887046 0.001725630 0.004851351 0.009164946 0.003524266

C 0.0012489740 0.004186684 0.002500142 0.007235517 0.016718279 0.005436066

D 0.0013161022 0.004122577 0.002612345 0.004801545 0.009911008 0.003387228

E 0.0008832857 0.003475858 0.002105143 0.003976969 0.008449830 0.002810773

gyros\_dumbbell\_x gyros\_dumbbell\_y gyros\_dumbbell\_z accel\_dumbbell\_x

B 0.002942541 0.007428022 0.001255535 0.009539125

C 0.001319951 0.001860795 0.001256278 0.014521740

D 0.002535123 0.006754199 0.001307310 0.008386619

E 0.005288278 0.015585864 0.001331497 0.007022964

accel\_dumbbell\_y accel\_dumbbell\_z magnet\_dumbbell\_x magnet\_dumbbell\_y

B 0.006987430 0.007210797 0.001798930 0.002657777

C 0.010527462 0.010345043 0.002408102 0.004050727

D 0.008499006 0.006702829 0.001974735 0.003237278

E 0.006763015 0.005453594 0.001567464 0.002571025

magnet\_dumbbell\_z roll\_forearm pitch\_forearm yaw\_forearm gyros\_forearm\_x

B 0.003099838 0.001853614 0.009710982 0.001827859 0.006574122

C 0.005070188 0.003216830 0.017705754 0.002816770 0.003428270

D 0.004179649 0.001987070 0.012548873 0.002038947 0.001788786

E 0.003377088 0.001903500 0.010520500 0.001894078 0.002678267

gyros\_forearm\_y gyros\_forearm\_z accel\_forearm\_x accel\_forearm\_y accel\_forearm\_z

B 0.03655776 0.010100663 0.002615981 0.002153607 0.004506633

C 0.02588567 0.008245959 0.004162182 0.003490317 0.006228249

D 0.03220798 0.009267936 0.003220209 0.002912721 0.005418593

E 0.03253806 0.009012017 0.002645170 0.002222830 0.004607988

magnet\_forearm\_x magnet\_forearm\_y magnet\_forearm\_z

B 0.001353753 0.001100030 0.001521428

C 0.002308843 0.001395941 0.001900739

D 0.001543259 0.001518322 0.001732648

E 0.001269182 0.001182323 0.001480946

Residual Deviance: 1935.758

AIC: 2343.758

> summary(stepbicepcomp)

Call:

multinom(formula = classe ~ roll\_belt + pitch\_belt + yaw\_belt +

total\_accel\_belt + accel\_belt\_x + accel\_belt\_z + magnet\_belt\_x +

magnet\_belt\_y + magnet\_belt\_z + roll\_arm + pitch\_arm + yaw\_arm +

total\_accel\_arm + gyros\_arm\_x + accel\_arm\_x + accel\_arm\_y +

accel\_arm\_z + magnet\_arm\_x + magnet\_arm\_y + magnet\_arm\_z +

roll\_dumbbell + pitch\_dumbbell + yaw\_dumbbell + accel\_dumbbell\_x +

accel\_dumbbell\_y + accel\_dumbbell\_z + magnet\_dumbbell\_x +

magnet\_dumbbell\_y + magnet\_dumbbell\_z + roll\_forearm + pitch\_forearm +

accel\_forearm\_x + accel\_forearm\_y + accel\_forearm\_z + magnet\_forearm\_x +

magnet\_forearm\_z, data = compbicepsdata)

Coefficients:

(Intercept) roll\_belt pitch\_belt yaw\_belt total\_accel\_belt accel\_belt\_x

B 0.001085800 -0.05989708 -0.34447517 -0.063551220 -0.1522052 0.036211649

C 0.001499364 0.02080533 -0.11514732 -0.007371668 -0.0293539 0.002743414

D -0.004516050 0.25005045 0.11040387 -0.036903685 -0.2128983 -0.024151096

E 0.005897056 0.01511210 -0.05542712 -0.028551608 0.1095586 0.015005315

accel\_belt\_z magnet\_belt\_x magnet\_belt\_y magnet\_belt\_z roll\_arm pitch\_arm

B -0.044615777 -0.024766500 0.050245217 0.04001215 0.004561297 -0.040732287

C 0.005538916 0.006923779 0.025259670 0.02803533 0.001219662 0.007067134

D 0.051938597 -0.002871677 0.003341317 0.02332069 -0.002476991 -0.045256737

E -0.002399561 0.002830972 0.018520601 0.01427578 0.004980785 0.002225469

yaw\_arm total\_accel\_arm gyros\_arm\_x accel\_arm\_x accel\_arm\_y accel\_arm\_z

B -0.012096183 -0.1244547 -0.57786646 -0.036274865 0.002083967 0.022377331

C -0.001338214 -0.1286565 -0.07398397 -0.014709896 -0.023230548 0.007753600

D 0.003368509 -0.1051244 -0.05484324 -0.002192664 0.037636255 -0.006079281

E 0.002779999 -0.0309253 -0.09574868 -0.024112764 0.013445996 0.018469393

magnet\_arm\_x magnet\_arm\_y magnet\_arm\_z roll\_dumbbell pitch\_dumbbell yaw\_dumbbell

B 0.003963846 0.015402704 -0.0336496304 -0.013446823 -0.027055297 -0.006430291

C 0.006852228 -0.005836607 0.0002513612 -0.001967158 0.002045318 -0.008468712

D -0.003731562 -0.013183910 -0.0039188038 0.013340890 -0.007935169 -0.001080339

E 0.006545164 -0.001827149 -0.0181753292 -0.016519675 -0.014140249 -0.003184980

accel\_dumbbell\_x accel\_dumbbell\_y accel\_dumbbell\_z magnet\_dumbbell\_x

B 0.008851740 0.004570004 0.032308409 0.0075601145

C -0.023560779 -0.021326691 0.057821677 0.0006794829

D -0.005940207 -0.044192281 -0.001725695 -0.0006964841

E -0.001276445 0.022208815 0.019242804 -0.0024280054

magnet\_dumbbell\_y magnet\_dumbbell\_z roll\_forearm pitch\_forearm accel\_forearm\_x

B -0.012963454 -0.005361983 0.0038868955 0.026897246 -0.004085540

C 0.004689637 -0.026079744 0.0036987714 -0.005028206 0.005604959

D 0.022357928 -0.011671849 0.0016477241 0.063664553 -0.012995531

E 0.003489307 -0.008666058 0.0004153057 0.024837920 0.002699922

accel\_forearm\_y accel\_forearm\_z magnet\_forearm\_x magnet\_forearm\_z

B -0.010352398 0.02261003 0.0031944488 0.006975792

C -0.016221119 0.02092242 0.0005094189 0.005772858

D -0.013395220 0.02668166 0.0076040534 0.012535002

E -0.006228993 0.01807420 0.0002290551 0.002652465

Std. Errors:

(Intercept) roll\_belt pitch\_belt yaw\_belt total\_accel\_belt accel\_belt\_x

B 0.0005065241 0.09842528 0.1152816 0.06154653 0.2206990 0.03055463

C 0.0004596368 0.10138432 0.1581579 0.07089144 0.2173142 0.03400464

D 0.0004286271 0.09838541 0.1210163 0.05977318 0.2310572 0.03417497

E 0.0006135713 0.08013663 0.1104517 0.05912308 0.1815983 0.02764298

accel\_belt\_z magnet\_belt\_x magnet\_belt\_y magnet\_belt\_z roll\_arm pitch\_arm

B 0.03243080 0.015292139 0.009266008 0.010058508 0.001471524 0.005145573

C 0.03482442 0.013494292 0.010720206 0.011377679 0.001655957 0.004449779

D 0.03574290 0.013358780 0.009225925 0.010409995 0.003343126 0.012588863

E 0.02789156 0.009125821 0.007768502 0.008973419 0.002019155 0.005662242

yaw\_arm total\_accel\_arm gyros\_arm\_x accel\_arm\_x accel\_arm\_y accel\_arm\_z

B 0.001417508 0.02433210 0.09258340 0.003540041 0.009640142 0.005507673

C 0.001951459 0.02802010 0.08931017 0.003552119 0.010874656 0.006020719

D 0.003147798 0.03096983 0.11788110 0.007516274 0.015811322 0.008647609

E 0.003356571 0.03348369 0.08684873 0.005248106 0.011716402 0.006065650

magnet\_arm\_x magnet\_arm\_y magnet\_arm\_z roll\_dumbbell pitch\_dumbbell yaw\_dumbbell

B 0.001186354 0.004317067 0.002604335 0.010717077 0.01691652 0.007470021

C 0.001294054 0.004455723 0.002830441 0.011843187 0.02288895 0.008608133

D 0.002210893 0.006626808 0.004137382 0.009520483 0.01769786 0.006436948

E 0.001872809 0.004748619 0.002920305 0.008061067 0.01426679 0.005541370

accel\_dumbbell\_x accel\_dumbbell\_y accel\_dumbbell\_z magnet\_dumbbell\_x

B 0.02133013 0.01386964 0.01264740 0.003487219

C 0.02743723 0.01549534 0.01435596 0.003807096

D 0.01639718 0.01569323 0.01311369 0.003323226

E 0.01291102 0.01143457 0.01044102 0.002438778

magnet\_dumbbell\_y magnet\_dumbbell\_z roll\_forearm pitch\_forearm accel\_forearm\_x

B 0.005523935 0.004707408 0.001908924 0.01640010 0.003783434

C 0.006127360 0.006166699 0.002518786 0.01720564 0.004354029

D 0.005917606 0.006536798 0.002280253 0.02190423 0.004802679

E 0.004198999 0.005360569 0.001825509 0.01445685 0.003631499

accel\_forearm\_y accel\_forearm\_z magnet\_forearm\_x magnet\_forearm\_z

B 0.001955983 0.006610129 0.002279573 0.002115412

C 0.002228017 0.007620782 0.002620610 0.002436060

D 0.002878442 0.009791010 0.002870466 0.002893510

E 0.002167127 0.007766838 0.002252621 0.002307267

Residual Deviance: 1017.457

AIC: 1313.457

d. Report the variable importance

Since I have used the multinom function for the categorical multinomial logistic function, the output does not readily show the p values of variables. So they are calculated using the wald and z statistics.

The following are the statistically significant variables, with p-values less than 0.05. That is at the statistical significance level of 5%.

roll\_belt; pitch\_belt; magent\_belt\_y, magnet\_belt\_z; roll\_arm; pitch\_arm; yaw\_arm; total\_accel\_arm; gyros\_arm\_x; accel\_arm\_x; accel\_arm\_z; magnet\_arm\_x; magnet\_arm\_y; magnet\_arm\_z; accel\_dumbell\_y; accel\_dumbell\_z; magnet\_dumbell\_x; magnet\_dumbell\_y; magnet\_dumbell\_z; roll\_forearm; pitch\_forearm; accel\_forearm\_x; accel\_forearm\_y; accel\_forearm\_z; magnet\_forearm\_z

> pcs

(Intercept) roll\_belt pitch\_belt yaw\_belt total\_accel\_belt accel\_belt\_x

B 0.03206253 0.54282017 0.00280699 0.3018043 0.4904139 0.2359604

C 0.00110605 0.83740613 0.46658121 0.9171810 0.8925519 0.9356983

D 0.00000000 0.01103654 0.36160760 0.5369740 0.3568366 0.4797595

E 0.00000000 0.85042265 0.61579265 0.6291538 0.5463079 0.5872499

accel\_belt\_z magnet\_belt\_x magnet\_belt\_y magnet\_belt\_z roll\_arm pitch\_arm

B 0.1689076 0.1053273 5.876106e-08 6.951484e-05 0.001937107 2.442491e-15

C 0.8736274 0.6078887 1.845963e-02 1.373716e-02 0.461408303 1.122414e-01

D 0.1461915 0.8297942 7.172279e-01 2.507660e-02 0.458741633 3.244138e-04

E 0.9314411 0.7563971 1.712265e-02 1.116330e-01 0.013633922 6.942924e-01

yaw\_arm total\_accel\_arm gyros\_arm\_x accel\_arm\_x accel\_arm\_y accel\_arm\_z

B 0.0000000 3.140143e-07 4.331797e-10 0.000000e+00 0.82885058 4.845905e-05

C 0.4928706 4.399055e-06 4.074477e-01 3.455523e-05 0.03266232 1.978087e-01

D 0.2845671 6.877583e-04 6.417581e-01 7.704991e-01 0.01729687 4.820549e-01

E 0.4075426 3.556983e-01 2.702546e-01 4.336528e-06 0.25112480 2.327455e-03

magnet\_arm\_x magnet\_arm\_y magnet\_arm\_z roll\_dumbbell pitch\_dumbbell yaw\_dumbbell

B 8.341679e-04 0.0003599042 0.000000e+00 0.2095840 0.1097448 0.3893411

C 1.189103e-07 0.1902254900 9.292358e-01 0.8680779 0.9287972 0.3252121

D 9.144808e-02 0.0466481191 3.435522e-01 0.1611295 0.6538871 0.8667138

E 4.743480e-04 0.7004041651 4.853278e-10 0.0404312 0.3216218 0.5654509

accel\_dumbbell\_x accel\_dumbbell\_y accel\_dumbbell\_z magnet\_dumbbell\_x

B 0.6781509 0.74178009 0.010632550 0.03016254

C 0.3904975 0.16871976 0.000056322 0.85834761

D 0.7171502 0.00486242 0.895304727 0.83399493

E 0.9212456 0.05210665 0.065328903 0.31945293

magnet\_dumbbell\_y magnet\_dumbbell\_z roll\_forearm pitch\_forearm accel\_forearm\_x

B 0.0189364910 2.546814e-01 0.04173315 0.100991519 0.280209092

C 0.4440571238 2.346018e-05 0.14197563 0.770101735 0.197988386

D 0.0001579627 7.417042e-02 0.46992204 0.003655011 0.006812118

E 0.4059818177 1.059581e-01 0.82003395 0.085783249 0.457195249

accel\_forearm\_y accel\_forearm\_z magnet\_forearm\_x magnet\_forearm\_z

B 1.205343e-07 0.0006250316 0.16111354 9.751351e-04

C 3.326228e-13 0.0060429287 0.84587093 1.780000e-02

D 3.261337e-06 0.0064278415 0.00807145 1.476879e-05

E 4.049118e-03 0.0199600138 0.91900764 2.503030e-01

e. Report the unimportant variables

yaw\_belt; total\_accel\_belt; accel\_belt\_x; accel\_belt\_z; magnet\_belt\_x;

accel\_arm\_y; accel\_arm\_z; roll\_dumbbell; pitch\_dumbbell; yaw\_dumbbell; accel\_dumbbell\_x

f. Interpret the results

(Intercept) roll\_belt pitch\_belt magnet\_belt\_y

B 0.001085800 -0.05989708 -0.34447517 0.050245217

magnet\_belt\_z roll\_arm pitch\_arm yaw\_arm

0.04001215 0.004561297 -0.040732287 -0.012096183

total\_accel\_arm gyros\_arm\_x accel\_arm\_x accel\_arm\_y

-0.1244547 -0.57786646 -0.036274865 0.002083967

magnet\_arm\_x magnet\_arm\_y magnet\_arm\_z accel\_dumbbell\_y

0.003963846 0.015402704 -0.0336496304 0.004570004

accel\_dumbbell\_ z magnet\_dumbbell\_x magnet\_dumbbell\_y

0.032308409 0.0075601145 -0.012963454 magnet\_dumbbell\_z roll\_forearm pitch\_forearm

-0.005361983 0.0038868955 0.026897246

accel\_forearm\_x accel\_forearm\_y accel\_forearm\_z

-0.004085540 -0.010352398 0.02261003

magnet\_forearm\_x magnet\_forearm\_z

0.0031944488 0.006975792

Multinomial Logistic Regression, takes one of the dependent categorical variable as the reference variable and the coefficients of the other dependent variables are reported by r. So for the sake of example, the output of coefficients related to categorical dependent variable B has been chosen for interpretation.

The impact of roll\_belt: The regression output shows that ***1 unit of increase in the reading of the roll\_belt would decrease the log of odds of an instance to be classified as category B movement than category A movement by 0.0598.***

The impact of pitch\_forearm: The regression output shows that ***1 unit of increase in the reading of the pitch\_forearm would increase the log of odds of an instance to be classified as category B movement than category A movement by 0.0268***

In this way for each of the significant predictor variable, the value would be summed up to arrive at the final log of odds value for an instance to be in the category B than category A.

g. Visualize the results

> head(predbicep)

A B C D E

1 0.001028824 7.529275e-14 1.911687e-09 1.503249e-06 0.9989697

2 0.002053749 2.547153e-14 3.001786e-09 3.048458e-06 0.9979432

3 0.001247461 4.057900e-14 3.724685e-09 4.251747e-06 0.9987483

4 0.002040355 2.025101e-14 7.987469e-09 9.508320e-06 0.9979501

5 0.002414314 2.232786e-14 8.871471e-09 1.126754e-05 0.9975744

6 0.002242910 1.520833e-14 2.293195e-08 1.555579e-05 0.9977415

> curve <- multiclass.roc(classe ~ predbicep, data = compbicepsdata)

Error in multiclass.roc(classe ~ predbicep, data = compbicepsdata) :

could not find function "multiclass.roc"

> predbicep <- predict(stepbicepcomp, compbicepsdata, type='probs’)

> nrow(compbicepsdata)

[1] 4024

> nrow(predbicep)

[1] 4024

> curve <- multiclass.roc(classe ~ predclass, data = compbicepsdata)

Error in multiclass.roc(classe ~ predclass, data = compbicepsdata) :

could not find function "multiclass.roc"

> curve <- multiclass.roc(compbicepsdata$classe ~ predclass)

Error in multiclass.roc(compbicepsdata$classe ~ predclass) :

could not find function "multiclass.roc"

> table(compbicepsdata$classe)

A B C D E

1365 901 112 276 1370

> table(predclass)

predclass

A B C D E

1372 892 114 274 1372

> original <- table(compbicepsdata$classe)

> predicted <- table(predclass)

> total <-rbind(original, predicted)

> total <- t(total)

> total

original predicted

A 1365 1372

B 901 892

C 112 114

D 276 274

E 1370 1372

CONFUSION MATRIX:

> table(predclass, compbicepsdata$classe)

predclass A B C D E

A 1340 13 19 0 0

B 24 864 4 0 0

C 1 24 88 0 1

D 0 0 0 273 1

E 0 0 1 3 1368

MISCLASSIFICATION ERROR:

> mean(as.character(predclass) != as.character(compbicepsdata$classe))

[1] 0.02261431